Fifth National Report
of the Republic of Croatia
to the Convention on Biological Diversity

Croatia, 2014

Executive summary

The Fifth Report (NR5) covers the period from 2009-2013, concentrating on the latest developments in conservation of biodiversity of the Republic of Croatia[1]. It should be mentioned that the main efforts of Croatia during the reporting period were concentrated on preparatory work for accession to the European Union. Apart from harmonization of national legislation with EU *acquis*, the main activities of nature protection sector were related to preparation of ecological network Natura 2000. For that purpose an extensive research work was initiated, with focus on inventorying biodiversity and establishing the framework for monitoring. Republic of Croatia acceded to the EU on 1st July 2013. The new Nature Protection Act was adopted by Croatian parliament in June 2013 while the Regulation on Ecological Network was adopted in September 2013 by the Government of Croatia.

The Report is structured in three main parts. The first one deals with an update of biodiversity status, trends and threats in the reporting period starting from 2009. Information is extracted mainly from the *Report on State of Nature of Republic of Croatia for the period 2008-2012* that was prepared by the State Institute for Nature Protection (SINP) in 2013/14.

The issue of ecosystem services, related to implications of biodiversity for human well-being, has been introduced through the implementation of the various projects and studies using integrated approach to determine the relationship between biodiversity and ecosystem services and their values. Recent Study for Freshwater Ecosystem Services was conducted within the GEF/UNDP project National Biodiversity Planning to Support the Implementation of the CBD 2011-2020 Strategic Plan in Croatia (2012 - 2014). Demonstration of the benefits and values of freshwater ecosystems and biodiversity at a national level were included through freshwater ecosystems valuation study in the Danube basin, with the overall aim to strengthen the link between biodiversity of freshwater ecosystems and human well-being and their contribution to economic development.

The second part of NR5 analyses the implementation of the National Biodiversity Strategy and Action Plan from 2008 (NBSAP 2008) on the level of individual strategic guidelines. The third part of the NR5 gives an overview of contribution of Croatia to the achievement of 2020 Aichi Targets.

I. An update on biodiversity status, trends and threats

Ecosystems and habitats

Comparing to its relatively small area of 56,594 km², Croatia is endowed with exceptional richness and diversity of species and habitats. Geomorphologic differences between lowland, mountain and coastal Croatia as well as the great diversity of terrestrial, marine and underground habitats have resulted in a wealth of species. The northern part of Croatia is characterized in lowland rivers with well-preserved willow-poplar gallery forests and Common oak forests, wet grasslands and extensive marshes.

The mountain karst area of Dinaric Alps is covered with the beech and the mixed beech-fir forests that represent the most western extensive forest complex in this part of the Europe, with significant populations of Brown bear, Wolf and Eurasian lynx. Karst area covers 46% of Croatian territory. Karst ecosystems represent the uniqueness and richness of global value and contain a high level of endemic taxa in underground habitats. Croatia has a great variability of terrestrial, water and interstitial underground habitats. So far, there are about 7000 registered caves, but due to the intensification of research, significant increase of new discoveries is expected. As a part of Dinaric mountain range, which is characterized by the highest diversity of cave fauna in the world, Croatian cave fauna, with a large number of endemic and relict species is extremely rich at European and global scale. The current number of terrestrial and aquatic cave invertebrates in Croatia exceeds 500, and about 70% of them are endemic. During the process of accession to EU, Croatia proposed technical adaptations of Annex I of the Habitats Directive and accordingly, two additional habitat types have been included which are characteristic for Dinaric karst area of Croatia and neighboring non-EU countries: *6540 Sub-Mediterranean grasslands of the Molinio-Hordeion secalini* - humid grasslands found alongside karstic rivers and in karstic fields (poljes) of the Dinaric Alps and *32A0 Tufa cascades of karstic rivers of the Dinaric Alps*, including tufa-creating river communities and tufa-creating vegetation on river cascades. Karst mountains creating the border towards the coastal Croatia comprise the high rate of so-called “tertiary relicts”, many of them being endemics. Apart from underground endemics, the high level of endemism of coastal Croatia is connected to the chain of islands. Coastal Croatia is rich with open grasslands and with shrub vegetation like garrigue and maquis. Mature forests are represented in smaller fragments of the Holm oak and Downy oak. The Adriatic Sea is rich with sea grass meadows, mostly of *Posidonia oceanica.* The sea bottom along the eastern Adriatic coast is rocky while offshore is mostly flat with sediments and coralligenous concretions along the islands. Almost the whole eastern Adriatic coast is rocky, forming so-called Dalmatian type of the coast. There are specific habitat types of submerged karst that are characteristic for Eastern Adriatic like vruljas (submerged freshwater springs), karstic estuaries, marine lakes, deep circalittoral hard bottoms (bare karst), anchihaline caves, marine caves and descending caves with bathyal elements.

Forests are the most widespread terrestrial ecosystem in Croatia, covering almost a half of Croatian territory with more than 100 forest plant communities. Generally, forests are considered to be near-natural and in good state. Even 95% of forest vegetation is in its natural composition, which is rare and extremely valuable at both European and global level. The largest complexes of mountain beech-fir forests

1) Republic of Croatia has submitted its Fourth National Report to the Convention on Biological Diversity (NR4) in 2009.

are distributed over 200,000 ha of western Dinarides while lowland complexes of Pedunculate oak forests can be found in the Sava River basin, covering more than 200,000 ha. Almost all forest habitats in Croatia, covering cca 64% of all forest area belong to Natura 2000 habitat types[2]. In principle, only sub-Mediterranean forests of the Pubescent oak are not included. Some habitats cover major areas, such as the beech forests or oak forests. Beech forests are generally considered to be in good condition and are not facing degradation, while Pedunculate oak forests are extremely sensitive to change of ecological conditions because of their dependence on water regime. During the last decade there is significant decrease in area of old forest stands of oak forests.

Today habitats in Croatia are mainly threatened by different anthropogenic activities. On the other hand, ceasing of certain human activities like mowing or grazing can also have negative effect, resulting in natural succession, changes of ecological conditions and disappearance of species. Succession is also a threat to wetland habitats which require active management. Regulation of watercourses and changes in water regime is one of the biggest threats to all water-dependent habitat types - like river gravel, sand and mud shores; natural steep river banks; tufa cascades of karstic rivers; all types of wet grasslands and forests. Coastal habitats are under the strong pressure from building and tourism-related activities. The most threatened are sand and pebble beaches which are rare since 92% of Croatian coast is rocky, as well as mudflats and sandflats, often combined with vulnerable halophilous vegetation, which are important habitats for migratory birds like waders. Meadows of marine sea grass are common along the Croatian coast and are considered among the most representative and important Mediterranean coastal ecosystems but also among the most threatened marine habitats in Croatia.

Native indigenous species

There are approximately 40,000 known species in Croatia. The assumed number is considerably higher, with estimates ranging from at least 50,000, to over 100,000 species. Every year, scientists are recording new species for Croatia as well as discovering and describing new species and subspecies for science, especially in poorly researched groups such as algae, mosses, fungi and invertebrates.

The richness of Croatia in terms of wild species lies not only in their diversity, but also in their endemic nature. Certain endemic species are tertiary relics that were left over in areas not greatly affected by glaciation, especially coastal mountains. Also, a number of endemics have developed in isolated habitats like caves, islands and Adriatic rivers. Even 2.79% of species recorded for Croatia are endemic. Freshwater fishes include the largest percent (11.8%) of endemics and the largest part of stenoendemics, which are connected to karstic rivers of Adriatic basin. They are followed by invertebrates (7.5%) and plants (6.7%).

By the end of 2012, 1284 species (CR, EN and VU) were included on the national Red list out of 2954 evaluated. Population trends and changes of status of individual species are still not known but will be available upon revision of red lists, using recent IUCN methodology. The biggest threat to wild species in Croatia which affects 53.5% of assessed species is posed by direct destruction of their habitats (DT7 according to IUCN Threats Classification Scheme). Natural habitats are being transformed into construction land or agricultural land. Although the construction of roads and other transport routes results in habitat fragmentation, potential threats to large carnivores from highway construction have been reduced through the construction of green bridges, serving as animal corridors. On the other hand, due to the decay of traditional, low-productivity agriculture, previous large surfaces of pastures and meadows are turning into thicket, with their biodiversity disappearing. Water management interventions are changing the natural water regime of watercourses, which results in the degradation of wetland habitats with high economic and biological value, such as floodplain forests of Pedunculate oak. The introduction of alien species, some of which are turning into invasive ones, also represents a major threat to wild species. Excessive use through commercial harvesting of plants and fungi, or through fishing, exposes the populations of a number of wild species to danger. Intensive agriculture and tourism, pollution of water, soil and air, as well as poaching, constitute significant threats to wild species of Croatia. In addition, one should also not disregard the impact of climate change, which is considered to be one of the key causes of threat to biodiversity globally, with recorded influences in terms of, among other things, nesting time, migrations, reproduction success and changes in species distribution. These effects have already been registered in Croatia, especially change of dates of arrival of certain birds and start of the nesting, as well as the phenomenon of coral bleaching. The fact is that the effects of many threats to biodiversity in Croatia are not completely known and they require further research, especially the issue of climate change effects on biodiversity.

Domesticated indigenous species

There are 27 currently recognized and preserved indigenous breeds of domesticated animals in Croatia: three cattle, four horse, three donkey, three goat, two swine, nine sheep, one turkey, one chicken and one bee. They are all listed on the *National List of indigenous and protected breeds and varieties of domesticated animals.* Seven indigenous dog breeds are also registered. The most of Croatian indigenous breeds are still kept predominantly in traditional way and have an important role in maintaining certain threatened habitat types. In 2011 the national assessment of threats to domesticated indigenous breeds was done according to adjusted IUCN criteria, in order to start the implementation of conservation activities. Results were published in the *Green book of indigenous breeds of Croatia.*

Despite the fact that Croatia has a number of collections of varieties of cultivated plants, which are being stored at various entities (in the form of seeds, plant material or field collections), and which are part of the National Plant Gene

2) Covered under Habitats Directive

Bank, the comprehensive list of indigenous varieties of cultivated plants has not yet been created.

Invasive alien species

Since 2009 the number of recorded alien species in Croatia has increased but complete analysis of their number, introduction, distribution and impact on ecosystems still does not exist. Lists of invasive alien species for different taxonomic groups are only partial. The largest number of plant alien species was registered in Mediterranean area, especially islands, occurring in most cases in agricultural and artificial areas. There is a large number of registered alien freshwater fishes (25 - about 70 % of the total alien freshwater species recorded in Europe) and marine fishes (arriving into the Mediterranean via the Gibraltar and the Suez Canal or by accidental introduction, escape from aquaculture or aquariums or by ballast waters). Pressure of invasive alien algae in the Adriatic Sea is increasing due to global climate change. In 2009, 16 invasive alien invertebrates in freshwater ecosystems have been recorded. Some invasive species cause serious damages to the economy like Zebra mussel or pose a threat to human health like Common ragweed and Tiger mosquito.

II. Implementation of the National Biodiversity Strategy and Action Plan

The Croatian Strategy and Action Plan for the Protection of Biological and Landscape Diversity (NBSAP) from 2008 specify 7 general strategic objectives (goals), 29 specific strategic objectives and 117 strategic guidelines. In order to achieve NBSAP objectives, 302 action plans were planned to be carried out, divided within 7 thematic issues: Protection of biodiversity (Protected areas, Ecosystems and habitats protection, Ecological network, Protection and conservation of wild taxa, Protection and conservation of domesticated taxa; Ex-situ protection; Invasive species control); Landscape conservation; Geological diversity protection; Sustainable use of natural resources (Agriculture, Forestry, Hunting, Fishing, GMO's, Water management, Tourism, Transportation, Energy, Exploitation of mineral resources); Legislation and institutional framework; Cross-cutting issues (Research and monitoring, Education, Public Informing and participation, Physical planning, Ecological network impact assessment) and finally NBSAP Implementation (Monitoring and evaluating the implementation and financial mechanisms of the NBSAP).

Looking at the evaluation of implementation of specific strategic objectives in this reporting period we have to take into consideration that NBSAP 2008 envisaged prioritization of the action plans with time dimension for its implementation. The priority action plans (PR) should be implemented within the shortest possible time, short-term action plans (ST) within five years, medium-term action plans (MT) within ten years, and the long-term ones (LT) within a period of 20 years. Overall, NBSAP 2008 implementation has shown positive trend. There is an overall continuity in the progress, for part of activities process has started in this reporting period while full implementation is envisaged in the next reporting period.

On the level of the main NBSAP issues, proportion of implemented action plans was rather equable. Significant results were achieved with action plans connected to the accession process of Croatia to the EU. Great efforts were invested during the pre-accession period into inventory of species and habitat types for the purpose of defining the sites of ecological network Natura 2000. Legislation has been fully harmonized with the EU *acquis*, including GMO-related legislation. Institutions in nature protection, especially on national level, were strengthened and their capacity building, mostly using EU pre-accession funds. Very important mechanism of *Nature Impact Assessment* (appropriate assessment) was put in place, combined with Strategic Environmental Assessment (SEA) and Croatian longstanding legislative procedures of Environmental Impact Assessment (EIA) as its integral part..

The revision of NBSAP 2008 is plan to start in 2014 and will be supported by the GEF/UNDP project *National Biodiversity Planning to Support the Implementation of the CBD 2011-2020 Strategic Plan in Croatia*.

Protection of biological diversity

By the end of 2013 there were 419 **protected areas** in Croatia, classified in nine national categories and covering 8.56% of the total surface of Croatia (including 12.20% land territory and 1.94% of internal waters and territorial sea). There is an increase in total surface at the state level from 7.56% in 2009. More than 50% of area is covered by nature parks. Eight new areas have been protected since 2009 .

In the reporting period the area of Mura-Drava-Danube has been proclaimed as transboundary biosphere reserve and the area of the Nature Park Vransko jezero has been included in the Ramsar List. Currently, among the national protected areas there are several with international designation: one World Heritage site (Plitvička jezera National Park), five Ramsar sites (Crna Mlaka, Lonjsko i Mokro polje, Kopački rit, Delta Neretve and Vransko jezero), two biosphere reserves (Velebit mountain and TBR Mura-Drava-Danube) and one GEOPARK Papuk.

Regarding **ecosystems and habitats**, significant activities have been implemented for conservation and protection of habitat types, especially related to identification of distribution of Annex I habitat types present in Croatia and their designation as Natura 2000 sites. Mapping of terrestrial habitat types on scale 1:25,000 was accomplished for a number of protected sites and sites of ecological network, mostly for national parks and nature parks, whilst the mapping on the whole territory started in 2014. Mapping of marine habitat types was accomplished only for few small sites and more extensive mapping is planned in coming years through the EU structural and investment funds.

According to NPA (2013), the National Ecological Network

that was proclaimed by the Regulation from 2007, is no longer in force but has been substituted by the **EU ecological network Natura 2000**. The final list of Natura 2000 sites was adopted in September 2013. It covers 36.67% of land territory and 16.39% of internal waters and territorial sea, putting Croatia at the top with Slovenia and Bulgaria in terms of percentage of the land territory included in Natura 2000. 742 proposed Sites of Community Importance (pSCIs) (of which 171 sites are cave objects) and 38 Special Protected Areas (SPAs) are included. pSCIs have been defined for 74 habitat types and for 135 species. SPAs have been defined for 126 bird species. Around one quarter of the surface of the Natura 2000 ecological network (26.14%) is already protected within nine national categories of protected areas. The analysis of overlaps between the Natura 2000 ecological network and protected areas shows that 87.17 % of the total surface of protected areas is located within the Natura 2000 ecological network.

Implementation of the NBSAP regarding **wild indigenous species** included evaluation of existing and collecting new data for the purpose of establishment of Natura 2000, for 226 species from the Annex II of the Habitats Directive and Annex I of the Birds Directive. Twelve species have been included in the Annexes II and IV of the Habitats Directive upon the proposal of Croatia. Monitoring protocols for 24 species have been prepared and monitoring of 64 species was implemented in the reporting period. Four new red lists have been prepared (for cave fauna, freshwater and brackish water crustacea, land and freshwater snails, sea algae and seagrass) and three revised (for reptiles and amphibians, butterflies and birds). Red books for cave fauna, birds and reptiles and amphibians have been published. Red book of corals is in preparation. Management plans for Eurasian lynx, Wolf and Brown bear have been revised and adopted. Draft Management plans for three species (Croatian dace, Karst meadow viper and Saker falcon) have been prepared. Protocol on the Reporting and Actions in Case of Encountering Dead, Sick or Injured Strictly Protected Marine Animals (marine mammals, marine turtles and cartilaginous fish) has been established since 2010. Five authorized recovery centres for strictly protected animals continued with their work.

Significant results have been achieved in the assessment of threats and the protection of **domesticated indigenous breeds** while regarding the issue of **ex-situ protection** the most achievements were related to legislative and administrative framework. As for invasive alien species, most of activities were related to education and public informing. The new NPA improved national policy framework on invasive alien species. Several experimental eradication activities were implemented.

Mainstreaming biodiversity into sectors

In the reporting period, the new NPA (2013) as well as all sectorial legislation has been in principle strengthened regarding sustainable use of natural resources and biodiversity protection because they have been harmonized with the EU *acquis*. It can be concluded that cooperation between nature protection and certain sectors has significantly improved during the reporting period, e.g. forestry, agriculture and water management. Generally, it is evident that cooperation on mainstreaming biodiversity improves and intensifies in cases when sectors are obliged to implement certain activities or include nature protection issues into their agenda. Future cooperation should be strengthened, especially in the process of drafting and adopting strategic and planning documents. Important cooperation with sectors that have most influence on biodiversity has been established through the PHARE project on Institutional Strengthening and Implementation of the Natura 2000 Ecological Network in Croatia (2008 - 2010).

Cooperation with **physical planning** sector has improved during the reporting period through nature protection requirements in process of drafting and adopting physical plans and is enhanced in cases of preparation of physical plans for protected areas. Regarding the sector of agriculture, collaboration between the Ministry of Environmental and Nature Protection and the Ministry of Agriculture has improved in the course of preparation of the Rural Development Programme of the Republic of Croatia for the period 2014-2020 when the proposal of agri-environment-climate was developed under the surveillance of the inter-sectorial working group. Significant cooperation with the forestry sector was achieved via the PHARE project on Natura 2000 in Croatia, followed by establishing of the Working group for the definition of forest areas within the Natura 2000 Croatia. In 2012, the FSC certificate of the state-owned company Croatian Forests (Hrvatske šume d.o.o.) for sustainable and responsible management of state forests which make 78% of all forests and forest land in Croatia, was extended for the period of five years. Cooperation between nature protection and hunting sectors is being implemented in the field of management of large carnivores' populations, especially decision process on hunting quotas and implementation of monitoring protocols. It is still lacking when it comes to systematic inventories and monitoring of game and strictly protected species. The issue of ornithological important carp fishponds, which were included in ecological network Natura 2000, promoted collaboration with freshwater fishery sector and implementation of the National support scheme Conservation of Fish Pond Ecosystems, established by the Ministry of Agriculture. Apart from this issue, there are significant weaknesses of inter-sectorial cooperation. Despite there is the legal obligation according to the NPA, nature protection requirements are usually not being requested during the process of preparation of management plans in freshwater fishery sector.

Cooperation between nature protection and **marine fishery** sector is showing progress. During the reporting period, the most important activities were regarding harmonization of national legal framework with the provisions of the EU *acquis*. Important biodiversity conservation mechanism is the Mediterranean Regulation which was transposed into Marine Fishery Act and which proscribes prohibition of fishing with trawl nets, dredges, purse seines, boat seines, shore seines or similar nets above all Natura 2000 sites, all protected areas, seagrass beds, coralligenous habitats and mäerl beds. Nature protection sector is included in preparation of National strategic plan for aquaculture for period 2014-2020 and

preparation of management plans for fishing.

Legislation on **genetically modified organisms (GMOs)** has been harmonized with EU directives and Biosafety Protocol and institutional framework established. There was no registered deliberate release of GMOs into environment in Croatia. No GMO crops have been registered either. Contained use of GMOs in laboratories is implemented under proscribed conditions that include biosafety.

Cooperation between nature protection and **water management** sectors was achieved through intensive collaboration on assessment of annual programs of water maintenance works. During the reporting period, Croatian Waters worked on the development of methodology for evaluation and classification of the ecological status of surface waters in accordance with the Water Framework Directive (WFD). There are still some issues to be solved, mostly related to overall assessment of certain types of activities like regulation of watercourses and extraction of river bed sediments. Now assessment is done on the project basis so it is difficult to evaluate cumulative effects.

Tourism is still oriented to projects related to providing touristic infrastructure mainly in coastal area. Eco-tourism is still not recognized by the State as potential valuable enough to invest more efforts for its development. Some pilot-projects were financed by the Ministry of tourism but there was no systematic monitoring of such initiatives. Progress is mostly related to the improvement of visitor management in protected areas, like building of information centres, educational trails and information panels. This is particularly important for the parks that need diversification of activities in order to diminish burden from visitors overflow during high season, as well as parks that still have no adequate visitor infrastructure in place. Additionally, the new overarching framework in management of national and nature parks was the adoption of new visual identity - Parks of Croatia - which will definitely further underpin their potential for regional development. .

In **transport** sector, strategic planning and assessment of transport corridors in relation with biodiversity is still weak. In the reporting period there were 55 km of new highway built. Progress has been reached in building of new wildlife crossings but not in regular maintenance of existing ones. Regarding waterways, although all navigable rivers in Croatia are transboundary and there are international technical bodies collaborating on their management, still water management sector significantly prevails in this process while nature protection is not adequately taken into account.

In marine transport there is the problem of ballast waters from great ships entering Adriatic from outside waters and spreading of invasive species. The proposal of the Ballast Water Management Strategy of the Republic of Croatia was prepared but not yet adopted.

Plans and programs of **energy** sector, which have a huge impact on nature (HE and wind power plants), did not go through SEA procedure. Nature protection can influence planning of locations for power plants through issuing nature protection requirements into physical plans and through case by case EIA procedures. Planned locations of wind power plants have been strategically assessed only for wind potential and not for their effects on biodiversity. 14 wind power plants have already being built and 81 are still planned, all on the territory important for migratory birds and bats as well as for breeding birds of prey.

There is weak cooperation between nature protection and **mining** sector and it needs strengthening, especially in issues of exploitation fields in protected areas, procedure of recovery of exploitation fields and inspection issues.

Future cooperation with all sectors should be significantly strengthened, especially in the process of drafting and adopting strategic and planning documents.

Cross-cutting issues

In general, national **legislation** was harmonized with EU legislation and international agreements. Sectorial legislation needs more harmonizing with nature protection and environmental protection legislation. There were no substantial changes needed in nature protection **institutional framework** during the reporting period, with the exception of the change in 2011 pertaining to the competent Ministry from the Ministry of Culture into the newly formed Ministry of Environmental and Nature Protection. In 2013, there were approximately 900 CSOs registered as organizations in the sphere of “ecology”.

During the reporting period, systematic **inventory** activities were concentrated on species and habitat types for which sites of Natura 2000 are designated (226 species and 74 habitat types). Apart from that work, there were other researches performed by individual scientists, scientific institutions and CSOs. There have also been records of new species for Croatia and even a number of new scientifically described species. Biospeleological inventory is of special interest as new taxa are constantly being discovered in caves of Croatia. As the EU member state, Croatia is obliged to report on conservation status of 580 species and habitat types - 238 species from Annexes II, IV and V of the Habitats Directive (including added species upon the proposal of Croatia), 74 habitat types from Annex I (including added habitats upon the proposal of Croatia) and 268 regularly occurring bird species (349 bird populations in total). Having in mind this obligation, Croatia started work on establishing **monitoring** framework. Monitoring protocols for 24 species and for 5 habitat types have been prepared and monitoring of 43 bird species and 28 other species was implemented. Work on the establishment of the **Nature Protection Information System** has continued - NPIS includes 10 databases out of which 3 were made publically available through web services (Natura 2000, protected areas and habitat types).

Croatia has established the process of *Ecological network impact assessment* (ENIA) in 2007, upon proclamation of

National Ecological Network. NIA was designed according to the relevant mechanism of the Habitats Directive and it was additionally harmonized with it by the new NPA from 2013. ENIA is a procedure which is used to assess whether there is likelihood that the implementation of a plan, program or project independently or together with other plans, programs or projects, might have a significant impact on conservation objectives and on the coherence of the territory of the ecological network, as well as for the strategies which have obligation to preform SEA. ENIA procedure is fully integrated in the EIA and SEA mechanisms[3], meaning that if EIA and SEA are obligatory procedures, ENIA is included as the constituent part.

In the reporting period there was significant increase of the representation of nature protection, in terms of the number of courses dealing with this issue at higher-education institutions in Croatia. However, systematic cooperation between state bodies in charge of **education** and nature protection still needs to be established.

Information of public on nature protection is mostly implemented through web sites of the MENP (www.zastita-prirode.hr) and SINP (www.dzzp.hr and www.natura2000.hr). In the course of 2013, SINP published all completed spatial databases on its website. Regarding **public participation**, it can be concluded that efficient and high-quality mechanisms of citizen and CSO participation in the processes that shape public policies and in decision-making processes are still not fully developed.

Nature protection in Croatia primarily relies upon **funding** from the state budget, with the budgets of regional and/or local self-government units participating in the funding process to a lesser degree. Croatia has positive experience regarding Environmental fiscal reform referring to a range of taxation and pricing measures based on "polluter pays principles". Environmental Protection and Energy Efficiency Fund secures additional funds to finance projects, programs and similar activities in the field of conservation, sustainable use, protection and improvement of the environment and nature. In the reporting period the EPEFF started cooperation with the Ministry of Environmental and Nature Protection in the preparation of projects for EU funding, numbers of projects were implemented with support of international funds, mostly from EU pre-accession funds and the project oriented work will continue in the upcoming period through ESI funds.

III. Progress towards the 2020 Aichi Biodiversity Targets

As a part of this Report, the national activities of the NBSAP implementation have been put in correlation with Aichi Biodiversity Targets and contribution of Croatia to their implementation was evaluated. One of the main shortages of Strategy from 2008 comes out of the fact that strategy objectives and action plans have been defined rather generally, without target values or indicators. Therefore, it is concluded that the future planning (new NBSAP is planned for 2014) put an accent on defining clear and precise action plans, accompanied with target values and indicators as well as on relating them to Aichi and EU 2020 Biodiversity Strategy targets. As it was reported in NR4, Croatia has defined a list of environmental indicators, including biodiversity indicators. For the purpose of evaluation of the progress towards Aichi targets, relevant national indicators are mentioned along with each target, if they exist. Anyway, for most of these it was not able to give trends because needed data are still not systematically collected and processed. As for indicators proposed by CBD, relevant ones are also mentioned in the table but trends were mostly described only generally as needed quantitative data were not available.

Overall assessment of NBSAP contribution to Aichi targets indicates that since 2010 Croatia made significant progress in related activities and contributed especially in enlarging the area with special protection status (protected areas and ecological network) as well as in establishing quality legislative framework, harmonized with EU *acquis*. It should be stated that cooperation with other biodiversity-related sectors needs further improvement, especially in mainstreaming biodiversity and putting forward clearly defined responsibilities of other sectors for biodiversity conservation. Although there is legal obligation and already established practice (in most of the sectors) to issue nature protection requirements and measures for inclusion into all sectorial management plans and physical planning documents, possibilities to influence and control their implementation is weak. SEA procedure for sectorial plans and strategies became obligatory in 2013.. Besides mainstreaming biodiversity into sectors, the framework for inter-sectorial management of sites of ecological network should be established as a priority, including collaborative preparation of management plans. National framework for monitoring and reporting is still not fully established. First evaluation of favorable conservation status (FSC) of threatened species and habitat types will be available for the next reporting to EU according to Birds and Habitats directives (2019). There were intensive activities on evaluation of threat status of species according to IUCN criteria and preparation of red lists and red books.

In conclusion, it is evident that Croatia made significant progress in establishing various national frameworks needed for efficient biodiversity conservation. Future efforts should be concentrated primarily on strengthening mainstreaming of biodiversity, management of sites of particular importance for biodiversity and monitoring activities designed for international reporting requirements.

3) In line with Environmental Protection Act and Nature protection Act

Table of Contents

List of abbreviations

ACCOBAMS - Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area

ASCI - Areas of Special Conservation Interest

BAU - Business as Usual

CBD - Convention on Biological Diversity

CBS - Croatian Bureau of Statistics

CEA - Croatian Environment Agency

CKC - Croatian Kennel Club

CLC - Corine Land Cover

COAST - Conservation and Sustainable Use of Biodiversity in the Dalmatian Coast

COP - Conference of Parties

CSOs - Civil Society Organizations

DAD-IS - Domestic Animal Diversity Information System

EAFRD - European Agricultural Fund for Rural Development

EIA - Environmental Impact Assessment

EMFF - European Maritime and Fisheries Fund

ENIA - Ecological Network Impact Assessment

EPA - Environmental Protection Act

EPEEF - Environmental Protection and Energy Efficiency Fund

ESUs - Evolutionary Significant Units

EU - European Union

FAO - Food and Agriculture Organization of the United Nations

FCS - Favourable Conservation Status

FSC - Forest Stewardship Council -

GEF - Global Environment Facility

GIS - Geographic Information Systems

GMOs - Genetically Modified Organisms

HEP - Hrvatska elektroprivreda

IAS - Invasive alien species

ICCAT - International Commission for the Conservation of Atlantic Tunas

IPA - (EU) Instrument for Pre-accession Assistance

IUCN - International Union for Conservation of Nature

LIFE - (EU) Financial Instrument for the Environment

MDG - Millennium Development Goals

MENP - Ministry of Environmental and Nature Protection

MPA - Marine Protected Area

NBSAP - National Biodiversity Strategy and Action Plan

NHC - National Habitats Classification

NETCET - Network for the Conservation of Cetaceans and Sea Turtles in the Adriatic

NPIS - Nature Protection Information System

NPA - Nature Protection Act

NR - National Report

PAs - Protected Areas

PAMS - Protected Areas Management System

PIs - Public institutions for management of protected areas

RAC/SPA - Regional Activity Centre for Specially Protected Areas

RES - Renewable Energy Sources

SEA - Strategic Environmental Assessment

SEM - Sustainable Ecosystem Management

SFES - Study for Freshwater Ecosystem Services

SINP - State Institute for Nature Protection

SPA/BD - Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean

SPAMI - Specially Protected Areas of Mediterranean Importance

SSA - Sector Scenario Analysis

UAA - Utilized Agricultural Area

UNDP - United Nations Development Programme

UNESCO - United Nations Educational, Scientific and Cultural Organization

WFD - Water Framework Directive

WWF - World Wide Fund for Nature

WTP - Willingness to Pay

Introduction

Republic of Croatia has submitted its Fourth National Report to the Convention on Biological Diversity (NR4) in 2009[1]. The Fifth Report (NR5) covers the period from 2009-2013. According to the *Guidelines for the Fifth National Report*[2], it concentrates on the latest developments in conservation of biodiversity that have been achieved since the submission of the NR4. Biodiversity status, trends and threats are described as an update comparing to situation in 2009. In order to avoid overlapping with the NR4 and repeating descriptions of components of Croatian biodiversity, this Report puts an accent on new information and refers to the NR4 for any text relevant to the issues concerned. Some examples of exceptional biodiversity of Croatia or activities that marked the reported period are described in more details in different boxes.

The Report is structured in three main parts as suggested by the CBD guidelines. The first one deals with an update of biodiversity status, trends and threats since 2009. Information for this part is taken mainly from the *Report on State of Nature of Republic of Croatia for the period 2008-2012* (RSN 2008-2012*)* that was prepared by the State Institute for Nature Protection (SINP) in 2013. Sources of additional information are cited in the text. The issue of ecosystem services, which is related to implications of biodiversity for human well-bring, was only shortly presented since the more comprehensive work on this subject has been initiated in Croatia mainly through the GEF/UNDP project *National Biodiversity Planning to Support the Implementation of the CBD 2011-2020 Strategic Plan in Croatia* (2012 - 2014). The second part of NR5 analyses the implementation of the National Biodiversity Strategy and Action Plan from 2008 (NBSAP 2008)[3] on the level of strategic guidelines (targets). Although the NBSAP includes chapters on landscape and geological diversity, these are not analyzed here as biodiversity is in the focus of reporting to the CBD. The third part of the NR5 gives an overview of contribution of Croatia to 2020 Aichi Targets. Relevant 2015 Millennium Development Goal - 7: *Ensure environmental sustainability,* has not been analyzed in the framework of this Report as the special report has been prepared in 2010[4].

It should be mentioned that the main efforts of Croatia during the reporting period were concentrated on preparatory work for accession to the European Union. Apart from harmonization of national legislation with EU *acquis*, the main activities of nature protection sector were related to preparation of ecological network Natura 2000. For that purpose an extensive research work was initiated, with focus on inventorying biodiversity and establishing the framework for monitoring. Republic of Croatia acceded to the EU on 1st July 2013. The new Nature Protection Act[5] was adopted in June 2013 while the Regulation on Ecological Network[6] was adopted in September 2013 by the Government of Croatia.

1) Ministry of Culture (2009): Fourth National Report of the Republic of Croatia to the Convention on Biological Diversity. Republic of Croatia, Ministry of Culture. Croatia, Zagreb

2) CBD (2013): Guidelines for the Fifth National Report; Fifth National Reports Resource Manual http://www.cbd.int/nr5/. Convention on Biological Diversity

3) Croatian Parliament (2008): The Strategy and Action Plan for the Protection of Biological and Landscape Diversity of the Republic of Croatia. Official Gazzette No. 143/2008

4) Overview of achievements of the Republic of Croatia in the fulfilment of Millennium Development Goals during the period from 2006 to 2010, Ministry of Foreign Affairs and European Integration, http://www.mvep.hr/custompages/static/gbr/files/101006_millennium_development_goals.pdf

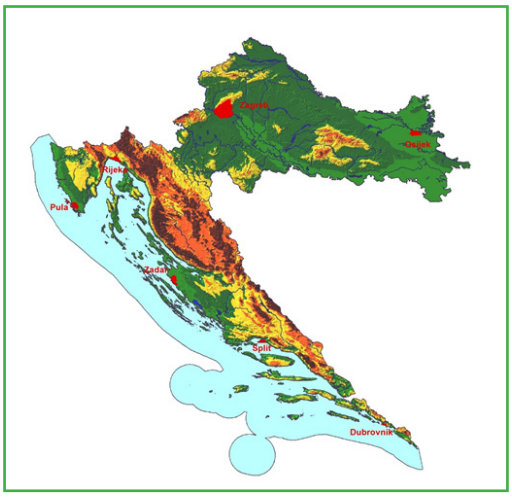
5) Official Gazzette No. 80/2013

6) Official Gazzette No.124/2013

Part I: An update on biodiversity status, trends and threats and implications for human well-being

Box 1. SHORT OVERVIEW OF BIODIVERSITY OF CROATIA

Comparing to its relatively small area of 56,594 km², Croatia is endowed with exceptional richness and diversity of species and habitats. Geomorphologic differences between lowland, mountain and coastal Croatia as well as the great diversity of land, marine and underground habitats have resulted in a wealth of species. The northern part of Croatia lies on the edge of the flat Pannonian region and is characterised in lowland rivers with well-preserved willow-poplar gallery forests and Common oak (*Quercus robur*) forests, wet grasslands and extensive marshes. Some of the key species include the Otter (*Lutra lutra*), the White-tailed Eagle (*Haliaeetus albicilla*), the Black Stork (*Ciconia nigra*) and others. This region is of high importance as stop-over area for migratory waterbirds, especially Ramsar sites Kopački Rit on the confluence of Drava and Danube rivers and Lonjsko Polje along the Sava River as well as numerous large carp fishponds that are extremely valuable wetlands. Northern Croatia also includes a number of hills and mountains between the river plains that are covered mostly with forests of the Sessile oak (*Quercus petraea*) or the Beech (*Fagus sylvatica*) as well as with numerous flower-rich meadows.



From northern Croatia towards the coast, the mountain karst area of Dinarides emerge, covered with the beech and the mixed beech-fir (*Abies alba*) forests that represent the most western extensive forest complex in this part of the Europe, with significant populations of the Brown bear (*Ursus arctos*), the Wolf (*Canis lupus*) and the Eurasian lynx (*Lynx lynx*). Karst ecosystems represent the uniqueness and richness of global value. In karst depressions between the mountains, the special seasonally flooded habitats of "karst polje's" are developed with wet grasslands and temporary lakes, including many temporary sink-rivers with endemic fishes. Dinaric karst area also contains a high level of endemic taxa in underground habitats. Croatian rivers in Dinaric karst are rich in cascades made of organogenic tufa - a habitat specific for Croatia and few neighboring countries. The most famous example is certainly the complex of tufa cascades in the Plitvice Lakes National Park, the UNESCO World Heritage site.

A line of karst mountains creates the border towards the coastal Croatia which has a typically Mediterranean landscape. These Dinaric karst mountains, especially Velebit and Biokovo, used to be a sanctuary for many species during the last Ice Age, so today they comprise the high rate of so-called "tertiary relicts". Some of them are endemics of Croatia like the Velebit degenia (*Degenia velebitica*), the only representative of the genus *Degenia* in the world. Apart from underground endemics, the high level of endemism of coastal Croatia is connected to the chain of islands. Coastal Croatia is rich with open grasslands, in the past mostly used as pastures - unfortunately today a significant part of this land is overgrowing into the scrub due to either depopulation or changes in the way of life of people who are recently more oriented to tourism. Despite this fact, the Croatian coast still contains some rare species dependent either on extensive husbandry, like the Griffon Vulture (*Gyps fulvus*), on open grasslands like the Lesser Kestrel (*Falco naumanni*) or on agricultural mosaics like the Roller (*Coracias garrulus*), the Calandra Lark (*Melanocorypha calandra*) and others. Apart from open areas, the coastal area is rich with different shrub vegetation like garrigue and maquis. Mature forests are represented in smaller but still significant fragments of the Holm oak (*Quercus ilex*) Mediterranean forests and the Downy oak (*Quercus pubescens*) sub-Mediterranean forests.

The Adriatic Sea is a specific, isolated semi-closed basin and the northernmost part of the Mediterranean Sea that stretches in the NW-SE direction in the length of 870 km. North Adriatic is extremely shallow (mostly 25 to 50 m) and with lower average temperatures due to the influence of cold winds and water coming from Alps. It makes this area unique in Mediterranean and famous for a number of boreal biota, including endemic taxa like the brown algae *Fucus virsoides*. Middle Adriatic is also rather shallow (average depth of 140 m) with the exception of the Jabuka Pit that reaches depth of 273 m. This part of Adriatic is rich with sea grass meadows, mostly of *Posidonia oceanica*, South Adriatic depression goes down to 1330 m. The depths down to 200 m (continental shelf) occupy as much as 73.9 % of the Adriatic. The sea bottom along the eastern Adriatic coast is rocky while offshore it is mostly flat with sediments and coralligenous concretions along the islands. Large coral reefs beyond depths of 300 m have also been registered. Today almost the whole eastern Adriatic coast is rocky, forming so-called Dalmatian type of the coast. These geomorphological specificities of Dinaric karst area represent the basis for development of diverse habitat types like marine caves or reefs along the steep slopes of islands. There are specific habitat types of submerged karst that are characteristic for Eastern Adriatic like vruljas (submerged freshwater springs), karstic estuaries, marine lakes, deep circalittoral hard bottoms (bare karst), anchihaline caves, marine caves and descending caves with bathyal elements.

National Park Kornati and neighboring Nature Park Telašćica include the most indented island group in the Adriatic Sea. Photo: Archive of NP Telašćica

1. An update on biodiversity status, trends and threats

1.1. Ecosystems and habitats

(For description of ecosystems and habitats see chapter 1.1. of the NR4)

Status, trends and threats

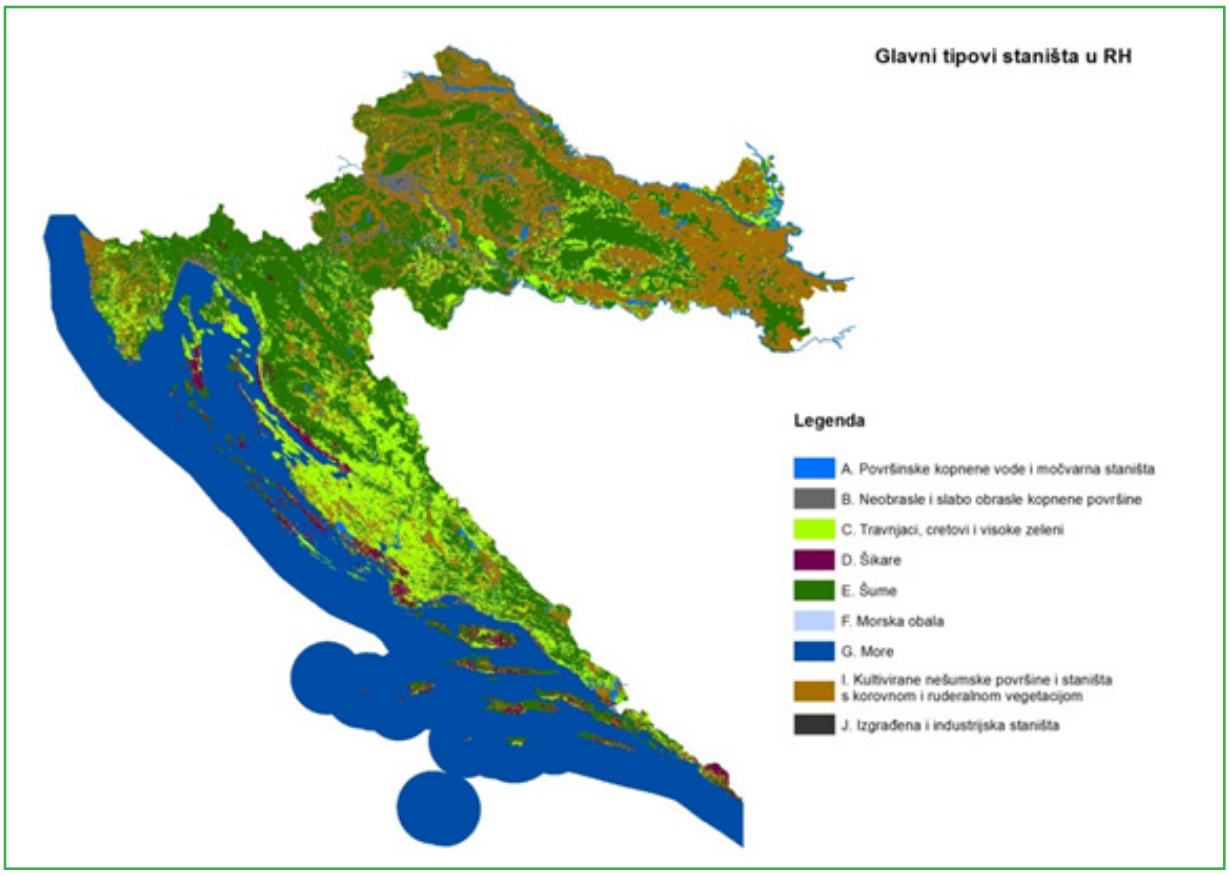
Comparing to the overview of status of ecosystems and habitats in NR4 there have not been significant changes since 2009. Some new information and few examples of exceptional habitat types in Croatia can be found in boxes (2 - 7) of this Report.

Croatia is still using its National Habitats Classification (NHC) that was revised in 2009 and is currently under revision. It consists of five levels, the first one being compatible with EUNIS classification that is currently used in EU. It is important to emphasize that it can also be compared to Corine Land Cover (CLC) classes because CLC mapping is being regularly updated in European countries every six years so changes in land cover could be monitored.

In NR4 the main classes of Croatian habitat types were presented according to the EUNIS classification. In this Report the map is based on NHC. Relation between EUNIS and NHC main categories is shown in Table 1. The map indicates that the most widespread habitats of Croatia are different types of forests (43.5% of national territory), followed by cultivated land (30%) and grasslands (18%).

During preparation of Croatian proposal of ecological network Natura 2000, habitat types have been analyzed according to the PHYSIS classification of the Habitats Directive which is a legal basis for Natura 2000. Three manuals, covering terrestrial, marine and underground habitat types have been prepared by Croatian scientists, describing individual Natura habitat types and listing all corresponding NHC classes. Two new habitat types, specific for Dinaric karst area of Croatia and few neighboring countries have been newly described and added to the Annex I of the Habitats Directive, based on Croatian proposal: *32A0 Tufa cascades of karstic rivers of the Dinaric Alps* and *6540 Sub-Mediterranean grasslands of the Molinio-Hordeion secalini*.

7) Topić, J. i Vukelić, J. (2009): Priručnik za određivanje kopnenih staništa u Hrvatskoj prema Direktivi o staništima EU. Državni zavod za zaštitu prirode, Zagreb
Gottstein, S. (2010): Priručnik za određivanje podzemnih staništa u Hrvatskoj prema Direktivi o staništima EU. Državni zavod za zaštitu prirode, Zagreb
Bakran-Petricioli, T. (2011): Priručnik za određivanje morskih staništa u Hrvatskoj prema Direktivi o staništima EU. Državni zavod za zaštitu prirode, Zagreb



Map 1. *Habitat types in Croatia according to the National Habitats Classification (NHC)*

Table 1. *Comparison of the main EUNIS and NHC classes*

Habitat type	EUNIS	NHC
Marine habitats	A	G
Coastal habitats	B	F
Inland surface waters and wetland habitats	C	A
Mires, bogs and fens	D	
Grassland habitats	E	C*
Shrub, heath and tundra habitats	F	D
Forest habitats	G	E
Inland non and poorly covered land surface	H**	B
Cultivated nonforested land and habitats with weeds and ruderal vegetation	I	I
Constructed and industrial habitats	J	J
Habitat complexes	K	K
Underground habitats		H

** C includes bogs and fens*
*** EUNIS includes underground habitats on 2nd level as H1*

Pressures and threats to ecosystems and habitats in Croatia have mostly remained the same as described in NR4. Activities taken to address them in the reporting period are presented in the Part II of this Report. Due to implementation of EU legislation, especially designation of ecological network Natura 2000 and the mechanism of appropriate assessment of plans, programes and projects, it can be expected that in future certain pressures and threats could decrease. The main prerequisite is to establish effective management of Natura 2000 sites. The COUNCIL REGULATION (EC) No 1967/2006 of 21 December 2006 concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea (Mediterranean Regulation) that aims to protect biodiversity of the Mediterranean Sea, including the Adriatic Sea, is also important mechanism that would in future have positive effect on the conservation of fisheries resources and marine habitat types.

Habitats in Croatia are mainly threatened by different anthropogenic activities. On the other hand, ceasing of certain human activities like mowing or grazing can also have negative effect, resulting in natural succession, changes of ecological conditions and disappearance of species. Succession is also a threat to wetland habitats which require active management. Regulation of watercourses and changes in water regime is one of the biggest threats to all water-dependent habitat types - like river gravel, sand and mud shores; natural steep river banks; tufa cascades of karstic rivers; all types of wet grasslands and forests. Coastal habitats are under the strong pressure from building and tourism-related activities. The most threatened are sand and pebble beaches which are rare since 92% of Croatian coast is rocky, as well as mudflats and sandflats, often combined with vulnerable halophilous vegetation, which are important habitats for migratory birds like waders. Meadows of marine sea grass (Box 5) are common along the Croatian coast and are considered among the most representative and important Mediterranean coastal ecosystems but also among the most threatened marine habitats in Croatia. Willow shrubs (Box 6) found near large continental rivers and galleries of oleander in southern Dalmatia are among the endangered and rare shrub habitats in Croatia.

Analysis of CORINE Land Cover databases from 2006 and 2012[8] indicates changes in some CLC classes in this period (Table 2). The area of certain classes has increased like urban and industrial areas (CLC 112, 121, 142) mostly on account of Complex cultivation patterns and Land principally occupied by agriculture, with significant areas of natural vegetation (classes 242 and 243). Sport and leisure facilities (CLC 142)

8) CEA (2013): Corine Land Cover- Pokrov i namjena korištenja zemljišta u Republici Hrvatskoj-stanje i trendovi. Croatian Environment Agency. http://www.azo.hr/CORINELandCover

increased mostly on account of Sclerophyllous vegetation and Transitional woodland-shrub (CLC 242 and 243). There is relatively significant increase of Olive groves (CLC 223) that could be explained by incentive measures for planting new olive groves during the EU pre-accession period. Land principally occupied by agriculture, with significant areas of natural vegetation (CLC 243) has also increased, partly on account of Natural grasslands (CLC 321) but also other categories. Transitional woodland-shrub (CLC 324) has increased almost exclusively on account of forests (CLC 311, 312 and 313).

Regarding the loss of CLC classes in the period 2006-2012, there is a strong highlight on all types of forests and especially broad-leaved forests (CLC 311). Forests (defined in CLC as trees higher than 5 m) have changed mostly into Transitional woodland-shrub which by definition includes young forest after regeneration) (CLC 324).

Table 2. *Changes of CLC classes based on comparison of CLC 2006 and CLC 2012 (data source: Croatian Environment Agency; data analysis: SINP)*

CODE	CLC class	2012_% of nat. territory	Difference from 2006 (ha)
111	Continuous urban fabric	0,01%	+6
112	Discontinuous urban fabric	2,57%	**+6837**
121	Industrial or commercial units	0,24%	**+1868**
122	Road and rail networks and associated land	0,17%	**+2262**
123	Port areas	0,01%	+468
124	Airports	0,05%	+3
131	Mineral extraction sites	0,10%	+541
132	Dump sites	0,01%	+37
133	Construction sites	0,04%	+472
141	Green urban areas	0,03%	+12
142	Sport and leisure facilities	0,13%	**+1442**
211	Non-irrigated arable land	6,55%	+399
212	Permanently irrigated land	0,18%	+114
221	Vineyards	0,51%	-102
222	Fruit trees and berry plantations	0,16%	-308
223	Olive groves	0,39%	**+1867**
231	Pastures	5,27%	-360
241	Annual crops associated with permanent crops	0,00%	0
242	Complex cultivation patterns	18,05%	-477
243	Land principally occupied by agriculture, with significant areas of natural vegetation	9,51%	**+13827**

CODE	CLC class	2012_% of nat. territory	Difference from 2006 (ha)
311	Broad-leaved forest	28,99%	**-41037**
312	Coniferous forest	1,69%	**-6541**
313	Mixed forest	4,69%	**-6040**
321	Natural grasslands	4,48%	+939
322	Moors and heathland	0,05%	-1830
323	Sclerophyllous vegetation	2,43%	-5866
324	Transitional woodland-shrub	11,06%	**+33435**
331	Beaches, dunes, sands	0,00%	+22
332	Bare rocks	0,16%	-2795
333	Sparsely vegetated areas	1,14%	+3649
334	Burnt areas	0,02%	+705
411	Inland marshes	0,34%	+56
421	Salt marshes	0,01%	+36
422	Salines	0,01%	+71
423	Intertidal flats	0,00%	+29
511	Water courses	0,43%	+211
512	Water bodies	0,53%	+243
521	Coastal lagoons	0,00%	0
TOTAL		***100,00%***	

Box 2. NEW ANNEX I HABITAT TYPES OF THE HABITATS DIRECTIVE

During its process of accession, Croatia proposed some technical adaptations of Annex I of the Habitats Directive and accordingly, two additional habitat types have been included which are characteristic for Dinaric karst area of Croatia and neighbouring non-EU countries[9].

One of them is *6540 Sub-Mediterranean grasslands of the Molinio-Hordeion secalini* that includes humid grasslands of the alliance *Molinio-Hordeion secalini* found alongside karstic rivers and in karstic fields (poljes) of the Dinaric Alps. These humid meadows were traditionally used as extensive pastures and hay meadows and are flooded or very wet in winter and spring, gradually drying throughout the summer. Because of the extreme differences in soil moisture, there is a mix of hygrophilous plants and plants more typical of dry habitats growing together. These habitats are threatened by the regulation of river flow and those on karst fields by succession, as a result of the abandonment of pastures and mowing practices, or due to the use of such surfaces as arable land.

Sub-Mediterranean grasslands of the Molinio-Hordeion secalini. Photo: J. Radović, SINP

Another habitat type is *32A0 Tufa cascades of karstic rivers of the Dinaric Alps*, including tufa-creating river communities and tufa-creating vegetation on river cascades. The vegetation is rich in algae, bryophytes and ferns (*Eucladio-Adiantetum*) which actively deposit tufa from the water. The most famous features of tufa barrages occur within the national parks Plitvice Lakes and Krka River but these habitats can also be found on other rivers in the karst area of the Dinarides. These habitats are threatened by succession, change of the water regime and eutrophication.

Tufa cascades in NP Krka. Photo: B. Opačić, SINP

A detail of the tufa barrage. Photo: B. Opačić, SINP

9) European Commission (2013): Interpretation Manual of European Union Habitats- EUR28

Box 3. HABITATS IN SUBMERGED KARST

Habitats that are characteristic for the Croatian part of the Adriatic Sea are those in submerged karst: marine lakes, karst estuaries, bare karst in the sea, anchihaline caves, submerged caves and pits, submerged river canyons[10]. Because they are rare and occupy very small areas, as well as they are under great anthropogenic influence, these habitats are extremely threatened.

Marine caves and pits were formed in subareal conditions and became submerged upon rising of the sea level after the last glaciations. Due to ecological characteristics which are present in submerged caves and pits (lack of light and food, poor water exchange, lower and more stable temperatures) some of these habitats are very similar to those in deep sea. That is why deep sea organisms can be found even in shallow areas in littoral zone, like the carnivorous sponge *Asbestopluma hypogea*.

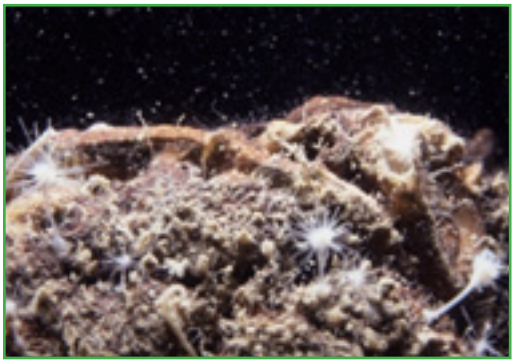
Anchihaline caves extend from a few meters to a few kilometers from the coast toward the inland, forming a transition zone between freshwater underground and the sea. In the surface parts of anchihaline caves there is an inflow of freshwater, while marine water remains in the bottom.

Karst marine lakes are sea water bodies enclosed in limestone, which are in contact with surrounding coastal sea through fissures in karst rocks or very narrow and shallow channels. They are characterized by weak exchange of water with the surrounding sea, lower tidal amplitude, temperature extremes, almost permanent water column stratification, and temporal hypoxia or anoxia in the bottom layers. In the marine lakes, the number of species is small, but their population density is high. The most famous karst marine lakes in Croatia are Rogoznica Lake and Lake Mir on the island of Dugi otok.

Vruljas are submerged pits or springs which are formed as a result of pressurized freshwater flow in the karstified coast. There are two types of vruljas. In the case of sieve-type vruljas freshwater is flowing from the sea bottom through numerous small openings. Pit-type vruljas are much bigger and marine organisms that inhabit them have a great ability to adapt to changes of salinity and strong hidrodynamism.

Karst marine lake Rogoznica Lake, Photo: D. Petricioli

Vrulja, Photo: D. Petricioli



Asbestopluma hypogea - deep sea carnivorous sponge in the cave at a depth of 24 m, NP Telašćica. Photo: D. Petricioli

10) Bakran-Petricioli, T., Petricioli, D. (2008): Habitats in Submerged Karst of Eastern Adriatic Coast- Croatian Natural Heritage. Croat.Med. J. 2008; 49: 455-8. www.cmj.hr

Box 4. FORESTS

More than 100 forest plant communities are represented in Croatia, covering cca 2.5 million ha - almost a half of Croatian territory. High forests cover 37% of national territory and the rest are different degrees of degraded forest vegetation. Generally, forests are considered to be near-natural and in good state. Even 95% of forest vegetation is in its natural composition, which is rare and extremely valuable at both European and global level. The largest complexes of mountain beech-fir forests are distributed over 200,000 ha of western Dinarides (Gorski kotar, Velebit Mountain) while lowland complexes of Pedunculate oak forests can be found along the Sava River, covering more than 200,000 ha. In Mediterranean region, most of the forest vegetation is in stadium of the maquis or shrubs, although a number of well-preserved complexes of the Holm oak and the Black pine still exist.

Almost all forest habitats in Croatia, covering cca 64% of all forest area, belong to Natura 2000 habitat types protected by the Habitats Directive. In principle, only sub-Mediterranean forests of the Pubescent oak (*Quercus pubescens*) are not included. Representative part of each Natura habitat type as well as forests important for Natura species, are designated as Natura 2000 sites. Some habitats cover major areas, such as the Common beech (*Fagus sylvatica*) forests or forests of the Pedunculate oak (*Quercus robur*) and the Sessile oak (*Quercus petraea*). The distribution of other habitats is limited, such as the relict forests of the European yew and limes *Tilio-Taxetum*, or Scots pine forests *Helleboro-Pinetum*. Beech is the most widespread tree species, while oaks, especially Pedunculate oak is the most important from economic point of view.

Natura 2000 forest habitat types present in Croatia

9110 *Luzulo-Fagetum* beech forests

9130 *Asperulo-Fagetum* beech forests

9160 Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli*

9180 *Tilio-Acerion* forest of slopes, screes and ravines*

91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)*

91F0 Riparian mixed forest of *Quercus robur*, *Ulmus laevis* and Ulmus minor, *Fraxinus excelsior* or *Fraxinus angustifolia* along the great rivers (*Ulmenion minoris*)

91H0 Pannonian woods with *Quercus pubescens**

91K0 Illyrian *Fagus sylvatica* forests (*Aremonio-Fagion*)

91L0 Illyrian oak-hornbeam forests (*Erythronio-carpinion*)

91M0 Pannonian-Balkanic turkey oak-sessile oak forests

91R0 Dinaric dolomite Scots pine forests (*Genisto januensis-Pinetum*)

9260 *Castanea sativa* woods

92D0 Southern riparian galleries and thickets (*Nerio-Tamaricetea* and *Securinegion tinctoriae*)

9320 *Olea* and *Ceratonia* forests

9340 *Quercus ilex* and *Quercus rotundifolia* forests

9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)

9530 (Sub-)Mediterranean pine forest with endemic black pines*

9540 Mediterranean pine forests with endemic Mesogean pines

Beech forests are generally considered to be in good condition and are not facing degradation, while Pedunculate oak forests are extremely sensitive to change of ecological conditions because of their dependence on water regime[11]. Natura 2000 habitat type *91F0 Riparian mixed forest along the great rivers* includes the most valuable (from economic and ecological point of view) complexes of Pedunculate oak forests in lowland depressions of continental Croatia (Spačvanski bazen, Lonjsko i Mokro polje, Pokupski bazen and others). These forests cover cca 230,000 ha. Management is implemented through the system of seven 20-age classes (the oak stands to be cut should be 140 years old). Cutting and regeneration is being practiced in larger areas with the long-term aim to reach equal representation of all age classes. However, many old stands are being cut earlier, partly because of different pressures like changes of water regime, which lead to degradation, drying or even complete dying out of old stands.

Old beech forest in Žumberak area of NW Croatia. Photo: J.Radović, SINP

Analysis of CLC from 2006 and 2012 pointed out to the significant loss of broad-leaved forests which changed mostly into the young forest classified under *Transitional woodland-scrub*. This is compatible with data for Croatia from *Global Forest Change 2000-2012* of the University of Maryland (http://earthenginepartners.appspot.com/science-2013-global-forest) which resulted from analysis of Landsat images in characterizing forest extent and change (forest being defined as vegetation taller than 5m in height, the same as in CLC).

Main threats to forests in Croatia are: pollution of air, soil and water - the Fir (*Abies alba*) being the most sensitive to air pollution; changes in water regime due to inappropriate water management activities; transport and other infrastructure corridors built through the large forest complexes; conversion of forest land into building and/or agricultural land; forest fires especially in the Mediterranean part of Croatia and problems in management of private forests .

11) Topić, J. i Vukelić, J. (2009): Priručnik za određivanje kopnenih staništa u Hrvatskoj prema Direktivi o staništima EU. Državni zavod za zaštitu prirode, Zagreb

Area along the Sava River is famous for its oak forests. Photo: J. Vukelić

Box 5. SEAGRASS MEADOWS - AMONG THE MOST THREATENED MARINE HABITATS IN CROATIA

Four seagrass species have been recorded for the Croatian part of the Adriatic Sea - Neptun grass (*Posidonia oceanica*), Little Neptune grass (*Cymodocea nodosa*), *Zostera marina* and *Zostera noltii*. Among them, Neptun grass makes the largest and the most widespread meadows. In general, they are better developed in the central and southern part of the Adriatic, while the other three seagrass species are more widespread in the northern part.

Neptun grass meadows are habitats with very important ecosystem services and are included in Annex I of the Habitats Directive. They are "oxygen factories" and "reservoirs" of biodiversity where many species feed, reproduce and find shelter. Deposit of dead leaves of sea vegetation on sandy and pebble shores are also important as they contribute to the total quantity of organic substance in the coastal habitats. Organic detritus resulting from the disintegration of sea vegetation leaves serves as a food for some species of crustacean, small polychaetes, insects, species of beetles.

As the seagrasses grow where the pressure of human activities is high, they are threatened by an anchoring of vessels, wastewater pollution, invasive alien species (such as green algae of genus *Caulerpa*), marinas, ports, fish and shell cultivation facilities as well as some fishing gears like the bottom trawl nets. Due to their importance for biodiversity and ecosystem services, their sensitivity and the threats they face, all the seagrasses are strictly protected species.

Neptun grass meadow. Photo: B. Furlan

Layers of Neptun grass leaves deposited on the coast. Photo: T. Bakran-Petricioli

Cymodocea nodosa. Photo: T. Bakran-Petricioli

Zostera sp. Photo: T. Bakran-Petricioli

Box 6. RARE NATURA HABITAT TYPE IN CROATIA -92D0 SOUTHERN RIPARIAN GALLERIES AND THICKETS (NERIO-TAMARICETEA)

During development of Natura 2000 for Croatia, detailed research was done in order to clarify situation with this habitat type[12]. In Europe it is rare and distributed along the Mediterranean watercourses. In Croatia, two different types can be distinguished - associations with the Oleander (*Nerium oleander*) and associations with the Vitex (*Vitex agnus-castus*).

So far only four small sites have been registered with natural formations of Oleander. After phytosociological survey of each site it was determined that only one of them belongs to 92D0 habitat type: Orašac-kanjon, a site of 1 ha situated along the small watercourse Kočista, close to the coast. There is a water reservoir along the near-by water spring, divided from this Natura 2000 site by a dam. Downstream of the dam there is vegetation of the association *Rubo ulmifolii-Nerietum oleandri* that is distributed along the watercourse which finally enters the sea one km afterwards. It is the only site with this vegetation in Croatia while the other three sites with the Oleander belong to the maquis vegetation - one of them (Natura 2000 site Slano) belongs to the alliance *Oleo-Ceratonion* - another Annex I habitat type (9320 *Olea and Ceratonia* forests).

The study of *Nerio-Tamaricetea* in Croatia also pointed out that all associations with natural formations of Vitex also belong to this vegetation and can be classified under 92D0. Neretva Delta is Natura 2000 site with this habitat type as a target feature. It is a large delta area with a complex of different habitat types. On the river mouth with the sand beach there are fragments with vegetation of *Nerio-Tamaricetea* belonging to three associations: *Periploco-Viticetum agni-casti, Rubo-Viticetum agni-casti* and *Vitici-Tamaricetum dalmaticae*. Although this site is protected and included in ecological network, it is highly threatened by anthropogenic influence, especially outdoor recreational activities.

Natural formations of Oleander along the small watercourse in Orašac Natura site. Photo: N. Jasprica

Oleander in maquis of Oleo-Ceratonion in Slano Natura site. Photo: J. Radović, SINP

A bush of Vitex. Photo: N. Jasprica

12) Jasprica,N. (2009): Vegetation Nerio-Tamaricetea in Croatia. Scientific analysis. Report for the SINP.

Box 7. UNDERGROUND HABITATS

Due to very diverse geomorphological, hydrological and climatic conditions, Croatia has a great variability of terrestrial, water and interstitial underground habitats. Karst area covers 46% of Croatian territory. So far, there are about 7000 registered caves, but due to the intensification of research, significant increase of new discoveries is expected. Being part of the Dinaric mountain range, which is characterized by the highest diversity of cave fauna in the world, Croatian cave fauna, with a large number of endemic and relict species is extremely rich at European and global scale. The current number of terrestrial and aquatic cave invertebrates in Croatia exceeds 500, and about 70% of them are endemic.

Underground habitats and its species are extremely vulnerable and sensitive to external influences. Some of the major threats are physical devastation of habitats due to road construction, intensive urbanization, water pollution, intensive agricultural production with the use of synthetic fertilizers and pesticides, changes in groundwater regime or water quality, large hydrotechnical works, disturbance of animals by light in caves open to the public and amateur collection of groundwater fauna.

The most valuable caves in Croatia are included in ecological network Natura 2000 as 8310 habitat type. By its definition these are caves which are not open to public and which contain rich endemic fauna and/or Natura species like the Olm (*Proteus anguinus*), the Dinaric cave clam (*Congeria kusceri*) or terrestrial cave beetle *Leptodirus hochenwartii*. Besides, many caves are designated as Natura 2000 sites as important habitats for Annex II bat species.

One of the most important sites for underground water habitats is Natura site Ogulinsko-plaščansko područje on the border of Gorski kotar area. This site contains extremely rich and unique underground aquatic fauna. Besides the Olm it includes endemic Ogulin cave sponge (*Eunapius subterraneus*) - the world only known underground freshwater sponge; Dinaric cave tube-worm (*Marifugia cavatica*) - the world only known underground polychaete; *Velkovrhia enigmatica* - the world only known underground freshwater cnidarian as well as a number of endemic cave crustaceans and snails.

Dinaric cave clam (Congeria kusceri) - an endemic species of Dinaric karst and the only known aquatic cave clam in the world. Photo: H. Bilandžija

Olm (Proteus anginus) - an endemic species of Dinaric karst and the only known aquatic cave vertebrate in the world. Photo: B. Jalžić

1.2. Native indigenous species

(For detailed description of native indigenous species see the Chapter 1.2. of the NR4)

Status and trends

Currently, there are approximately 40,000 known species in Croatia. For the purposes of this Report, the term "species" includes also the lower intraspecific levels (subspecies, varieties), unless otherwise indicated. The assumed number of species is considerably higher, with estimates ranging from at least 50,000, to over 100,000 species. Every year, scientists are recording new species for Croatia as well as discovering and describing new species and subspecies for science, especially in poorly researched groups such as algae, mosses, fungi and invertebrates.

The richness of Croatia in terms of wild species lies not only in their diversity, but also in their endemic nature. Certain endemic species are tertiary relics that were left over in areas not greatly affected by glaciation, especially coastal mountains. Also, a number of endemics have developed in isolated habitats like caves, islands and Adriatic rivers.

In NR 4 it was stated that 911 species in Croatia are threatened (IUCN categories CR, EN and VU) out 2235 evaluated species. By the end of 2012, 1284 species (CR, EN and VU) are on the national Red list out of 2954 evaluated. It must be noted that these numbers cannot be used for trend analysis because new groups of species were included since 2009. Population trends and changes of status of individual species are still not known but will be available upon revision of red lists, using recent IUCN methodology.

Comparing presented data with the data from the NR4, one can notice an increase in the number of known or recorded species in Croatia by over 2000 species, which makes about 5%. The reason behind this is not necessarily an actual increase in the number of species, but better knowledge resulting from intensified research focused on the inventory of flora and fauna. In some cases, the number of recorded species has indeed increased, for example in case of plants and certain invertebrate groups. It should be mentioned that the significant contribution to intensive biodiversity research during reporting period was provided by the nature protection sector through (co)financing a number of research projects (approximately 700). This engagement was mostly related to research of species covered by the Birds and the Habitats Directive for the purpose of preparing ecological network Natura 2000. The biggest step forward in terms of knowledge regarding biodiversity was achieved in case of invertebrates, which is the consequence of their numbers and diversity. However, the knowledge about invertebrates is still significantly lagging behind the knowledge about vertebrates.

Even 2.79% of species recorded in Croatia are endemic. Freshwater fishes include the largest percent (11.8%) of endemics and the largest part of stenoendemics, which are connected to karstic rivers of Adriatic basin. They are followed by invertebrates (7.5%) and plants (6.7%).

Hereby, in the following text new information on native indigenous species is presented, comparing to the NR4.

Table 3. *Number of known, endemic, threatened, protected and extinct species in Croatia in 2012. (Source: SINP database, 2013)*

Group	Total number of known species[1]	Number and percentage (%) of endemic species[1]	Number and percentage (%) of threatened species CR/EN/VU[1]	Number and percentage (%) of protected species[1,2]	Number and percentage (%) of extinct species[1,6]
Fungi	~ 4500	? (?)	251 (~ 5.6)	381 (~ 8.5)	0 (0)
Lichens	1028	0 (0)	46 (4.5)	98 (9.5)	0 (0)
Plants (Bryophita, Pteridophta and Spermatophyta)	5636	377 (6.7)	223 (3.9)	1641 (29.1)	11 (0.20)
Freshwater algae	1668	6 (0.4)	? (?)	0 (0)	? (?)
Sea algae	1525	? (?)	8 (0.5)	21 (1.4)	0 (0)
Terrestrial invertebrates	~ 16 300	~ 540 (~ 3.3)	341 (~ 2.1)	673 (~ 4.1)	? (?)
Freshwater invertebrates	~ 2000	~ 150 (~ 7.5)	175 (~ 8.75)	229 (~ 11.5)	4 (~ 0.2)
Saltwater invertebrates	6781	~ 15 (~ 0.2)	65 (1.0)	89 (1.3)	? (?)
Freshwater fish[3]	153	18 (11.8)	61 (39.9)	100 (65.4)	6 (3.9)
Saltwater fish[3]	452	0? (0?)[4]	24 (5.3)	34 (7.5)	3 (0.7)
Amphibians	20	0 (0)	2 (10)	20 (100)	0 (0)
Reptiles	39 +2*	0 (0) / 4[5]	6 (14.6)	39 (95)	0 (0)
Nesting birds	246	0 (0)	56 (26.8)	240 (97.6)	10 (4.1)
Wintering birds	136	0 (0)	9 (6.6)	132 (97.1)	1 (0.7)
Migratory birds	205	0 (0)	9 (4.4)	201 (98)	1 (0.5)
Mammals	116 (101)[7]	1 (1)	8 (7.9)	85 (73.3)	5 (4.3)
TOTAL	***~ 40,000***	***~ 1110 (~ 2.7)***	***1284 (~ 3.1)***	***3984 (~ 9.9)***	***41 (~ 0.1)***

1 Sums in case of vertebrates include only species, while invertebrates, plants, algae, fungi and lichens also include subspecies; in case of birds, the calculation includes separate populations (nesting, wintering and migratory) for all species recorded in Croatia so far (i.e. all regular, irregular, occasional and rare species)
2 The total number of protected species also includes protected and strictly protected species (Ordinance on Proclamation of Wild Species Protected and Strictly Protected; Official Gazette 99/09)
3 In case of fishes, some species are specified in the sum of freshwater species and in the sum of marine species, given the fact that they use both ecosystems, which means that the total number of fish species in Croatia is not the sum of these two numbers
4 Four endemic species in the Adriatic are known; however, they are probably not stenoendemic to Croatia
5 The number of endemic subspecies is presented separately
6 There were no extinctions during the reporting period; the situation is presented according to actual red lists
7 The total number of known mammal species includes free wild species (101), one domesticated species and all introduced species
** Wild species which are questionable for Croatia*

Fungi and lichens

Approximately 4500 species of fungi and lichens have been recorded in Croatia so far. The exact number is not known, because not all the data (published and unpublished) have been processed and consolidated, and more detailed research is also lacking. According to a moderate assessment, there are approximately 20,000 species in the territory of Croatia, out of which 1100 lichens.

Plants and algae

There are 8829 species and subspecies of plants and algae recorded in Croatia.

Vascular flora of Croatia (Pteridophyta and Spermatophyta), according to available data, includes the total of 4990 species and subspecies. Due to a different methodology of presenting species and subspecies, this number is lower than the number from NR4. However, in reality, this number should in fact be higher, due to the fact that new plant species and subspecies have been recorded in the period from 2008 to 2013 (e.g. *Carex punctata, Iris pumila, Pimpinella tragium* subsp. *lithophila*, *Reseda inodora*), including alien species (e.g. *Thladiantha dubia*). Some new species have also been scientifically described (e.g. *Allium croaticum, Allium telmatum* (Fig. 1), *Astragalus croaticus*).

There are 377 endemic plant species and subspecies in Croatia. Some of them are more widespread also outside Croatia (subendemic species, e.g. *Chouardia litardierei, Limonium cancellatum, Tanacetum cinerariifolium*, while some grow on only one or several localities in Croatia (stenoendemic species; e.g. *Brassica botteri, Centaurea crithmifolia, Degenia velebitica*). There are 112 stenoendemic and 265 subendemic species. Areas with the highest concentration of stenoendemic species are the Velebit, Biokovo and Mosor mountains, followed by the area of Kvarner Bay, islands in central and southern Dalmatia, and the southern region of Konavle.

Fig. 1 *Allium telmatum, one of the new species scientifically described during the reporting period. It grows in coastal salt marshes and flowers in autumn. Photo: I. Boršić*

Box 8. VELEBIT DEGENIA (*Degenia velebitica*)

Velebit degenia is Croatian endemic species which was discovered by the Hungarian botanist Arpad Degen in 1907 on the Velebit Mountain. Only three sites with this plant have been identified so far, with estimated population of 37,000 individuals, covering in total 4.8 ha. It grows in habitat types of calcareous screes exposed to the wind and free from snow, covering sites exposed to the sun. As it grows on inaccessible area, it is possible that new sites could be found.

Based on the proposal made by Croatia during the process of its accession to EU, Velebit degenia was included in the Annex II (as priority species) and Annex IV (species of community interest in need of strict protection) of the Habitats Directive. Habitat loss caused by succession, shifting agriculture, collecting seeds for horticulture and very restricted genetic variability represent the main threats for this species.

Velebit degenia in flower. Photo: S. Bogdanović

Velebit degenia in fruit. Photo: J. Radović, SINP

The total of 646 species of **mosses** has been recorded for Croatia, out of which 488 species belong to Bryophyta, 156 species to Marchantiophyta, and two species to Anthocerotopyta. Given the fact that the bryoflora of Croatia has been poorly researched and data on the most moss species are old, it is believed that the number of moss species is in fact higher, which is also confirmed by recent new findings (e.g. *Ditrichum gracile, Calypogeia sphagnicola*).

There are 2306 **algae** recorded for Croatia: 1668 freshwater and 638 marine. Generally, algae are poorly researched in Croatia. There are two centers of sea algae endemism in the Adriatic Sea. The first center is located in the north, along the western coast of the Adriatic and the area of Kvarner Bay, while the other center covers the open sea of the central Adriatic with islands. There are 31 species of endemic benthos algae recorded along the island of Jabuka, and 40 endemic species in the area around the islands of Vis and Biševo. The island of Jabuka is also a locality where algae are found at the biggest depth in the Adriatic, approximately 260 meters.

The total of six endemic species of freshwater algae has been recorded in Croatia: *Achnanthes plitvicensis, Cyclotella plitvicensis, C. pevalek, C. juriljii, Navicula jakovljevici* and *N. plitvicensis*. Taxonomically, these species belong to the group of Diatomeae, and their exclusive finding site is located in the area of the Plitvice Lakes National Park.

Invertebrates

In this reporting period the number of recorded invertebrates increased significantly, as a result of intensified research and a larger number of involved researchers, which led to the collection of new data, together with digitalization and consolidation of existing data. This increase also includes newly recorded alien species.

There are more than 25,000 recorded species of invertebrates: 65.25% terrestrial, 27.2% saltwater and 8% of freshwater. Insects are the dominant group in terms of numbers with approximately 14,000 species, most of which belong to Coleoptera, Lepidoptera and Diptera. Insects are followed by Arachnida and Gastropoda. When comparing ecosystems, insects constitute the biggest share of species among both land and freshwater invertebrates, while crustacea are dominating in the marine ecosystem.

Even 670 of recorded invertebrates are endemic (2.7%). Among freshwater invertebrates, the richest groups with

endemics are Gastropoda and Amphypoda of karstic watercourses while among terrestrial invertebrates cave fauna and Arachnida are predominant, as well as the snails of Adriatic coast and islands.

Freshwater fish

So far, altogether 153 fish species have been recorded in Croatian freshwaters but 130 are considered to be regularly occurring (21 inhabit also marine habitats). This makes 24% of European freshwater ichthyofauna, making Croatia the 2nd richest country in Europe, after much larger Turkey.

During this reporting period three new species have been described for the science (*Telestes karsticus, Squalius janae* and *Alburnus neretvae*). Croatian stenoendemic species in the Danube basin include four species. Due to the considerable number of isolated habitats and geological events, the Adriatic basin is particularly rich in endemic freshwater fish species. It is inhabited by as many as 15 stenoendemic species of Croatia. This is an indicator of major ichthyological value of the Dalmatian region and it is therefore not surprising that the region constitutes one of the centers of ichthyofauna diversity in Europe.

Table 4. *List of stenoendemic freshwater fish species in Croatia*

Species	Basin
Salmo visovacensis	Adriatic
Salmo zrmanjensis	Adriatic
Squalius zrmanjae	Adriatic
Squalus illyricus	Adriatic
Telestes polylepis	Danube
Telestes karsticus	Danube
Telestes ukliva	Adriatic
Telestes tursky	Adriatic
Phoxinellus dalmaticus	Adriatic
Telestes fontinalis	Danube
Telestes croaticus	Adriatic
Delminichtys jadovensis	Adriatic
Delminichtys krbavensis	Danube
Cobitis jadovensis	Adriatic
Cobitis dalmatina	Adriatic
Cobitis illyrica	Adriatic
Knipowitschia croatica	Adriatic
Knipowitschia mrakovcici	Adriatic
Knipowitschia radovici	Adriatic

Marine fish

There are 442 marine fish species recorded for the Adriatic Sea, what is about 60% of the total marine fishes of the Mediterranean Sea. It is important to note that the findings of at least 20 of species are old, not reliable and imprecise. The issue of endemic species in the Adriatic ichthyofauna is highly complex and so far unresolved, due to the frequent changes of taxonomic meaning and diverging opinions regarding the distribution of such species. For the time being, with a certain degree of reservation, it is believed that there are four endemic fish species in the Adriatic (1.1%), out of which all belong to the area of the continental shelf: *Acipenser naccarii*, *Knipowitschia panizzae*, *Pomatoschistus canestrinii* and *Speleogobius trigloides*.

Amphibians

The number of recorded amphibians in Croatia is 20, the same as in the previous reporting period.

Reptiles

The reliable number of reptiles recorded in Croatia is 39. Additionally, there are records of two species that are questionable because their latest findings have not been confirmed: the Anatolian Worm Lizard (*Blanus strauchi*) and the Worm snake (*Tyohlops vermicularis*). In NR4 the number of reptiles was 41 because it included these two questionable species.

Birds

The new list of birds from 2010[12] contains 399 species ever recorded in Croatia. It includes accidentals as well as 14 alien species, 3 of them being introduced by hunters, with established breeding populations. There are 288 regularly occurring species or 55% of European ornithofauna.

Mammals

There are 116 mammal species ever recorded for Croatia. This number includes 101 wild species (as mentioned in NR4) plus one extinct species at the European level (*Bos primigenius*) and 14 introduced alien species. Croatia is one of rare European countries with populations of three large carnivores: the Wolf *(Canis lupus)*, the Brown bear *(Ursus arctos)* and the Eurasian lynx *(Lynx lynx)*.

With its 34 bat species, Croatia is the richest bat fauna country in Europe. There are 10 species of marine mammals recorded for the Adriatic Sea: 9 species of Cetaceans and one species of *Phocidae* - the Mediterranean monk seal (*Monachus monachus*). Among them, only the Bottlenose dolphin (*Tursiops truncatus*) is resident for the Adriatic Sea, and the only marine species for which sites of Natura 2000 network are designated. According to areal survey from 2010, it is esimated that there are obout 5700 individuals of the Bottlenose dolphin in the Adriatic Sea.

Threats

The total of 17 red lists have been created so far in Croatia. In the period covered by this Report, four red lists have been prepared: for cave fauna (2009), freshwater and brackish water Crustacea (2011), land and freshwater snails as well as sea algae and sea grasses (proposal completed in 2011, with categories for some species revised in 2012). In addition, revisions have been prepared for three red lists: reptiles and amphibians (2012), butterflies and birds (both completed in 2013). Regarding mammals, on the basis of reports on the status of lynx population in 2011 and 2012, indicating that it is critically endangered due to small population and inbreeding, this species changed its IUCN category from NT to CR. Red books for cave fauna, birds and reptiles and amphibians have been published. Red book of corals is in preparation.

In all 17 red lists, the total of 2953 threat assessments were conducted, which does not cover all species known in these groups in Croatia, but certainly covers the most threatened ones. The biggest number of species with threat assessments belongs to vascular flora, followed by Coleoptera in the family of ground beetles (Carabidae). However, it is important to mention that the Red list of cave fauna includes assessments of 54 threatened species which are also covered by red lists of amphibians and reptiles, ground beetles, land and freshwater snails, and freshwater and brackish water crustacea, so the actual number of species with threat assessments conducted stands at 2899 species.

The red list of Croatia includes one species extinct in nature (EX), the plant Jabuka pink (*Dianthus multinervis*), and 42 species extinct in Croatia (regionally extinct species - RE). The most threatened groups regarding the proportion of threatened species are freshwater fishes (42%) and cave fauna (37%), followed by land and water snails, dragonflies and breeding birds (all 23%).

12) Tutiš, V., Kralj, J., Radović, D., Ćiković, D., Barišić, S. (ur.) (2013): Crvena knjiga ptica Hrvatske. Ministarstvo zaštite okoliša i prirode, Državni zavod za zaštitu prirode, Zagreb

Box 9. MEDITERRANEAN MONK SEAL (*Monachus monachus*)

Mediterranean monk seal (*Monachus monachus*) is one of the most endangered species of mammals in the world, and among the species with the lowest number of living animals. Its first scientific description stems from 1779, based on the carcass found near the settlement of Osor on the island of Cres in Croatia. This seal used to breed in marine caves in Adriatic Sea but during last decades it has drastically declined, partly because it was persecuted by fishermen, so today the breeding population is considered to be extinct in Croatia. Still, the species is strictly protected as there are numerous sightings of individual specimens in the Adriatic. During the last five years period, a number of reports of sightings from throughout the Adriatic exist but photo documentation has confirmed only one single animal, predominantly staying in the northernmost part of the Croatian side of the Adriatic. Efforts of relevant institutions, experts and the Mediterranean Monk Seal Group have been invested in order to prepare *the Code of Conduct during the encounter with Mediterranean monk seal* giving instructions for people who encounter this animal in the sea; around or in marine cave; on the coast; as well as while in a boat. Monitoring cameras have been installed in marine caves which are more frequently used by the Monk seal.

Mediterranean monk seal along the Istrian coast in 2012. Photo: Mediterranean Monk Seal Group

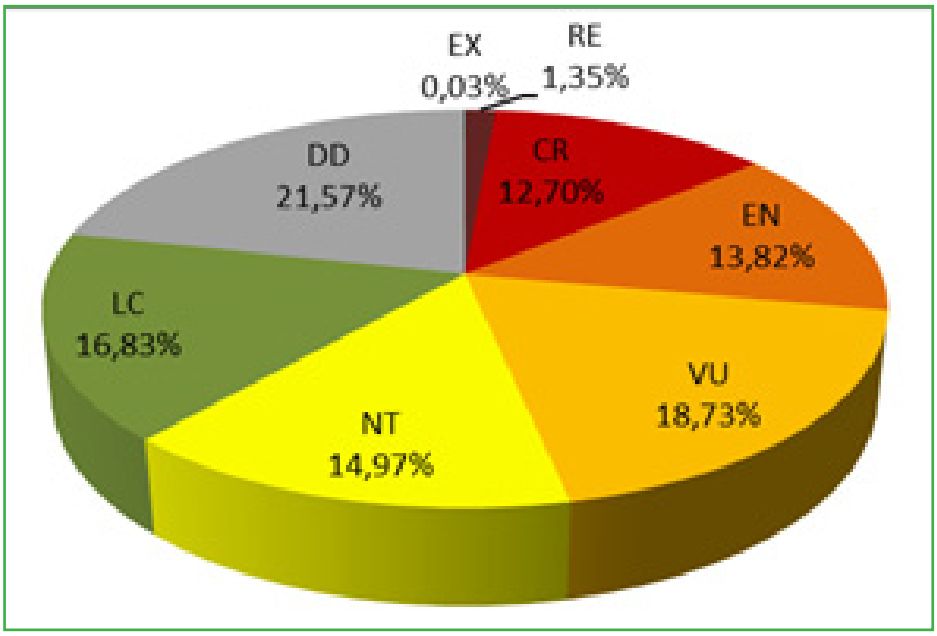


Figure 2. *Representation of individual categories in the total of assessed species. EX - Extinct, RE - Regionally Extinct, CR - Critically Endangered, EN - Endangered, VU - Vulnerable, NT - Near Threatened, LC - Least Concern, DD - Data Deficient*

Table 2. *Overview of the number of species[1] in Croatia with threat assessments[2] based on red lists. EX - Extinct, RE - Regionally Extinct, CR - Critically Endangered, EN - Endangered, VU - Vulnerable, NT - Near Threatened, LC - Least Concern, DD - Data Deficient (Source: SINP database, 2013)*

Group	Number of species[1]								
	EX	RE	CR	EN	VU	NT	LC	DD	Total
Fungi	0	0	55	77	119	0	0	63	314
Lichens*	0	0	3	11	32	8	2	0	56
Vascular flora	1	10	90	62	71	186	0	340	760
Sea algae i seagrass	0	0	2	0	6	3	49	22	82
Butterflies	0	0	8	4	7	18	0	8	45
Dragonflies	0	2	6	5	5	12	0	6	36
Ground beetles	0	0	38	35	63	76	143	40	395
Stoneflies	0	2	1	3	11	4	26	35	82
Land and freshwater snails	0	0	50	50	48	4	12	30	194
Freshwater and brackish crustacea	0	0	6	24	20	13	2	3	68
Corals	0	0	8	20	37	7	13	31	116
Cave fauna	0	0	65	49	70	0	0	2	186
Freshwater fish	0	6	13	20	28	11	2	8	88
Saltwater fish	0	3	5	8	11	28	36	32	123
Amphibians	0	0	0	3	0	4	14	2	23
Reptiles	0	0	0	5	2	12	21	1	41
Birds - nesting population	0	10	18	23	15	25	144	0	235
Birds - migratory population	0	1	3	2	3	7	18	5	39
Birds - wintering population	0	1	3	3	2	4	14	1	28
Mammals	0	6	1	4	3	20	1	8	42
TOTAL	***1***	***41***	***375***	***408***	***553***	***442***	***497***	***637***	***2954***

1 Threat assessments included the determination of threat categories for species and subspecies or varieties.
2 A Number of species, especially cave fauna, crustaceans, snails and marine/freshwater fishes, have been evaluated in the framework of different red lists/books

The biggest threat to wild species in Croatia which affects 53.5% of assessed species is posed by direct destruction of their habitats (DT7 according to IUCN Threats Classification Scheme). Natural habitats are being transformed into construction or agricultural land, while the construction of roads and other transport routes results in habitat fragmentation. On the other hand, due to the decay of traditional, low-productivity agriculture, previous large surfaces of pastures and meadows are turning into thicket, with their biodiversity disappearing. Water management interventions are changing the natural water regime of watercourses, which results in the degradation of wetland habitats with high economic and biological value, such as floodplain forests of Pedunculate oak. The introduction of alien species, some of which are turning into invasive ones, also represents a major threat to wild species. Excessive use through commercial harvesting of plants and fungi, or through fishing, exposes the populations of a number of wild species to danger. Intensive agriculture and tourism, pollution of water, soil and air, as well as poaching, constitute significant threats to wild species of Croatia. In addition, one should also not disregard the impact of climate change, which is considered to be one of the key causes of threat to biodiversity globally, with recorded influences in terms of, among other things, nesting time, migrations, reproduction success and changes in species distribution. These effects have already been registered in Croatia, especially change of dates of arrival of certain birds and start of the nesting. The fact is that the effects of many threats to biodiversity in Croatia are not completely known and they require further research, especially the issue of climate change effects on biodiversity.

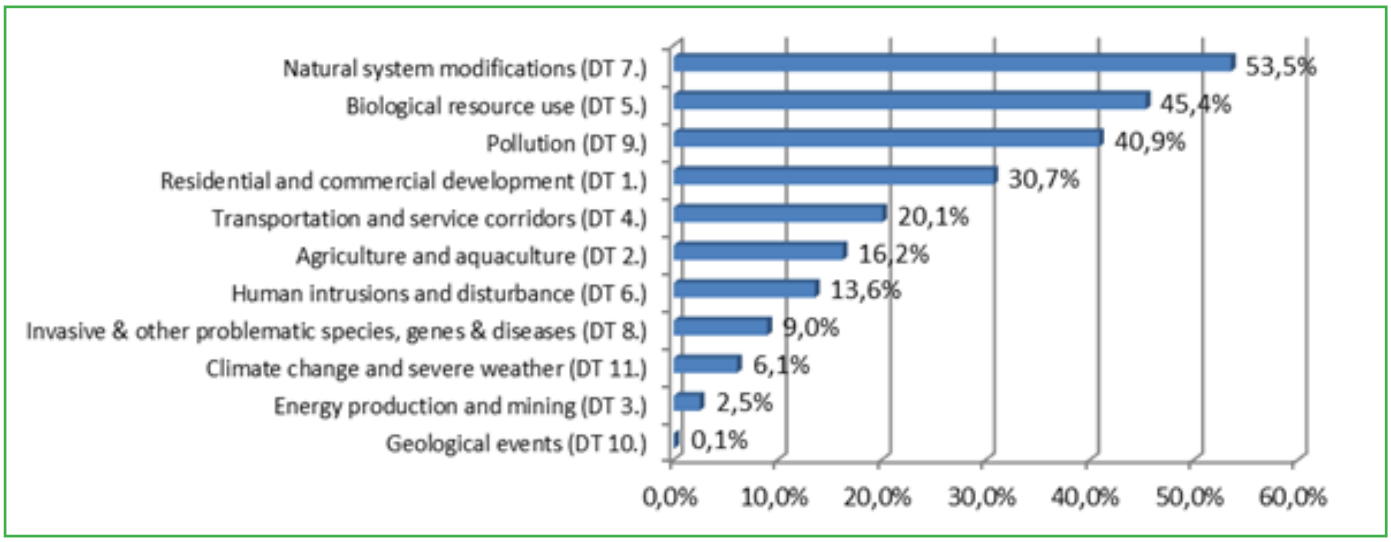


Figure 3. *Threats to the wild species in Croatia (categorized according to the first level of IUCN Threats Classification Scheme) with percentage of affected species*

Box 10. BALKAN SNOW VOLE (*Dinaromys bogdanovi*) - GLOBALLY THREATENED SPECIES (IUCN RED LIST)

Balkan snow vole is an endemic species of the Dinarides that was included in the Annexes II and IV of the Habitats Directive, based on the proposal made by Croatia during the process of its accession to EU. It is the only living representative of its genus, and its range was restricted throughout prehistorically times. After Pleistocene, the disappearance of the species in Europe commenced in the northwestern part of its land area (the species has so far disappeared from Italy and Slovenia), and it is assumed that the disappearance could also ensue in Croatia and Bosnia and Herzegovina[13]. Genetic and morphological data clearly indicate that the Balkan Snow Vole is composed of three historically isolated, independently evolving sets of populations, that can be regarded as evolutionary significant units (ESUs).

Typical habitat of the Balkan snow vole are groupings of rocks on meadows above the tree line but it can also be found more sparsely distributed in rocky habitats below the tree line. Because it is restricted to karst limestone habitats, it has a naturally discontinuous distribution, and subpopulations are always small and isolated. Possible threat to the species is interspecific competition with another native rock-dwelling vole, European snow vole (*Chionomys nivalis*) but its extent should be determined through a long term monitoring program. In the IUCN Red List, Balkan snow vole is classified as a vulnerable species (VU). In the period from 2008 to 2012, research was conducted with the aim of determining the actual distribution of the species in Croatia.

Dinara Mountain - typical habitat of the Balkan snow vole. Photos: N. Tvrtković

Young female Balkan snow vole

13) Kryštufek, B. 2008. Dinaromys bogdanovi. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>

1.3. Domesticated indigenous species

Status and trends

The creation of the *National Program of Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture in the Republic of Croatia*, which is an important legislative document for the conservation of all plant genetic sources, including domesticated varieties, began back in 2006 and was adopted in 2013.

Despite the fact that Croatia has a number of collections of varieties of cultivated plants, which are being stored at various entities (in the form of seeds, plant material or field collections), and which are part of the National Plant Gene Bank, the comprehensive list of indigenous varieties of cultivated plants has not yet been created. The consolidation of data on all accessions preserved in all collections throughout Croatia is undertaken by the Institute for Seeds and Seedlings of the Croatian Centre for Agriculture, Food and Rural Affairs.

There are 27 currently recognized and preserved indigenous breeds of domesticated animals in Croatia: three cattle (Istrian cattle, Slavonian-Syrmian Podolian cattle and Buša), four horses (Croatian Posavina horse, Croatian coldblooded horse, Lipizzan and Međimurje horse), three donkeys (Istrian donkey, Coastal Dinaric donkey and Northern Adriatic donkey), three goats (Croatian mottled goat, Croatian white goat and Istrian goat, Fig. 4. and 5.), two swine (Slavonian black pig and Turopolje pig), nine sheep (Cigaja, Cress sheep, Dalmatian pramenka sheep, Dubrovnik sheep, Istrian sheep, Krk sheep, Lika pramenka sheep, Pag sheep and Rab sheep), one turkey (Zagorje turkey), one chicken (Croatian Hen) and one Bee (Grey honey bee). They are all listed on the *National List of indigenous and protected breeds and varieties of domesticated animals*. The list is being supplemented with breeds whose indigenous status is confirmed in compliance with the *Ordinance on confirmation of new breeds, varieties and hybrids (OG 164/04)*. During this reporting period, one breed (Istrian goat) was included on this list as indigenous breed. Indigenous dog breeds are not included on this list. The Grey honey bee (*Apis mellifica carnica*), which is also on this list, is not subject to the national breeding program and is not recorded in Domestic Animal Diversity Information System (DAD-IS) which is hosted by the Food and Agriculture Organization of the United Nations (FAO) (http://dad.fao.org/).

The most numerous breeds in Croatia are Dalmatian pramenka sheep and Lika pramenka sheep, whose number increased during this reporting period.

It is important to note that the most of Croatian indigenous breeds are still kept predominantly in traditional way and have an important role in maintaining certain threatened habitat types. For example, Croatian Posavina horse (Fig. 6. and 7.), Croatian coldblooded horse, Turopolje pig, Slavonian black pig and Slavonian-Syrmian Podolian cattle spend the most of the year outside and contribute significantly to conservation of wet grasslands along the Sava River.

Figure 4. *Istrian goat - female. Photo: A. Ivanković*

Figure 5. *Istrian goat - male. Photo: A. Ivanković*

Figure 7. *Posavina horse is important for maintaining wet grasslands along the Sava River. Photo: J.Radović*

The Register of all dog breeds in Croatia is kept by the Croatian Kennel Club (CKC) which issues Croatian pedigrees for all dogs registered and born in Croatian territory, and issues all ordinances and regulations pertaining to the breeding of pure-blooded dog breeds, their assessment and exhibition at dog shows. There are seven registered indigenous Croatian dog breeds: Dalmatian dog, Istrian short-haired hound, Istrian coarse-haired hound, Posavaz hound, Croatian sheepdog, Tornjak (Bosnian-Herzegovinian and Croatian shepherd dog, Fig. 8.) and Međi (Small Međimurje dog).

Figure 8. *Tornjak (Bosnian-Herzegovinian and Croatian shepherd dog) lives in the sheep herd and protects them from wolves. Photo: SINP*

Threats

In 2009, a *Commission for the Preparation of the National Program and Action Plans for the Conservation of Farm Animal Genetic Resources* made a national assessment of threats to domesticated indigenous breeds according to IUCN criteria, in order to start the implementation of conservation activities for endangered one. However, during the 2011, a new assessment and evaluation of data were prepared by using the adjusted IUCN categories and criteria for national level.

Although awareness raising and implementation of conservation activities helped to raise the abundance of some indigenous breeds, there are still numerous reasons why the indigenous domesticated species are threatened, particularly changes in agricultural practice and strategies in agricultural production (favoring a small number of highly productive varieties and breeds) and socio-economic changes in the country (rural depopulation). There is also still room for improvement of relevant legislation as well as related incentives.

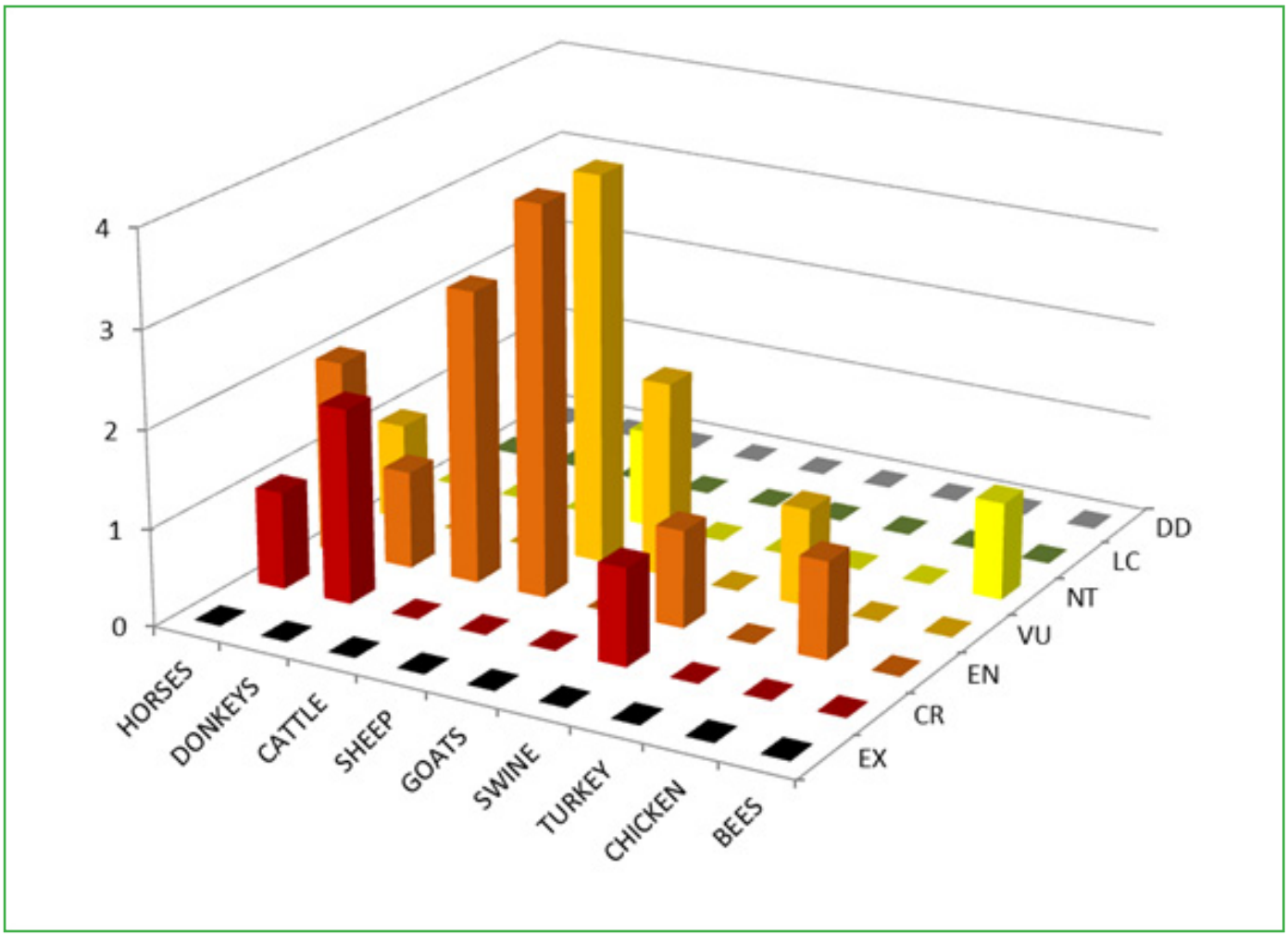


Figure 9. *Overview of threats to indigenous breeds, with the threat assessment prepared according to adjusted IUCN categories and criteria: EX - Extinct, CR - Critically Endangered, EN - Endangered, VU - Vulnerable, NT - Near Threatened, LC - Least Concern, DD - Data Deficient*

1.4. Invasive alien species

Status and trends

Invasive alien species represent significant threat to biodiversity, which intensity and scope is still being researched. Since 2009 the number of recorded alien species in Croatia has increased but complete analysis of their number, introduction, distribution and impact on ecosystems still does not exist. Lists of invasive alien species for different taxonomic groups are only partial. The most comprehensive one is the preliminary list of invasive alien plants. Among 606 species and subspecies of alien plants recorded for Croatia (what is about 11.9% of the total Croatian vascular flora), 64 of them are invasive. As it is assumed that there could be even more than 1500 alien plants in Croatia, the number of registered invasive ones will most certainly rise. The majority of invasive alien plants originate from North and South America. They have been registered on almost 50% of Croatian territory, most of them being distributed in big towns and sea ports as well as along the large lowland rivers. During last two decades, the largest number of new alien species is connected to Mediterranean area, especially islands. Generally, alien plants occur in most cases in agricultural and artificial areas.

Table 3. *Preliminary List of Invasive Alien Plants in Croatia*

Species	
Abutilon theophrasti Medik.	*Erigeron annuus* (L.) Pers. subsp. *strigosus* (Mühlenb. ex Willd.) Wagenitz
Acer negundo L.	*Euphorbia maculata* L.
Ailanthus altissima (Mill.) Swingle	*Euphorbia prostrata* Aiton
Amaranthus retroflexus L.	*Galinsoga ciliata* (Raf.) S.F.Blake
Ambrosia artemisiifolia L.	*Galinsoga parviflora* Cav.
Amorpha fruticosa L.	*Helianthus tuberosus* L.
Angelica archangelica L. subsp. *archangelica*	*Impatiens balfourii* Hooker f.
Artemisia annua L.	*Impatiens glandulifera* Royle
Artemisia verlotiorum Lamotte	*Impatiens parviflora* DC.
Asclepias syriaca L.	*Juncus tenuis* Willd.
Aster squamatus (Spreng.) Hieron.	*Lepidium virginicum* L.
Bidens frondosa L.	*Nicotiana glauca* Graham
Bidens subalternans DC.	*Oenothera biennis* L.
Broussonetia papyrifera (L.) Vent.	*Oxalis pes-caprae* L.
Carpobrotus edulis (L.) N.E.Br. in Phillips	*Panicum capillare* L.
Cenchrus incertus M.A.Curtis	*Panicum dichotomiflorum* Michx.
Chamomilla suaveolens (Pursh) Rydb.	*Parthenocissus quinquefolia* (L.) Planchon
Chenopodium ambrosioides L.	*Paspalum dilatatum* Poir.
Conyza bonariensis (L.) Cronquist	*Paspalum paspalodes* (Michx.) Scribn.
Conyza canadensis (L.) Cronquist	*Phytolacca americana* L.

Species	
Conyza sumatrensis (Retz.) E.Walker	*Reynoutria japonica* Houtt.
Cuscuta campestris Yuncker	*Reynoutria sachalinensis* (F.S.Petrop.) Nakai in T. Mori
Datura innoxia Mill.	*Robinia pseudoacacia* L.
Datura stramonium L.	*Rudbeckia laciniata* L.
Diplotaxis erucoides (L.) DC.	*Solanum eleagnifolium* Cav.
Duchesnea indica (Andrews) Focke	*Solidago canadensis* L.
Echinocystis lobata (Michx.) Torr. et Gray	*Solidago gigantea* Aiton
Eleusine indica (L.) Gaertn.	*Sorghum halepense* (L.) Pers.
Elodea canadensis Michx.	*Tagetes minuta* L.
Epilobium ciliatum Raf.	*Veronica persica* Poir.
Erigeron annuus (L.) Pers. subsp. *annuus*	*Xanthium spinosum* L.
Erigeron annuus (L.) Pers. subsp. *septentrionalis* (Fernald et Wiegand) Wagenitz	*Xanthium strumarium* L. subsp. *italicum* (Moretti) D.Löve

Pressure of invasive alien algae in the Adriatic Sea is increasing due to global climate change. The tropical green algae *Caulerpa taxifolia* and *Caulerpa racemosa* var. *cylindracea* are among the most invasive, posing significant threat to sea grass meadows. *C. taxifolia* was observed at three locations in 1994 and 1996 but it remained restricted to only one site with decreasing trend since 2009, possibly because of relatively low winter temperatures. *C. racemosa* (Fig. 10.) was first found in autumn 2000 close to the Hvar Island in Middle Adriatic and by the end of 2010 it was observed at 99 locations.

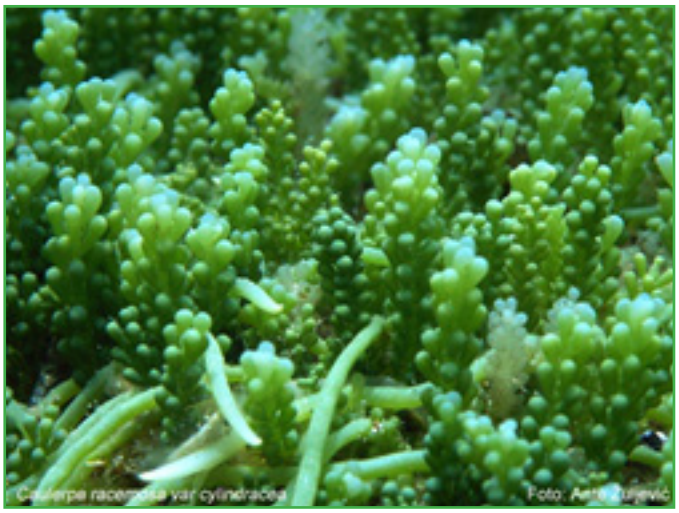


Figure 10. *Caulerpa racemosa. Photo: A. Žuljević*

Figure 11. *Gambusia holbrookii. Photo: A. Duplić*

For different groups of animals some lists of alien species exist but without specifying their invasive influence. Among freshwater fish, 25 alien species have been recorded for Croatia, which makes about 70 % of the total alien freshwater species recorded in Europe. Most of them have adapted to new habitats but some of them have been recorded only occasionally. In this reporting period there are 6 new species, only one of them - *Neogobius gymnotrachelus* with established breeding populations.

Table 4. *List of Alien Freshwater Fish Species in Croatia. Species that are recorded in this reporting period are marked bold.*

Species		
Ameiurus melas	*Hypophthalmichthys nobilis*	*Oncorhynchus mykiss*
Ameiurus nebulosus	*Lepomis gibbosus*	***Oreochromis niloticus***
Carassius auratus	*Micropterus salmoides*	***Percottus glenii***
Carassius gibelio	***Morone saxatilis x M. chrysops***	***Piaractus brachypomus***
Coregonus lavaretus	*Neogobius fluviatilis*	*Pseudorasbora parva*
Coregonus peled	***Neogobius gimnotrachellus***	***Salmo salar***
Ctenopharyngodon idella	*Neogobius kessleri*	*Salvelinus alpinus*
Gambusia holbrookii	*Neogobius melanostomus*	*Salvelinus fontinalis*
Hypophthalmichthys molitrix		

The Croatian ichthyofauna of the Adriatic Sea also includes alien fish species. There are 25 alien fish species recorded in the Adriatic so far but only 10 have been recorded more than once, so it is difficult to define their status in the Adriatic and if some of them may have established populations. One of the causes of their entry into the Adriatic is changes in climate and oceanographic processes. New fish species arrive into the Mediterranean via the Gibraltar and the Suez Canal. Those that reach the Mediterranean via the Suez Canal from the Red Sea are called “Lessepsian migrants” (Fig. 12.). Some of these species are strong predators and can have a direct impact on the food chains in the Adriatic ecosystem. Accidental introduction, escape from aquaculture or aquariums, and ballast waters are also important causes of the entry of alien fish species into the Adriatic.

Figure 12. *Bluespotted cornetfish (Fistularia commersonii) - Lessepsian migrant. Photo: A. Žuljević*

Table 5. *List of Alien Sea Fishes in Croatia. Underline - more than one record*

Species		
Caranx crysos	*Holacanthus ciliaris*	*Plectorhinchus mediterraneus*
Caranx ronchus	*Lagocephalus lagocephalus lagocephalus*	*Saurida undosquamis*
Cyclopterus lumpus	*Lagocephalus sceleratus*	*Siganus luridus*
Elates ransonnetti	*Lobotes surinamensis*	*Siganus rivulatus*
Enchelycore anatina	*Mycteroperca rubra*	*Sphyraena chrysotaenia*
Epinephelus coioides	*Pagrus major*	*Stephanolepis diaspros*
Equulites (Leiognathus) klunzingeri	*Paraexocetus mento*	*Terapon theraps*
Fistularia commersonii	*Paranthias furcifer*	*Tylosurus acus imperialis*
Hemiramphus far		

The most problematic species of invasive reptiles is the Red-eared terrapin (*Trachemys scripta elegans*) (Fig. 14.), which negatively affects the native European pond terrapin (*Emys orbicularis*). A research following its colonization of the lakes in protected park Maksimir in Zagreb was undertaken in the period 2006-2012. The number of this alien species was rising constantly on account of the native terrapin, from 65 in 2006 to 206 in 2012, while the native species decreased from estimated 11-12 to only 2 specimens.

In 2009, 16 invasive alien invertebrates in freshwater ecosystems have been recorded, but today this number is probably higher than 20. The most known are the Zebra mussel (*Dreisenna polymorpha*), the Killer shrimp (*Dikerogammarus villosus*) and Signal crayfish (*Pacifastacus leniusculus*). Among the most known terrestrial invasive alien invertebrates are Harlekin beetle (*Harmonia axyridis*) (Fig. 13.), Chestnut gall wasp (*Dryocosmus kuriphilus*), butterfly Geranium bronze (*Cacyreus marshalli*), spider (*Mermessus trilobatus*) and snail Red slug (*Arion rufus*).

Some invasive species cause serious damages to the economy and pose a threat to human health. It is estimated that the Zebra mussel (*Dreisenna polymorpha*) overgrowing parts of hydropower plant Varaždin on the Drava River, caused additional costs for its removal of 200,000€ during the four years period. Besides, cleaning of one channel overgrown with the Canadian waterweed (*Elodea canadensis*) cost cca 70.000€ through five years while in the summer of 2008 this species caused damage worth 500,000€ through the loss of 2% of yearly electricity production.

The most common invasive species causing human health problems are the Common ragweed (*Ambrosia artemisiifolia*) (Fig. 15.) because of allergy reaction of many people as well as the Tiger mosquito (*Aedes albopictus*) (Fig. 16.) that was first registered in 2004 in Zagreb and today is distributed throughout the most part of Croatia.

It should be noted that there are many species in Croatia that are not alien for the country but are considered alien species for certain ecosystems or regions where they can become invasive and suppress native species. Such are some freshwater fishes like the Catfish (*Silurus glanis*), the Pike (*Esox lucius*), the Carp (*Cyprinus carpio*) and the Zander (*Sander lucioperca*) which are indigenous to the Danube basin but can have negative effect when they are translocated, intentionally or unintentionally to the Adriatic Basin. Similar situation is with the game species Wild boar (*Sus scrofa*) that has spread on many Croatian islands.

Figure 13. *Harlekin beetle Photo: B. Krstinić*

Figure 14. *Red-eared terrapin Photo: G. Laušić*

Figure 15. *Common ragweed. Photo: I. Boršić*

Figure 16. *Tiger mosquito. Photo: James Gathany, www.wikimedia.org*

2. Ecosystem services

The issue of ecosystem services that is directly connected to the Aichi Targets 14 and 15, as well as EU 2020 Biodiversity Strategy is still quite new concept for Croatia. This topic has been indirectly integrated in NBSAP 2008 within chapters Protection of biodiversity and Sustainable use of natural resources (a strategic objectives and action plans for cooperation with the sectors of agriculture, forestry, hunting, fishing, water management and tourism). However, a number of activities related to assessment of the values of biodiversity and economic valuation of its ecosystem services have been initiated recently, mostly connected to implementation of different projects and studies..

Economic valuation of biodiversity and ecosystem services as a tool for improvement of the sustainable management in Nature Park Vransko jezero was conducted in 2013[14]. Contingent valuation and the replacement costs methods were implemented in order to assess the value of cultural services and regulatory services provided by fresh water of the area.

WWF project on the Dinaric Arc Ecoregion *Protected Areas for a Living Planet* evaluated economic benefits of protected areas National Park Sjeverni Velebit and Nature Park Velebit, including ecosystems and their services (fresh water, agriculture, fisheries, forests, tourism, and disaster prevention) in order to identify their contribution to national/regional economic development and human well-being. The "Sector Scenario Analysis" (SSA) approach was used in the study, involving two scenarios - "business as usual" (BAU) management model, and "sustainable ecosystem management" (SEM) model. The key results of the study have shown that ecosystems of analyzed protected areas provide irreplaceable ecosystem services that are enabling economic benefits in tourism, in particular "green" tourism; agriculture (in particular fruit production); and the improvement of the way of life in general within the protected area and in its surroundings. The SEM management model has proven to be more favorable for a number of sectors in terms of nature conservation, but also in terms of increasing economic revenues[15].

In the framework of the GEF/UNEP project COAST Guidelines for Sustainable Rural Development were prepared, using experiences and recommendations based on evaluation of ecosystem services[16].

Through the protected areas visitors survey made in 2010, baseline for the current and potential level of 'willingness to pay' (WTP) was defined for improved service quality and condition facilities[17]. The targeted respondents (domestic and international visitors) have shown that visitors are willing to pay for improved services.

One of the components of the GEF/UNDP project *Support to the Implementation of the CBD Strategic Plan 2011-2020 in Croatia* (CBD-GEF) is the study of benefits and values of freshwater ecosystems and biodiversity in the Danube basin, implemented in a pilot-area of the Drava River[18], with the overall aim to strengthen the link between biodiversity of freshwater ecosystems and human well-being as well as their contribution to economic development. A list of ecosystem services relevant for Sava-Drava-Danube floodplains was drafted, including: provisioning services (timber production; biomass energy; fish production and angling; game and hunting; drinking water supply; agriculture production; energy production); regulating services (flood mitigation; sediment deposition; water self-purification; carbon sequestration-storage; local climate regulation; air quality; erosion prevention; draught mitigation and water storage); supporting services (habitats for species; biocorridor - connectivity) and cultural services (esthetic value of landscape; recreation/tourism, naive art; local crafts-willow baskets; traditional architecture; indigenous breeds).

14) Schoumacher Cindy, Master Thesis (2013): Recognizing and mainstreaming natural capital, biodiversity and ecosystem services into policies within the Pan-European region, Case study: Croatia

15) Flores, M., Ivičić, I. (2011): Valuation of the Contribution of the Ecosystems of Northern Velebit National Park and Velebit Nature Park to Economic Growth and Human Wellbeing: Croatia. http://awsassets.panda.org/downloads/valuation_of_the_contribution_of_the_ecosystems_of_northern_velebit_national_park_and_ve.pdf

16) COAST project: Conservation and Sustainable Use of Biodiversity in the Dalmatian Coast

17) WB (2010) Valuation of Tourism Benefits for Croatia's Protected Areas

18) Study for Freshwater Ecosystem Services, UNDP/GEF project "National Biodiversity Planning to Support the implementation of the CBD 2011-2020 Strategic Plan in Croatia".

Box 11. FOREST ECOSYSTEM SERVICES

The value of ecological and social benefits provided by the forest system has been recognized in the forestry sector for quite a while. One example is an important role of riparian and alluvial forests in regulation of water regime, water protection and stable local climate. It is estimated that these forests, covering cca 150,000 ha receive an average of 800 mm of precipitation and 1200 mm of flood water. Out of this, cca 600 mm of water is being purified and enters underground waters which ensure altogether cca 900 million m^3 of potable water[19].

According to the Forest Act[20], non-market forest functions include the following forest ecosystem services:

- Protection of soil against erosion by water and wind;
- Balancing of water dynamics in the landscape, with the prevention of flash floods and high water surges;
- Water purification via filtering through the forest soil, with the supply of clean water for groundwater flows and potable water sources;
- Favorable impact on the climate and on agricultural activities;
- Purification of polluted air;
- Impact on the beauty of landscapes;
- Creation of more favorable impacts on human health;
- Ensuring space for rest and recreation;
- Providing incentives for the development of ecological, hunting and rural tourism;
- Conservation of the genofond of forest trees and other types of forest biocenosis;
- Conservation of biological diversity of the genofond, species, ecosystems and landscapes;
- Support to general and targeted nature protection (national parks, etc.) of forest landscapes;
- Mitigation of greenhouse gas effects via carbon binding and enrichment of the environment with oxygen;
- General protection and improvement of human environment via the existence of forest ecosystems as a form of biological capital of major value;
- Importance for land security and the development of local communities.

In the early 1990s, the concept of "non-market forest functions" was developed. According to the Forest Act, legal entities performing economic activities in the Republic of Croatia have the duty of paying a fee for ecosystem services mentioned above, in the form of the fee (0,0265% of the total revenue) for use of non-market forest functions. These funds are used for various works in forest management, including maintaining biodiversity and ensuring sustainable principles of management.

19) Vukelić, J. (2008): Šume regionalnog parka Mura-Drava. Studija za Državni zavod za zaštitu prirode
20) Official Gazzette no. 140/2005, 82/2006, 129/2008, 80/2010, 124/2010, 24/2012

Part II: Implementation of the National Biodiversity Strategy and Action Plan

3. Overall evaluation of the NBSAP 2008 implementation

The first Croatian Strategy and Action Plan for the Protection of Biological and Landscape Diversity (NBSAP) from 1999 (Official Gazette 81/99) was presented and its implementation analyzed in NR4 (Chapters 2.1 and 3). NBSAP from 2008 (Official Gazette 143/08) has been adopted in the time of NR4 preparation. It was presented in chapter 2.2 of NR4, specifying its 7 general strategic objectives, 29 specific strategic objectives and 117 strategic guidelines. In order to achieve NBSAP objectives, 302 action plans were planned to be carried out, divided within 7 thematic chapters: *Protection of biodiversity* (Protected areas, Ecosystems and habitats protection, Ecological network, Protection and conservation of wild taxa, Protection and conservation of domesticated taxa; Ex-situ protection; Invasive species control); *Landscape conservation*; *Geological diversity protection*; *Sustainable use of natural resources* (Agriculture, Forestry, Hunting, Fishing, GMO's, Water management, Tourism, Transportation, Energy, Exploitation of mineral resources); *Legislation and institutional framework*; *Cross-cutting issues* (Research and monitoring, Education, Public Informing and participation, Physical planning, Ecological network impact assessment) and *NBSAP Implementation* (Monitoring and evaluating the implementation and financial mechanisms of the NBSAP). The largest part of the NBSAP action plans (106 or 35 % of them) is related to the issue of sustainable use of natural resources, followed by biodiversity protection (88 or 29 % of them). Regarding sub thematic issues, action plans for protected areas dominate (28 or 9.27% of them). Implementation of the NBSAP 2008 could not have been evaluated at the time of preparation of the NR4 (2009), so it was done in this Report, based mostly on the draft *Report on the State of Nature 2008 - 2012* (RSN 2008-2012)[21]. One of the instruments for monitoring and evaluating implementation of the Strategy is the *Report on the State of Nature*, which is prepared for the purpose of an analysis of the implementation, assessment of implementing measures, assessment of the completed supervision and use of financial resources for nature protection, and evaluation of the need for revision of the strategy, but also provides other relevant information on the state of nature.

On the level of the main NBSAP issues, proportion of implemented action plans was rather equable. Significant results were achieved with action plans connected to the accession process of Croatia to the EU. Great efforts were invested during the pre-accession period into inventory of species and habitat types for the purpose of defining the sites of ecological network Natura 2000. Legislation has been fully harmonized with the EU *acquis*, including GMO-related legislation. Institutions in nature protection, especially on national level, were strengthened and their capacity built, mostly using EU pre-accession funds. Very important mechanism of *Nature Impact Assessment* (appropriate assessment) was put in place, and combined with Strategic Environmental Assessment (SEA) and Croatian longstanding legislative procedures of Environmental Impact Assessment (EIA) as its integral part. In the reporting period the cooperation of nature protection with sectors has improved, like with forestry sector through preparation of Croatian proposals for European ecological network Natura 2000.

One of the main indicators of nature protection and its effectiveness is a threat status of the Red List species according to the IUCN criteria. Croatia has established red lists of the most important groups of species so far, so in the next reporting period their revisions will point out trends in conservation status of individual species. Furthermore, an important indicator is the Favourable Conservation Status (FCS) of species and habitat types covered by the EU Habitats Directive, which Croatia is obliged to determine by the end of the current reporting period in 2019, according to Article 17 of the Habitats Directive. Global biodiversity indicators and already developed National List of Biodiversity Indicators for EEA reporting should be used when planning future activities.

The process of revision of NBSAP (2008) will start in 2014 under the umbrella of the GEF/UNDP project *National Biodiversity Planning to Support the Implementation of the CBD 2011-2020 Strategic Plan in Croatia*. The RSN 2008-2012 proposes certain guidelines for this revision:

- Define general and specific strategic objectives to be clear and accompanied with target values and indicators, as well as with methods for measuring individual indicators (link to existing initiatives of Biodiversity Indicators Partnership and National List of Biodiversity Indicators)
- Define clear and precise action plans, accompanied with target values and indicators
- Give priority to action plans for defining main indicators of biodiversity conservation and NBSAP implementation
- Relate NBSAP targets to *Aichi targets* and targets of the EU 2020 Biodiversity Strategy.

This Chapter provides general overview of NBSAP 2008 implementation, followed by analysis of implementation of individual *strategic objectives.* Looking at the evaluation of implementation of specific *strategic objectives* in this reporting period we have to take into consideration that NBSAP 2008 envisaged prioritization of the action plans with time dimension for its implementation[22]. Having this in mind overall trend was assessed. Related activities (provided in the tables in each Chapter) provide short overview of the implementation for the priority action plans (PR) and short-term action plans (ST) (to be implemented within five years) in line with the with assessment made in the draft RSN 2008-2012.

21) draft report prepared by the SINP in 2013

22) The priority action plans (PR) should be implemented within the shortest possible time, short-term action plans (ST) within five years, medium-term action plans (MT) within ten years, and the long-term ones (LT) within a period of 20 years.

Overall, NBSAP 2008 implementation has shown positive trend. There is an overall continuity in the progress, for part of activities process started in this reporting period with full implementation envisaged in the next reporting period.

Box 12. GEF/UNDP PROJECT NATIONAL BIODIVERSITY PLANNING TO SUPPORT THE IMPLEMENTATION OF THE CBD 2011-2020 STRATEGIC PLAN IN CROATIA

The project started in 2012, and it will be finished in 2014. The MENP is responsible for the implementation of the project and the main implementing partner of the Ministry is SINP. In the framework of this project the analysis and amending data and information on biodiversity in Croatia are carried out, and the Report on state of nature 2008-2014 prepared which will serve as the basis for the revision of the NBSAP. The project envisages the staring of the process for NBSAP revision with integrated new approaches to the CBD's Strategic Plan for the period 2011-2020, including the value of ecosystem services, and resource mobilization framework as its integral pat. Study for Freshwater Ecosystem Services (SFES) produced, provide arguments for protection of freshwater ecosystems, based not only on their biodiversity, but also on other benefits, which they provide for human society or for the stability of the global ecosystem. In addition, the project contributed to the preparation of this Fifth National Report to the CBD.

4. Implementation of the NBSAP strategic guidelines

4.1. Protection of biological diversity

This chapter analysis implementation of the NBSAP 2008 related to thematic issues of protected areas, ecosystems and habitats, ecological network, wild species, domesticated species, ex-situ protection and invasive species. Besides, new information compared to the NR4 is presented on the current state of protected areas and sites of ecological network. The information on National profile on the implementation of the Programme of Work on Protected Areas (2010) and Action Plan for Implementing the Convention on Biological Diversity's Programme of Work on Protected Areas (2012) is available on CBD website[23].

23) http://www.cbd.int/protected/implementation/actionplans/country/?country=hr

Protected areas[24]

By the end of 2013 there were 419 protected areas in Croatia, classified in nine national categories and covering 8.56% of the total surface of Croatia (including 12.20% land territory and 1.94% of internal waters and territorial sea). More than 50% of area is covered by nature parks. In comparison to the last reporting period, the number of protected areas is lower. The reason lies in re-evaluation of 30 small sites that have lost characteristics for which they had been protected (mainly single trees protected as Monument of park architecture). But there is an increase in their total surface at the state level from 7.56% to 8.56% due to protection of two new large regional parks in 2009. 8 new areas have been protected since 2009 and 22 baseline studies for potential areas to be protected was prepared by SINP.

Among the national protected areas there are several with international designation: one World Heritage site (Plitvička jezera National Park), five Ramsar sites (Crna Mlaka, Lonjsko i Mokro polje, Kopački rit, Delta Neretve and Vransko jezero), two biosphere reserves (Velebit mountain and TBR Mura-Drava-Danube) and one GEOPARK Papuk.

24) Nature Protection Act defines 9 categories of spatial protection (protected areas)

Table 6. *Data on the number and surfaces of protected areas (PAs) in Croatia (Source: Register of Protected Areas, MENP, status on 31 December 2013)*

Category	No. of PA	Land	Sea	Total
Strict reserve	**2**	2425.18 ha	0.00 ha	2425.18 ha
National park	**8**	76,311.04 ha	21,652.12 ha	97,963.16 ha
Special reserve	**78**	29,348.74 ha	11,051.25 ha	40,399.99 ha
Nature park	**11**	412,739.22 ha	18,779.24 ha	431,518.46 ha
Regional park	**2**	102.721,20 ha	0.00 ha	102.721,20 ha
Nature monument	**84**	224.95 ha	0.00 ha	224.95 ha
Significant landscape	**85**	119.990,78 ha	9.293,00 ha	129.283,78 ha
Forest park	**28**	3061.14 ha	0.00 ha	3061.14 ha
Monument of park architecture	**121**	856.05 ha	0.00 ha	856.05 ha
Smaller sites within larger protected areas (overlapping):		57,760.39 ha	429.00 ha	58,189.39 ha
TOTAL:	***419***	***689,917.91 ha***	***60,346.61 ha***	***750,264.52 ha***
Share in total surface of Croatia:		***12.20 %***	***1.94 %***	***8.56 %***

Box 13. MEDMPANET "REGIONAL PROJECT FOR THE DEVELOPMENT OF A MEDITERRANEAN MARINE AND COASTAL PROTECTED AREAS (MPAS) NETWORK THROUGH THE BOOSTING OF MPAS CREATION AND MANAGEMENT (PILOT PROJECT CROATIA)"

The project started in 2012, and it will be finished in 2014. It is financed by the RAC/SPA and is designed to provide support to the regional MPA management authority (Public Institution PI "Priroda" established by the regional government), as well as to the state level government and expert bodies (MENP and SINP). The project is implemented through three main activities: *preparation of ecological study* which includes habitat map and marine species inventory in certain coastal areas of Primorsko-goranska County and development of monitoring protocols for two marine habitat types - *Posidonia oceanica* beds (1120*) and coralligenous community (as part of the type 1170 - Reefs) to meet reporting and monitoring requirements of the Habitats Directive. Furthermore, the project included *preparation of fishery study* which includes assessment of coastal fishery resources in two areas and socio-economic study of local fisheries. The third component within the project was *building capacity* for inventory of marine biodiversity - workshops on the use of GIS as a standard tool for handling geographical data in conservation management have been organized.

Strategic objective	
Continue development of the system of protected areas, efficiently manage protected areas, increase the total area under protection and promote active participation of the public concerned.	
NBSAP strategic guidelines	**Activities**
3.1.1.1 Prepare the fundamental documents for protected area management	Overall PA management strategy is defined through site specific management plans for the 10 year period in line with strategic framework set out by National Biodiversity Strategy. Management plans for one national park (Krka), six nature parks (Telašćica, Kopački rit, Papuk, Medvednica, Učka and Vransko jezero) and one significant landscape (Northwestern part of the island of Dugi otok) have been adopted. Draft management plans for three national parks (Kornati, Brijuni and Mljet), three nature parks (Lastovsko otočje, Biokovo and Žumberak-Samoborsko gorje) and one significant landscape (Slunjčica) are prepared. Management plan for all protected areas in the territory of Šibenik-Knin County is in preparation. Spatial plan for areas with special characteristics for all national parks, and for 6 nature parks have been adopted. Spatial plan for 5 nature parks are in preparation. In the period 2008-2012 spatial plans for following protected areas have been adopted: National Park Sjeverni Velebit (OG 35/12) and Nature Parks Lonjsko polje (OG 37/10) and Vransko jezero (OG 58/12). The project "MedPAN South Croatia" has significantly contributed to the development of management plans, mapping and monitoring of marine species and habitats, capacity building of Public Institutions as well as the participation of the public during the development of management plans of protected areas.
3.1.1.2 Digitalize boundaries and continue the review of existing protected areas	The revision of the Register of Protected Areas (a large number of corrections in categorization, identification of problems related to poorly defined boundaries of protected areas) has been intensified. The procedure for re-evaluation of 30 small sites that have lost characteristics for which they had been protected (mainly single trees protected as Horticultural monument) is in progress. The boundaries of the Nature Park Medvednica have been revised. The boundaries of all protected areas have been digitized in scale 1:25000. Problems related to the description of the boundaries have been identified. The process of boundary delineation and / or re-categorization has begun.
3.1.1.3 Evaluate, categorize and legally protect particular areas	8 new areas have been protected (2 regional parks, 2 significant landscapes, 3 monuments of park architecture and 1 nature monument). For 4 areas boundaries and/or categories of protection have been changed. For 22 areas baseline studies for potential area to be protected have been prepared. Area Mura-Drava-Danube has been declared as transboundary biosphere reserve. The area of the Nature Park Vransko jezero has been included in the Ramsar List.

Strategic objective	
Continue development of the system of protected areas, efficiently manage protected areas, increase the total area under protection and promote active participation of the public concerned.	
NBSAP strategic guidelines	**Activities**
3.1.1.4 Ensure involvement of the public concerned	Involvement of the public is ensured trough obligatory public hearing. More systematic and structured public participation in the process of establishment of new protected areas needs to be established. In the process of valorization of certain areas, only partial consultations have been carried out. Public participation is largely enabled during the preparation of protected areas management plans. Services for the exchange of spatial data regarding the boundaries of protected areas have been initiated. Project with revision of the Protected Areas Management System (PAMS) has been launched. Register of Protected Areas will be integrated with the spatial database of protected areas. During the reporting period Register of Protected Areas was finalized, and it will be publicized the next period.
3.1.1.5 Improve the protected area management system	New Nature Protection Act (2013) provides basis for the integral guidelines for the drafting process and the content of protected areas management plans, thus the appropriate secondary legislation (Ordinance) needs to be developed. The developed standard for management zones is used; through intensive collaboration and education the quality of management plans has been significantly raised. The standards for evaluating management efficiency have not been defined. Number of employees in County Public Institutions increased, the number of employees in national and nature parks public institutions stagnated due to the overall economic crisis. Nevertheless, the county and local PIs (rangers, and conservation services) need further staffing. Annual conservation service congresses as well as the ranger service congresses have been established. Since 2010 the Education program for the employees of the nature protection sector containing seven theme modules has been developed. The implementation of these modules started through the WB NIP project. The ticket collection system is not yet fully established, but the preparations have started through the NIP project. Public Institutions worked intensely on the development of their visitor infrastructure and education programs. Info-points and educational paths have been developed in great numbers, while visitor centers are at their starting phase and construction is envisaged in the next 7 year period. All national and nature parks have been categorized as having high fire risk factors and have been equipped with video surveillance. For this reason, significant funds have been spent in order to develop the system and strengthen the capacity of the PI. Through the collaboration of the MENP and Croatian Mine Action Centre national and nature parks have been given priority in their Demining program. During the reporting period a little more than 1/3 of mine suspected area in national and nature parks has been demined.
3.1.1.6 Resolve property-related relations and disputes, and increase the share of state-owned land within protected areas	In consultation with the Ministry of Defense and the Institutions responsible for the management of real estates, part of brownfield (non-perspective objects of armed forces and objects) which are close to national parks and nature parks have been assigned for the use to the Public Institution and for placing them in the function of the park. In the categories of national park, strict reserve special reserve there is a “Right of First Offer” by the State.
Assessment of NBSAP implementation	
Progress was achieved with protection of new areas, international designations of protected areas and management planning. Having in mind that protected areas, particularly national and nature parks, provide the core potential for regional development, investment in preparation of projects to improve nature education facilities and infrastructure for visitors will ensure education and raising of public awareness, thus reaching the objectives of sustainable management and providing benefits to the local and regional economy by attracting inward investment and enhancing local image and quality of life (construction is envisaged in the next 7 year period). Additionally, the new overarching framework in management of national and nature parks was the adoption of new visual identity - Croatian parks - which will definitely further underpin their potential for regional development.	

Box 14. MURA-DRAVA-DANUBE, THE NEW TRANSBOUNDARY UNESCO BIOSPHERE RESERVE

The new UNESCO Transboundary Biosphere Reserve Mura-Drava-Danube, stretching along the three rivers creating border between Croatia and Hungary, was proclaimed in 2012. This extensive transboundary area covers 631,460.71 ha (395,860.71 ha in Croatia and 235,600 ha in Hungary), including the Mura-Drava Regional Park as well as the Kopački Rit Nature Park, one of the five Ramsar sites in Croatia. The most of the Croatian part of this biosphere reserve is included in ecological network Natura 2000. The whole area is a part of the transboundary zone along the former Iron Curtain, which used to divide European continent into East and West for nearly 40 years. The fact that for decades it was rather closed for people and development activities, contributed to favorable conditions for wetland habitats and species.

The area contains a variety of wet habitats, including those that are among the most threatened in Europe: alluvial forests, wet grasslands, gravel and sand bars, islands, steep banks, oxbow lakes, stagnant backwater, abandoned riverbeds and meanders. Among the most significant species are: Otter (*Lutra lutra*), Beaver (*Castor fiber*), White-tailed Eagle (*Haliaeetus albicilla*), Black Stork (*Ciconia nigra*), Bittern (*Botaurus stellaris*), Purple Heron (*Ardea purpurea*), Great White Egret (*Egretta alba*), Spoonbill (*Platalea leucorodia*), Little Tern (*Sterna albifrons*), Danubian newt (*Triturus dobrogicus*) and five fishes that are endemics of the Danube basin: Huchen (*Hucho hucho*), Danubian Roach (*Rutilus pigus*), Balon's Ruffe (*Gymnocephalus baloni*), Schraetzer (*Gymnocephalus shraetser*) and Streber (*Zingel streber*). Mura-Drava-Danube is an important bird area in Europe, with wintering waterbirds numbering hundreds of thousands.

Transboundary management plan is envisaged for the Biosphere Reserve, which is aiming to promote and harmonize nature conservation efforts between Croatia and Hungary.

Non-regulated part of the Mura River. Photo: I. D. Grlica

Sand Martin (Riparia riparia), Croatian Red List species, nests in Drava riverbanks. Photo: I. D. Grlica

Box 15. VRANSKO JEZERO - THE NEW RAMSAR SITE FOR CROATIA

In 2013 the Ramsar Secretariat enlisted the new Ramsar site for Croatia - Vransko jezero (Vransko Lake), the largest natural lake in Croatia. It is situated in a shallow karst bed and separated from the Adriatic Sea by a narrow karst ridge. It represents one of only two large wetlands in the Mediterranean part of Croatia (the other one being the Neretva Delta Ramsar site). Until 18th century this area was covered with a vast marsh called the Vrana swamp. After melioration it was turned into agricultural land but the area along the lake was preserved as a wetland.

Ornitofauna of this site is extremely rich, numbering 255 recorded species, 102 of them being breeding birds. In the NW part of the lake there is a large reedbed containing the last heron colony in Mediterranean part of Croatia as well as many other threatened breeding waterbirs. Significant breeding birds include Pygmy Cormorant (*Phalacrocorax pygmeus*), Purple Heron (*Ardea purpurea*), Little Bittern (*Ixobrychus minutus*), Bittern (*Botaurus stellaris*), and 3 species of crakes (*Porzana porzana, P. pusilla* and *P. parva*). Vransko jezero is an important wintering site for the Coot (*Fulica atra*) with recorded yearly numbers between 40,000 and 195,000 birds that makes 1.6-7.8% of Mediterranean-Black Sea wintering population. Apart from the Coot, many ducks, grebes, cormorants and divers overwinter, so that total number of wintering waterbirds is always higher than 40,000.

Vransko jezero is protected as a nature park, including the ornithological reserve with the second largest reedbed on the Croatian coast. Together with the near-by area Jasen which contains a mosaic of wet habitats important as a feeding area for breeding birds of the Park, it is included in EU ecological network Natura 2000.

Vransko jezero is the only permanent breeding site of Pygmy Cormorant in Croatia. Up to 195,000 Coots winter on the lake. Photo: Archive of the Nature Park Vransko jezero

Ecosystems and habitats

Strategic objective	
Ensure long-term conservation of threatened and rare habitat types	
NBSAP strategic guidelines	**Activities**
3.1.2.1 Create the prerequisites for more effective implementation of the Ordinance on habitat types, habitats map, threatened and rare habitat types and habitat type conservation measures	Mapping of terrestrial habitat types was done on scale 1:25,000 for a number of protected sites and sites of ecological network, mostly for national parks and nature parks, covering altogether less than 2% of Croatian territory. Mapping on the whole territory is a part of the WB NIP project[25] and will start in 2014. Mapping of marine habitat types was accomplished only for few small sites, mostly in the framework of implementation of different international and national projects. More extensive mapping is planned in coming years through the EU structural and investment funds. The planned revision of National Habitats Classification is planed trough WB NIP project in next period. Revision for forest habitat types has already started while for other terrestrial ones will be done in 2014 through the WB NIP project.
3.1.2.2 Scientifically establish the threat status of certain habitat types in Croatia and develop specific measures for their protection	Threat analysis for habitat types was partly done for Natura habitat types in the framework of preparation of Natura 2000 proposal. General conservation measures for habitat types are prescribed by the *Ordinance on Habitat Types, Habitat Map, Threatened and Rare Habitat Types and on Measures for Conservation of Habitat Types* (Official Gazette 119/09). The Ordinance protects all habitat types of the Habitats Directive, Resolution 4 of the Bern Convention and habitat types considered to be threatened at the national level. Specific conservation measures are introduced in physical plans, sectorial management plans and individual projects through nature protection requirements issued by the MENP (Nature Protection Directorate). Upon the proclamation of ecological network Natura 2000, specific measures for target habitat types of individual Natura sites are to be defined by the separate Ordinance (legal bases provided in the Nature Protection Act) in line with the time framework proscribed in the EU directives.
3.1.2.3 Create the prerequisites for protection of habitats threatened at the national and European level	Two new habitat types have been described and included in the Annex I of the Habitats Directive upon the proposal of Croatia during its process of accession to the EU (see the Box 2). Distribution of Natura 2000 habitat types in Croatia was analysed, including significant field work, and the most important sites were designated as the sites of ecological network. Active protection, including revitalisation, was implemented on few small sites of rare habitat types like bogs, Mediterranean ponds and certain grasslands. Through the WB-NIP project the study was initiated to identify the most suitable management measures for different types of hay meadows, including development of potential incentives for farmers to be included in agri-environment-climate of Rural Development Programme of the Republic of Croatia for the period 2014-2020. Local community was actively involved into implementation of action plans for certain habitat types (e.g. mowing of wet meadows with breeding population of Corncrake *(Crex crex)* in Odransko polje and revitalisation of the only breeding ground of the Common Redshank *(Tringa totanus)* in wet grasslands of Paško polje.
Assessment of NBSAP implementation	
Significant activities have been implemented for conservation and protection of habitat types, especially related to identification of distribution of Annex I habitat types present in Croatia and their designation as Natura 2000 sites. There is an overall continuity in the progress, for part of activities process started in this reporting period with full implementation envisaged in the next reporting period.	

25) WB EU Natura 2000 Integration Project (NIP) http://www.zastita-prirode.hr/eng/Projects-International-Cooperation/Projects/EU-Natura-2000-Integration-Project-NIP

Box 16. MAPPING HABITAT TYPES OF CROATIA

The first map of habitat types of Croatia was finalized in 2004, covering the whole Croatian territory. It was prepared in 1:100,000 scale, with the minimum mapping surface of 9 hectares. This mapping was based on LANDSAT 2000 images in combination with cca 6000 field-checked points. Distribution of marine habitats was modeled so this part of the map is only indicative.

Since 2004, the existing map was amended to a lesser degree by data collected during field research within various projects. All these projects resulted in more detailed and precise habitat maps (scales of 1:25,000 or even 1:5000) for somewhat less than 2% of the land territory of Croatia, i.e. 100,750 hectares - including in particular different national parks and nature parks. Furthermore, marine habitats have been mapped or their mapping is being currently organized, in certain smaller areas in Adriatic sea, via various international and national projects.

The beginning of a more detailed mapping of non-forest terrestrial habitat types in Croatia in scale 1:25,000 that would cover the whole Croatian territory is expected in 2014 through the WB NIP project. The mapping of marine habitats is planned for following years to be financed through EU structural and investment funds. The new habitat maps will serve to monitor the status of individual habitat classes. They are also one of the main prerequisites for efficient management planning for Natura 2000 sites and for the implementation of the procedure of appropriate assessment of plans, programs and projects related to the ecological network.

Box 17. TRSTENIK BOG - THE EXAMPLE OF ACTIVE MANAGEMENT OF NATURA 2000 SITE

Revitalization of the Natura 2000 site Trstenik bog, implemented by the public institution "Priroda" of Primorsko-Goranska County presents one of the successful examples of active management of Natura 2000 sites.

The Trstenik bog is located in a karst depression in the Obruč mountain-cluster in Gorski kotar region. It lies at about 960 meters above sea level in the vegetation zone of beech and fir forests (*Abieti-Fagetum*). The part of the bog overgrown with bog vegetation is several hectares in size. In Croatia, bogs are very rare as they are at the edge of their distribution range and represent relicts located in sites with specific microclimate conditions. The Trstenik bog is important as one of the largest bogs in Croatia and a unique remnant of raised bogs. Here can be found a mixture of two Natura habitat types - the blanket bog and the alkaline fen. This is the only known site in Croatia for Natura habitat type 7130 Blanket bogs and as such of great conservation value. Also it is the only site in Croatia with the Hare's-tail Cottongrass (*Eryophorum vaginatum*), threatened species characteristic for blanket bogs. Several rare bog mosses *Sphagnum spp*. and other rare and threatened species on national level are represented here, such as *Carex echinata*, *C.panicea, C.flava* and *Eriophorum angustifolium*.

This bog is extremely threatened - it is submitted to natural succession, overgrowing with the grass *Molinia coerulea* and spruce trees). In the late 1950s, drainage canals were dug to dry out the bog, while, in recent times, the site has been afforested with spruce saplings. This has caused severe degradation of the bog habitat and created conditions for the succession of forest vegetation. Implementation of measures required for the revitalization of the area started in 2009, through cooperation between County Public Institution "Priroda", the SINP and the forestry Klana, co-financed by the T-HT company. Activities included the placement of partitions to canals that remove the water from the bog surface, transplantation of the bog mosses from well-preserved parts of the bog, cutting the *Molinia coerulea* grass and spruce trees overgrowing the bog, determining the numbers of plant species characteristic for bogs and establishing the monitoring. In the following years activities were continued by the PI "Priroda" with systematic monitoring of vegetation and water regime on four transects in the bog, implemented by Natural History Museum Rijeka. Detailed reports can be found on PI "Priroda" web page http://www.ju-priroda.hr/novosti.asp?id=novosti-sadrzaj.html

After revitalization activities, systematic monitoring of vegetation and water regime is implemented in Trstenik bog. Photo: PI "Priroda"

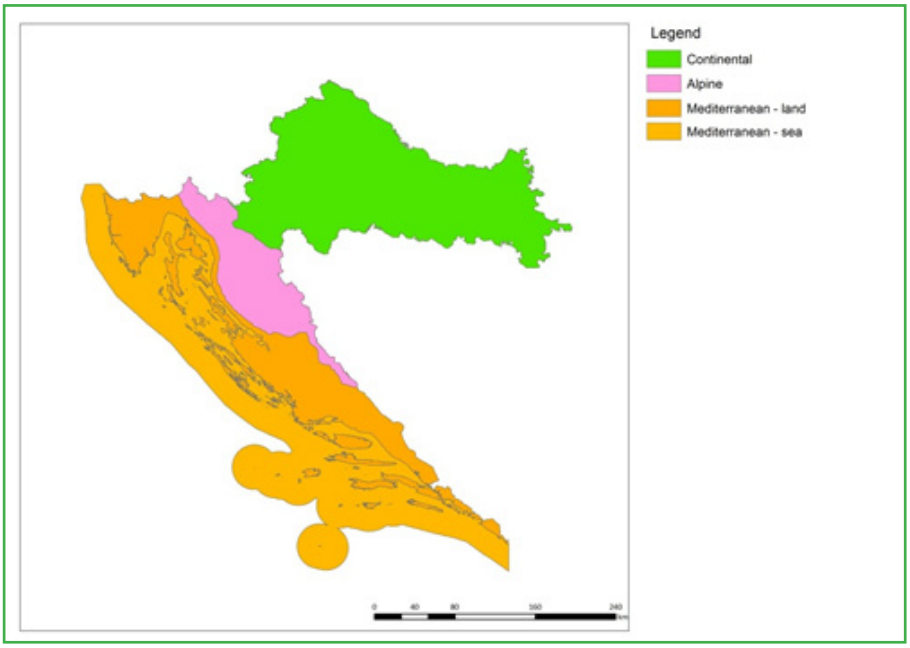
Ecological network

According to provisions of NPA from 2013, the National Ecological Network proclaimed by the Regulation from 2007, has been substituted by the EU ecological network Natura 2000. The final list of Natura 2000 sites (SPAs and pSCIs) was adopted in September 2013 by the Government[26].

The Ecological network Natura 2000 covers 36.67% of land territory and 16.39% of inland waters and territorial sea, putting Croatia at the top with Slovenia and Bulgaria in terms of percentage of the land territory included in Natura 2000. 742 proposed Sites of Community Importance (pSCIs) (of which 171 sites are cave objects) and 38 Special Protected Areas (SPAs) are included. pSCIs have been defined for 74 habitat types and for 135 species. Out of these, 20 habitat types and nine species are priority ones according to the Habitats Directive. SPAs have been defined for 126 bird species.

In Croatia, three terrestrial biogeographical regions are present: Continental, Alpine and Mediterranean and one marine biogeographical region: Mediterranean region.

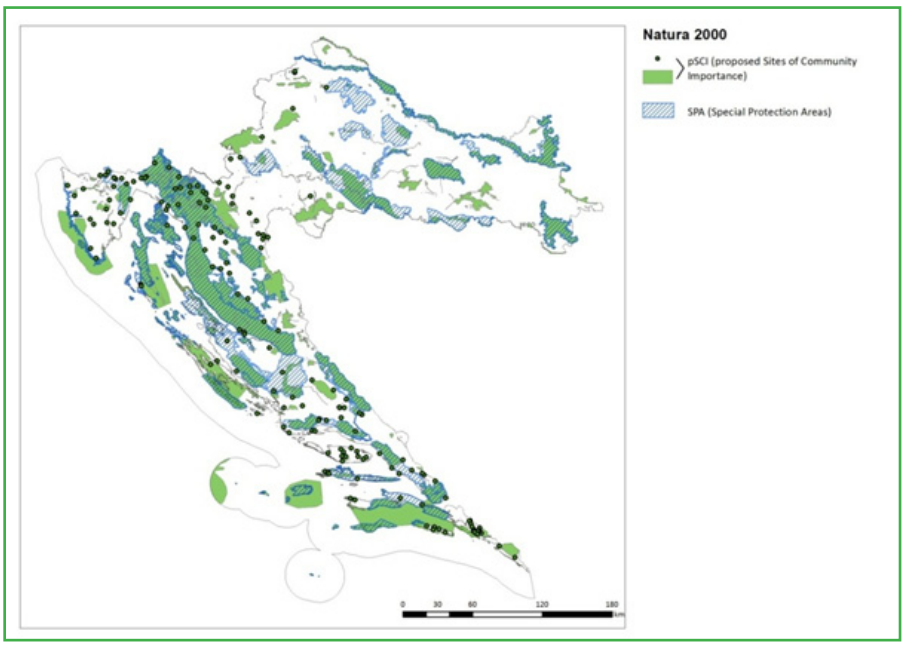
26) Regulation on the Ecological Network (Official Gazette 124/13)



Map 2. *Biogeographical regions in the Republic of Croatia (Data source: EEA, 2011)*

Table 7. *Data on the number and surfaces of ecological network Natura 2000 Croatia (Source: SINP)*

	Land surface of Croatia (km2)	% of land surface of Croatia	Coastal marine waters of Croatia (km2)	% of coastal marine waters of Croatia	Total surface of Croatia (km2)	% of total surface of Croatia	Number of ecological network sites
proposed Sites of Community Interest (pSCI)	16,059.57	28.38	4,903.12	15.44	20,962.69	23.73	742
Special Protection Areas (SPA)	17,107.55	30.23	1,040.13	3.28	18,147.68	20.54	38
Ecological network	20,754.97	**36.67**	5,204.63	**16.39**	25,959.6	**29.38**	**780**

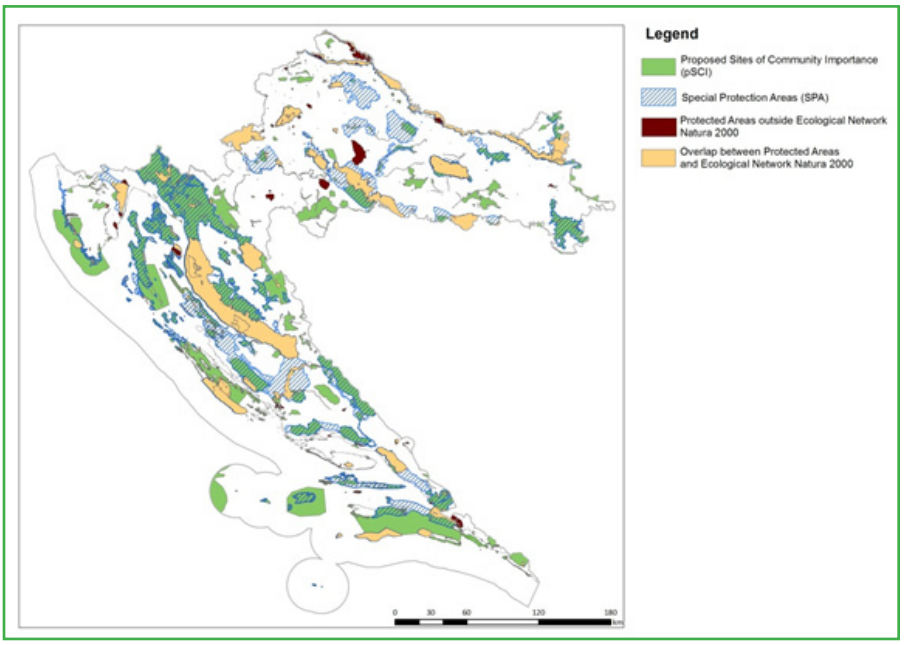


Map 3. *Ecological network Natura 2000 in the Republic of Croatia (Source: SINP)*

In case of the Ecological network of the Republic of Croatia which was proclaimed in 2007, areas were designated for habitat types and species threatened not only at the European, but also at the national level, as well as for endemic taxa. Due to this fact, changes in the criteria led to the changes in ecological network sites, their target species, habitat types and surfaces. Changes were also caused by the fact that wide-ranging researches were conducted in the period from 2007 to 2013, in cooperation with a wide expert and scientific community. The research was funded by the state budget, and it resulted in the collection of a major quantity of new data, on the basis of which ecological network sites were revised. Information is still missing for marine sites, so future research of these will be national priority.

Approximately one quarter of the surface of the Natura 2000 ecological network (26.14%) is already protected within nine protected area categories of the Nature Protection Act. The analysis of overlaps between the Natura 2000 ecological network and protected areas also shows that 87.17 % of the total surface of protected areas is located within the Natura 2000 ecological network.

The SINP hosts a website devoted to Natura 2000 with an interactive map (http://www.natura2000.hr/Home.aspx).



Map 4. *Map of overlaps between Natura 2000 ecological network and protected areas (Source: SINP)*

Box 18. PROJECTS IMPLEMENTED IN THE REPORTING PERIOD WHICH WERE DEALING WITH NATURA 2000

PHARE 2005 "Institutional Strengthening and Implementation of the NATURA 2000 Ecological Network in Croatia"

This project was implemented in the period 2008-2010. Within this project consultation process amongst the general public and all interest groups on the Natura 2000 proposal prepared by SINP has been conducted. Two rounds of thematic workshops were held and a number of remarks collected, and in line with these, SINP revised the proposal. Through the project, two draft management plans for proposed Natura 2000 sites were developed in cooperation with local stakeholders: Vransko jezero i Jasen, and the area important for large carnivores *Gorski kotar i sjeverna Lika*. A part of the project included the training of competent bodies in the mechanisms of Nature Impact Assessment. A public awareness raising campaign on Natura 2000 sites (brochures, website, TV spots) has been organized. All the project results, including the database on proposed NATURA 2000 areas are available at the website: www.natura2000.hr

IPA 2007 "Identification and setting-up of the marine part of Natura 2000 network in Croatia - marine NATURA 2000"

The project was implemented in the period 2010 - 2012. Through this project, a detailed plan to determine all potential NATURA 2000 marine sites has been prepared, in cooperation with international experts. Furthermore, the project envisaged training of SINP staff on monitoring and reporting in line with the requirements of the Habitats Directive and further development of the National Biodiversity Monitoring System through the training of amateurs, including members of diving clubs and centers, and enduring their inclusion in the mapping and monitoring of marine species and habitats. Within this project an Interpretation manual for determination of marine habitats according to the Habitats Directive has been prepared.

IPA 2009 "NATURA 2000: Establishment of management and monitoring (MAN-MON)"

It was implemented in the period 2011-2013. Within this project draft management plans for six proposed Natura 2000 sites have been prepared ("Spačva", "Pregon", "Konavosko Polje i Snježnica", "Odransko polje", "Bulji" and the cross-border Sutla River). Also, the national monitoring programs for 24 target species and for 3 target habitat types have been prepared.

NIP "EU Natura 2000 Integration Project"

The project started in May 2011, and it will be ongoing until the end of April 2016. It is financed through a World Bank loan. It is composed from three components: *Ecological Network Investments* - protected area and national ecological network site investments will help promote and strengthen integration of Natura 2000 objectives through investments in infrastructure, purchase of priority technical equipment for supervisors, fire protection equipment and supporting consultant services; *Ecological Network Data Systems* - biological inventory, habitat mapping, upgrading of data systems to fulfill EU reporting requirements and harmonizing data systems with EU INSPIRE Directive requirements will improve whole Ecological Network Data Systems and future Natura 2000 network; *Ecological Network Capacity Building* - the purpose of this component is to promote inter-sectorial cooperation with other government institutions, provide support for accessing EU grant programs for nature protection and design of interpretation of natural values.

Strategic objective	
Continue and complete designation of Special Conservation Areas for threatened and rare taxa and habitat types within the CRO-NEN and NATURA 2000 network and define protection and management measures for such areas	
NBSAP strategic guidelines	**Activities**
3.1.3.1 Ensure conservation of all components and the integrity of the CRO-NEN and NATURA 2000 network	Through the PHARE project on implementation of Natura 2000 in Croatia, extensive communication activities were performed including consultations with sectors of forestry, agriculture, water management and physical planning through thematic workshops. Workshops were also held on ENIA procedure for county level administration; on inventory and monitoring for reporting to EC; on role of CSOs in research and conservation activities; on management of Natura 2000 sites. 16 thematic brochures were published. Inter-sectorial working group for defining Natura 2000 forest sites was established by SINP, resulting in common proposal of forest Natura 2000 sites Ecological network Natura 2000 was proclaimed in 2013 by the Government of Croatia (Regulation on the Ecological Network). Digital borders of the ecological network were prepared in 1:25,000 scale and will be transferred into the 1:5000 scale. Draft management plans for 6 Natura 2000 sites have been prepared through IPA MAN-MON project (2011-2013) with active stakeholders' involvement. Existing management plans of protected areas which are also Natura 2000 sites adopted prior to proclamation of Natura 2000 during the revision need to adequately process target species and habitat types. Through IPA MAN-MON project intensive preparation of monitoring programs has started, and monitoring for some species is conducted. In the reporting period, 64 species and 3 habitat types are covered with the monitoring, what is about 11.7% of species and 4% of habitat types that are on the Habitats and Birds directives. Procedure of Appropriate Assessment for the ecological network for all plans, programs and projects that may have negative impact on target species and habitat types (ENIA), has been established by national legislation including alignment and integration with procedures of EIA and SEA already in place.
3.1.3.2 Ensure financial mechanisms for implementation of conservation measures for the CRO- NEN and NATURA 2000 network	The Ordinance on conservation objectives and basic measures for conservation of birds in sites of ecological network (OG 15/14) was enacted. Agri-environmental measures directed for nature protection are prepared through WB NIP project, and are included into the Rural Development Programme of the Republic of Croatia for the period 2014-2020. Financial resources for the preparation of management framework for Natura 2000, including setting up of overall monitoring mapping of marine habitats under national jurisdiction is envisaged trough European Structural and Investment funds.
Assessment of NBSAP implementation	
Significant progress was achieved in the reporting period. The proposal of Natura 2000 in Croatia was prepared, consultations with stakeholders and sectors were conducted and finally the ecological network was adopted by the Government.	

Wild species

Strategic objective	
Conserve and improve the existing diversity of wild taxa and recover a part of lost taxa where this is possible and justified. Ensure sustainable use of plant, fungal and animal taxa	
NBSAP strategic guidelines	**Activities**
3.1.4.1 Ensure favourable status of threatened taxa in the Republic of Croatia and the taxa listed in Annexes II, IV and V of the Habitats Directive and in Annex I of the Birds Directive, which are important for establishment of the NATURA 2000 network	For the purpose of the establishment of Ecological network Natura 2000, for 226 species from the Annex II of the Habitats Directive and Annex I of the Birds Directive, as well as for 74 habitats from the Annex I of the Habitats Directive, existing inventory data were evaluated and for many of them new field data collected. The rest of species were processed only partially. In 2012 the component of the WB NIP project started, aimed at processing historical inventory data for 13 groups of species and collecting new inventory data for 9 groups of species will be conducted in the period 2014-2016. Natura 2000 sites have been designated for 261 species from the Annex II of the Habitats Directive and Annex I of the Birds Directive. Regulation on ecological network was adopted by the Government in September 2013 (OG 124/13). Rule book on conservation objectives and basic measures for protection of birds in sites of ecological network was adopted in 2014 (OG 15/14). Intensive work on preparation of national monitoring protocols has started. Within the IPA MAN-MON project, protocols for 24 species have been prepared. Monitoring of 64 species was implemented in the reporting period (about 11.7% of total species of the Annexes of the Habitats and Birds Directive). Regarding Natura 2000 species, Management plan with action plan for Wolf (*Canis lupus*) and Management plan with action plan for Eurasian lynx (*Lynx lynx*) have been revised and officially adopted. Implemention is on-going according to available capacities. Management plan for Brown bear (*Ursus arctos*) has been revised. Draft management plan for Karst meadow viper (*Vipera ursinii macrops*) and for European otter (*Lutra lutra*) have been prepared.
3.1.4.2 Determine the exact distribution and status of the species proposed by the Republic of Croatia for inclusion in the amendments to the Habitats Directive	Twelve species have been included in the Annexes II and IV of the Habitats Directive upon the proposal of Croatia, and five of them (about 40 %) have been researched and inventoried during the reporting period.
3.1.4.3 Establish, on a scientific basis, the threat status of unprocessed groups of wild taxa and ensure protection of threatened, endemic and relict taxa	Four new red lists have been prepared (for cave fauna, freshwater and brackish water crustacea, land and freshwater snails, sea algae and seagrass) and three revised (for reptiles and amphibians, butterflies and birds). Red books for cave fauna, birds and reptiles and amphibians have been published. Red book of corals is in preparation. IUCN category of the Eurasian lynx was changed from NT to CR. Management plan with action plan for Eurasian lynx has been revised and adopted. Draft Management plans for Croatian dace (*Telestes polylepis*) (CR), Karst meadow viper (*Vipera ursinii macrops*) (EN) and Saker falcon (*Falco cherrug*) (CR) have been prepared. Certain activities regarding implementation of management plan for Croatian dace and Eurasian lynx have been conducted.
3.1.4.4 Continue establishment of the national wild taxa monitoring system	In 2012 monitoring of 43 bird species and 21 species belonging to other groups was implemented (about 11.7% of total species of the Annexes of the Habitats and Birds Directive). In 2013, the implementation of monitoring for additional 7 non-bird species began, and it is expected that 22 new monitoring programs would be completed soon.
3.1.4.5 Continue establishment of the nature protection information system that will include information on wild taxa	Work on the establishment of the Nature Protection Information System is continued. In collaboration with the Faculty of Science of the University of Zagreb, maintenance of Flora Croatica Database (CRO-Flora) is insured. Preparation of CRO-Fauna database has been intensified, regarding development of database itself and related applications (Georef), while the work on establishment of CRO-Speleo database has started. Standard Data Form database with the data on Ecological Network Natura 2000 has been prepared and all relevant data filled-in. CRO-Habitats database was prepared but not yet functional while the SINP GIS database on habitats was regularly maintained.

Strategic objective	
Conserve and improve the existing diversity of wild taxa and recover a part of lost taxa where this is possible and justified. Ensure sustainable use of plant, fungal and animal taxa	
NBSAP strategic guidelines	**Activities**
3.1.4.6 Active implementation of protection of migratory species	Draft management plan with action plan for one migratory species - Saker falcon (*Falco cherrug*) is prepared. Management plans for cetaceans and sea turtles are planned within the IPA Adriatic CBC project NETCET (Network for the Conservation of Cetaceans and Sea Turtles in the Adriatic) which started in 2012. Croatia has participated in the preparation of conservation plan for migratory shark species (Shark Conservation Plan).
3.1.4.7 Manage large carnivore populations at the national and international level	Management plans with action plan for Wolf and Eurasian lynx have been revised and adopted for the period 2010-2015. Management plans were implemented in a line with available resources, especially monitoring of damage prevention measures for domestic animals from Wolves (donating electric fences and tornjak sheep dogs). Management plan for Brown bear (*Ursus arctos*) revised and implemented accordingly. There is a permanent collaboration between Slovenian scientist and experts, especially regarding the information exchange on research, monitoring and particular management measures (LIFE Cro-Wolf and LIFE Slo-Wolf projects). Agreements about repopulating of Eurasian lynx and comprehensive management of Brown bear population were conducted. There is a sporadic collaboration, mostly on wolf population research in some parts of the north-west Bosnia and Herzegovina.
3.1.4.8 Improve the system of providing care and custody for injured, poisoned, sick or confiscated strictly protected wild animals	Protocol on the Reporting and Actions in Case of Encountering Dead, Sick or Injured Strictly Protected Marine Animals (marine mammals, marine turtles and cartilaginous fish) has been established since 2010. Protocols for large carnivores are also in place. Preparation of The Protocol for the monitoring of lethal fungi bat infections and Protocol on the reporting and actions in case of encountering bats in residential buildings has started. 5 authorized recovery centres for strictly protected animals continued with their work. Within the Protocol on the Reporting and Actions in Case of Encountering Dead, Sick or Injured Strictly Protected Marine Animals, collaboration with the Marine Educational Centre in Pula, which is authorized for marine turtle rehabilitation, has been established as well as with other relevant institutions on county or national level.
3.1.4.9 Co-operate with all relevant stakeholders in resolving the issue of placing poisons in nature and their improper use	No significant progress in the reporting period.
Assessment of NBSAP implementation	
Significant activities have been implemented for the conservation and management of large carnivores and for the collection of data on species for which Natura2000 sites have been designated. There has been improvement regarding collaboration with sectors.	

Box 19. RESTORATION OF THE HABITAT OF SNAKE-EYED SKINK (ABLEPHARUS KITAIBELII) IN THE NATURE PARK PAPUK

Snake-eyed skink (*Ablepharus kitaibelii*) has been recorded only in a very small area in Croatia, in the Nature Park Papuk and on several locations in the city of Ilok and the near surroundings. In both locations, the species is limited to only several hectares of suitable habitat. The Papuk population is facing two different pressures: widening of the local rock quarry and the spreading of allocthonous Black pine (*Pinus nigra*) throughout the habitat of the species. In order to stop the overgrowth in the habitat, the Nature Park Papuk and the Croatian Herpetological Society - HYLA initiated the restoration of the Snake-eyed skink habitat. During 2011, approximately 50 trees of Black Pine were felled, with a number of tree shoots removed. Given the fact that pupils from local schools participated in the restoration of the habitat as well, the activity also had an educational component. In the course of 2012, partial return of autochthonous vegetation was recorded, together with the return of several fauna species, including the Snake-eyed skink. It is planned to continue cleaning actions in the next years.

Snake-eyed skink. Photo: D. Jelić

Habitat of the Snake-eyed skink in Nature Park Papuk. Photo: SINP

Box 20. NEW AMENDMENTS TO ANNEXES II AND IV OF THE HABITATS DIRECTIVE

Based on the proposal made by Croatia during the process of its accession to EU, 12 species were included in the Annexes II and IV of the Habitats Directive. Seven of them are fishes restricted to karstic rivers of Adriatic Basin while others are species of karstic habitat of Dinarides.

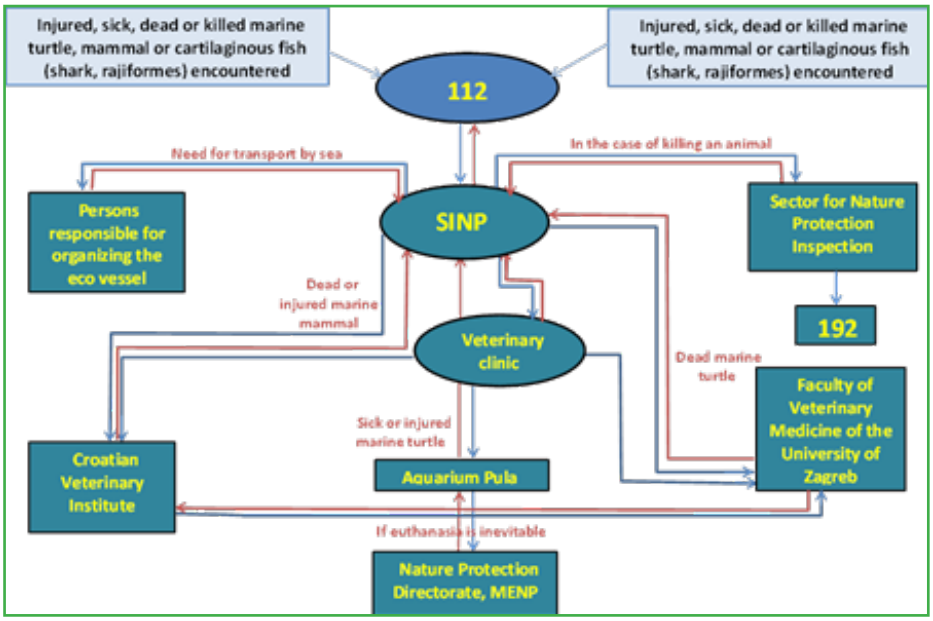
	Annex of the Habitats Directive
Balkan snow vole (*Dinaromys bogdanovi*)	II, IV
Mosor rock lizard (*Dinarolacerta mosorensis)*	II, IV
Sharp-snouted rock lizard (*Dalmatolacerta oxycephala*)	IV
Karst meadow viper (*Vipera ursinii macrops**)	II* (priorityspecies)
Dalmatia barbel-gudgeon (*Aulopyge huegelii*)	II
Adriatic trout (*Salmothymus obtusirostris*)	II
Dalmatian nase (*Chondrostoma kneri*)	II
Minnow nase (*Chondrostoma phoxinus*)	II
Croatian goby (*Knipowitschia croatica*)	II
Adriatic dace (*Squalius svallizae*)	II
Makal dace (*Squalius microlepis*)	II
Dalmatian ringlet (*Proterebia afra dalmata*)	II, IV
Velebit degenia (*Degenia velebitica**)	II*, IV

Adriatic trout, Photo: A. Duplić

Mosor rock Lizard, Photo: D. Jelić

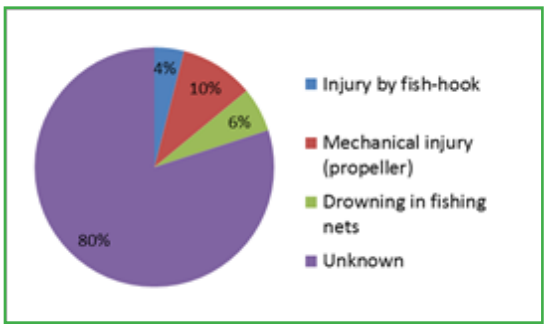
Box 21. PROTOCOL ON THE REPORTING AND ACTIONS IN CASE OF ENCOUNTERING DEAD, SICK OR INJURED STRICTLY PROTECTED MARINE ANIMALS (MARINE MAMMALS, MARINE TURTLES AND CARTILAGINOUS FISH)

Work on the establishment of this Protocol on the Reporting and Actions in Case of Encountering Dead, Sick or Injured Strictly Protected Marine Animals (marine mammals, marine turtles and cartilaginous fish) started in 2008 and it became functional at the beginning of 2010. Since then, intensified activities have been ongoing related to the expansion of the network of collaborators, to establishment of comprehensive system of collection of information and to preparing a plan of activities in case of encountering dead, sick or injured strictly protected marine species. During that period, State Institute for Nature Protection has established cooperation with a range of institutions that are contributing to the efficiency of the Protocol today.

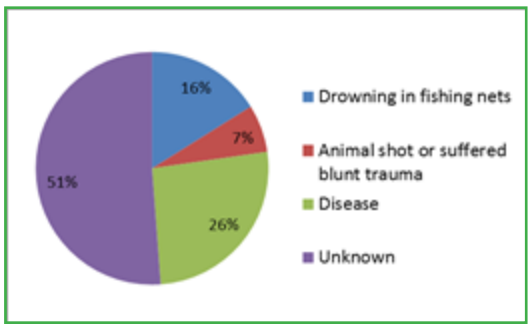


Scheme of the Protocol

In the period from 2008 to 2012, there were 189 reports in total. Out of those, 68 reports were regarding marine turtles (mostly the Loggerhead turtle) and 121 reports regarding marine mammals (mostly the Bottlenose dolphin).



Percentage of causes of mortality of marine turtles in the period 2008 - 2012



Percentage of causes of mortality of dolphins in the period 2008 - 2012

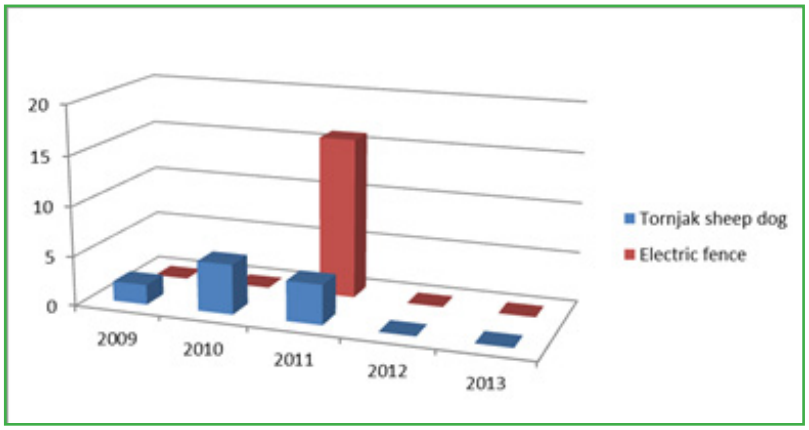
Parallel with the preparation of the Protocol, the SINP participated in the preparation of the international project NETCET (Network for the Conservation of Cetaceans and Sea Turtles in the Adriatic), within the IPA Adriatic CBC program. The project started in 2012, and it will be ongoing until the end of 2015, with 13 partners from Adriatic countries (Italy, Slovenia, Croatia, Montenegro and Albania). The key aim of the project is to establish cooperation and to strengthen the network of institutions, organizations and individuals involved in the protection of cetaceans and sea turtles in the Adriatic Sea. This will also result in the improvement of cooperation and exchange of experiences required for the active implementation of the Protocol.

Box 22. DAMAGE PREVENTION MEASURES FOR DOMESTIC ANIMALS FROM THE WOLF (*Canis lupus*)

Donating electric fences and tornjak sheep dogs

One of the main methods of stopping and reducing damages made to livestock is the controlled supervision of animals. A donation program for livestock breeders was prepared in order to decrease damages caused by strictly protected Wolf in accordance with the *Management Plan for the Wolf in Croatia*. Tornjak sheep dogs and electric fences were donated by the SINP for that purpose. Tornjak sheep dogs donation program has been implemented since 1997 - most intensively during the LIFE III CROWOLF Project (from 2003 to 2005). SINP has continued with donation program until 2012 when it was interrupted due to the lack of funding.

Apposing to the use of electrical fences, the use of sheep dog for prevention of damages was common practice in agricultural areas of Croatia until recently. Since 2003, 147 dogs and 80 electric fences were donated.



Numbers of donated tornjak sheep dogs and electrical fences. Source: SINP

Needs for tornjak sheep dogs and electric fences are larger than the donation program can cover. The purpose of donations is to help livestock breeders as well as encourage them to keep livestock in areas that are natural habitats of large carnivores, especially wolves. Field data clearly show that if the animals are guarded the damages are slim or non-existing.

Photo: J. Jeremić

Photo: SINP

Domesticated indigenous species

Strategic objective	
Conserve and promote the existing diversity of indigenous domesticated animal breeds and cultivated plant varieties using all suitable conservation methods (in situ, ex situ, inter situ)	
NBSAP strategic guidelines	**Activities**
3.1.5.1 Conserve and promote the existing diversity of indigenous domesticated animal breeds and cultivated plant varieties using all suitable conservation methods (in situ, ex situ, inter situ)	*National Program of Conservation of Indigenous and Protected Breeds of Domesticated Animals* was adopted in 2010 and implementation started. Breeding program for Istrian cattle was prepared, in addition to existing breeding programs for 23 breeds. Draft Management plans were made for all three donkey breeds and for Međimurje horse and some individual activities are partially implemented. Green Book of Indigenous Breeds of Croatia by using adjusted version of IUCN classification has been prepared. Preparation of Red Book of Grapevine Varieties started in 2013. *National Program of Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture* has been drafted.
3.1.5.2 Improve the system of incentives for breeding and exploitation of indigenous domesticated taxa aimed at conservation of threatened habitat types through Agri-environment-climate program	Continuation on national incentives trough preparation of adequate measures which are included into the draft Rural Development Programme of the Republic of Croatia for the period 2014-2020 to be adopted in 2014.
3.1.5.3 Encourage use of indigenous domesticated taxa for maintenance and improvement of the status of threatened habitat types	In some protected areas (Significant landscape Gajna and Nature Park Lonjsko polje) indigenous domesticated breeds are used for the maintenance and improvement of the status of threatened grassland habitat types.
Assessment of NBSAP implementation	
Significant results have been achieved in the assessment of threats and the protection of domesticated indigenous breeds. Incentive measures have been ensured and will continue in the upcoming period.	

Box 23. "GREEN BOOK OF INDIGENOUS BREEDS OF CROATIA"

Towards the end of 2011, in cooperation with the Croatian Agricultural Agency, SINP has published the "Green Book of Indigenous Breeds of Croatia" whose preparation involved a range of scientists and experts from various institutions. The book has included all the relevant knowledge of indigenous breeds, such as domestication, distribution, their traditional use, description and relevance of each breed, as well as the influence of indigenous breeds on the environment, habitats and biodiversity. In this book, for the first time, assessment of threats to indigenous breeds has been done by using adjusted version of IUCN classification, which is normally used for assessing threats to wild species.

In accordance to adjusted IUCN classification, 24 indigenous breeds (92 %) are in one of the categories of breeds threatened with extinction, and only two (8 %) belong to the Least Concern and are not threatened with extinction (Pag sheep and Grey honey bee). Four breeds are Critically Endangered (CR) - Međimurje horse, Istrian donkey, Northern Adriatic donkey and Turopolje pig. Assessment of threat to Istrian goat has not been done, since in 2011 it was not yet recognized as indigenous breed.

Coastal Dinaric donkey. Photo: SINP

Dalmatian pramenka sheep. Photo: SINP

Green Book of Indigenous Breeds of Croatia

Ex-situ protection

Strategic objective	
Conserve biodiversity components outside their natural habitats	
NBSAP strategic guidelines	**Activities**
3.2.1 Implement ex-situ protection of the most threatened indigenous and endemic taxa and indigenous domesticated taxa	Endemic species Velebit degenia (*Degenia velebitica*) is cultivated in the Botanical Garden of the Faculty of Science of the University of Zagreb. Croatian Herpetology society started collaboration with the Zoo Centre on ex-situ conservation of Snake-eyed Skink (*Ablepharus kitaibelii*), Karst meadow viper (*Vipera ursinii macrops*) and Pannonian viviparous lizard (*Zootoca vivipara pannonica*). *National Program of Conservation of Indigenous and Protected Breeds of Domesticated Animals* and the *National Program of Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture* have been adopted. Currently the breeding programs for 23 breeds exist. Comprehensive list of indigenous varieties of cultivated plants still does not exist, as well as categorization of threats. Consequentially, there are no breeding programs for cultivated plants. *Operational Program for Establishment of Gene Bank of Domesticated Animals in the Republic of Croatia* has been prepared. Croatian Agricultural Agency, which is in charge of establishment of gene bank, has established Department for Central Animal Gene Bank and works intensive on that issue. For domesticated varieties there are several collections in a form of seeds, seedlings and field collections that are kept at different subjects as a part of the National Plant Gene Bank.
Assessment of NBSAP implementation	
There is an overall continuity in the progress, with most achievements related to setting up legislative and administrative framework.	

Box 24. EX-SITU CONSERVATION IN BOTANICAL GARDENS

Even though there are approximately ten botanical gardens and arboreta in Croatia, the most important botanical garden is the Botanical Garden of the Faculty of Science of the University of Zagreb. In this botanical garden 31 species and subspecies (13.1% of all threatened plants of Croatia of IUCN categories RE, CR, EN and VU) are cultivated. On the basis of the permission provided by the competent Ministry, ex situ cultivation of endemic Velebit Degenia (*Degenia velebitica*) is ongoing on this location since 2007 while the cultivation of the other endemic plant the Dubrovnik Knapweed (*Centaurea ragusina*) started in 2009. There is a clear need to improve ex-situ protection in Croatia in the future.

Botanical gardens and arboreta within the Section of Botanical Gardens and Arboreta of the Croatian Botanical Society have been organizing the "Week of Botanical Gardens and Arboreta of Croatia" since 2011, thus confirming their significant role in the education and advocacy of plant conservation.

Ex situ cultivation of endemic Velebit degenia in the Botanical Garden of the Faculty of Science of the University of Zagreb. Photo: V. Stamenković

Invasive species

Strategic objective	
Prevent the introduction of invasive alien species into nature in the Republic of Croatia and continue resolving the issues of existing invasive species	
NBSAP strategic guidelines	**Activities**
3.3.1 Establish the existing situation with regard to alien and invasive species, assess their impact, define and carry out activities that would contribute to the elimination or weakening of such negative impacts.	In 2011, through Dinaric Arc project, WWF has supported preparation of a proposal for the development of a National Strategy on Invasive Alien Species providing general overview and necessary steps to deal with IAS. Due to limited resources, it was decided to focus on the implementation of specific activities from NBSAP, while keeping draft IAS Strategy as a part of the NBSAP. Planned determination of the current state of alien and invasive species, their complete lists and distribution maps still needs to be prepared. Orders for eradication of two invasive alien species are issued - Order for eradication of Signal crayfish (*Pacifastacus leniusculus*) and the Order for eradication of Wild boar (*Sus scrofa*). Although expected results have not been achieved, in 2012 eradication of Signal crayfish has started. Control and eradication of some invasive animal and plant species was also conducted. The Directorate for Seafaring Safety and Sea Protection, has produced a 'Protocol for the case of alarming about the viewing of the invasive alga of the species of Caulerpa, for prevention of spreading the alga in the submarine. Laboratory for benthos, Institute of Oceanography and Fishery is responsible for monitoring these activities. Draft action plan for eradication of Wild boar from the islands of Krk and Cres was prepared, but was not applied in practice.
3.3.2 Undertake necessary activities towards the prevention of introduction of new invasive alien species	Activities regarding education and public informing are conducted (website on invasive alien species is established (www.invazivnevrste.hr); some publications on invasive alien species are published (posters, leaflets); 12 articles on invasive alien species are prepared and published in GEO magazine; lectures and round tables about alien species are organized; public opinion regarding nature protection study on invasive alien species is done (as a basis for further planning of education activities and public informing) Collaboration with other sectors with the purpose of prevention of introducing invasive alien species was not established The new Nature Protection Act improved national policy framework on IAS in order to minimize the risk of alien species entering and becoming established in Croatia. The new Act establishes important changes regarding alien species by regulating the criteria for import and placement on the market of the alien species, as well as their introduction into the nature, taking into consideration the risk assessment protocols in order to predict their invasiveness.
3.3.3 Systematically monitor the distribution of invasive species in Croatia	Systematic monitoring programs on distribution of invasive alien species need to be prepared; certain monitoring activities are carried out by the Institute of Oceanography and Fisheries, mostly regarding invasive green algae genus *Caulerpa*. Planned monitoring of the spreading of invasive species that are indicators of climate change needs to be prepared.
Assessment of NBSAP implementation	
In this reporting period, activities regarding resolving the issues of invasive alien species were intensified. Most of the activities were related to education and public informing on invasive alien species. The new Nature Protection Act improved national policy framework on invasive alien species in order to minimize the risk of alien species entering and becoming established in Croatia. Further activities will be defined also in the framework of the new EU legislation on IAS.	

Box 25. ERADICATION ACTIVITIES

After one specimen of the Signal crayfish (*Pacifastacus leniusculus*) was recorded in February 2012 in the Korana River, a rapid response was initiated in order to stop and to control its future dispersion upstream and downstream. Activities were coordinated by SINP and involved Ministry of Environmental and Nature Protection and other relevant institutions and organizations. They included education and public awareness, field research, preparation of an eradication plan and eradication actions. The project will continue in the coming years.

NGO BIOM in collaboration with the Public Institution Nature Park Lastovsko otočje conducted a research project with the goal of experimental eradication of the Black rat (*Rattus rattus*) on three small islands. It was important to determine influence of these measures on the breeding success of two bird species - the Cory's Shearwater (*Calonectris diomedea diomedea*) and the Yelkouan Shearwater (*Puffinus yelkouan*). Preliminary results showed improved breeding success on two out of three islands after eradication.

Signal crayfish, Photo: L. Katušić

Yelkouan Shearwater killed by the Black rat, Photo: BIOM

4.2. Mainstreaming biodiversity into sectors

The following group of NBSAP thematic issues is dealing with mainstreaming biodiversity into different sectors. In NR4 these sectors were described in detail, based on information from the Report on State of Nature 2000-2007. Accordingly, in this Report only important new information is highlighted and the accent is put on implementation of the NBSAP 2008 strategic guidelines for each sector.

In the reporting period, the new Nature Protection Act from 2013 as well as all sectorial legislation has been in principle strengthened regarding sustainable use of natural resources and biodiversity protection because they have been harmonized with the EU *acquis*. It can be concluded that cooperation between nature protection and certain sectors has significantly improved during the reporting period, e.g. forestry, agriculture and water management. The least improvement was achieved with marine fishery sector. Generally, it is evident that cooperation on mainstreaming biodiversity improves and intensifies in cases when sectors are obliged to implement certain activities or include nature protection issues into their agenda. Spontaneous biodiversity conservation related initiatives occur only exceptionally. Nature protection is still envisaged by some sectors as separate problematic which require additional efforts and very often unwilling engagement. Future cooperation should be significantly strengthened, especially in the process of drafting and adopting strategic and planning documents.

Box 26. PHARE PROJECT NATURA 2000 IN CROATIA

Important cooperation with sectors that have most influence on biodiversity, has been established through the PHARE project on *Institutional Strengthening and Implementation of the NATURA 2000 Ecological Network in Croatia* (2008 -2010). Within the project, thematic workshops were held for the physical planning, water management, forestry and agriculture sectors with the objective to communicate the Natura 2000 proposal for Croatia and discuss possible future cooperation between sectors. A part of the project was dedicated to capacity building of county-level administration for implementation of the mechanism of appropriate assessment of impacts of plans, programs and projects on ecological network. A number of thematic brochures were published during the project life-time. This initiative resulted in follow-up cooperation with forestry and physical planning sectors in completing the Natura 2000 proposal and developing mechanisms for future mainstreaming biodiversity into these sectors.

Box 27. NATURE PROTECTION ACT (2013)

Mainstreaming biodiversity into sectors is partly prescribed by the Nature Protection Act (NPA), and partly by the relevant sectorial regulations. It is only through systematic cooperation between nature protection and other sectors that effective implementation of regulations can be ensured.

The basic mechanism of the NPA for mainstreaming biodiversity into sectors is obligation that all physical planning documents and sectorial management plans for use of natural resources, incorporate nature protection requirements issued by the Nature Protection Directorate of the Ministry of Environmental and Nature Protection. The Ministry issues requirements on the basis of expert document prepared by SINP which contains: an overview of the protected parts of nature, area of ecological network and ecologically significant areas with the corresponding maps; proposal on protection measures and requirements for sustainable use of natural resources and sites of the ecological network, and on measures for the conservation of biodiversity, landscape diversity and geodiversity. Nature protection requirements are supposed to be incorporated into sectorial documents but it must be stated that nature protection sector has no official feedback on results of this process, except in cases when protected areas and/or sites of ecological network are included. Also, implementation of prescribed measures needs more efficient supervision.

The other key mechanism is the procedure of Appropriate Assessment of plans, programs and projects that could have significant effect on sites of ecological network. Additionally, nature protection in sectorial activities can be defined more precisely via management plans for protected areas and sites of ecological network. NPA also ensures the inclusion of sectors in the management of ecological network sites. Although their management is in the competence of public institutions for nature protection, NPA states that the use of natural resources in these sites will be implemented on the basis of sectorial management plans which contain nature protection requirements. Management plan is a good instrument that can introduce clear distinctions between the competences and obligations of public institutions and individual sectors in a given site of the ecological network.

As for protected areas, individual protected area categories include protection regimes with certain limitations. In principle, the economic use of natural resources is prohibited in strict reserves and national parks (with certain exceptions in national parks). In special reserves, activities are not permitted if they might endanger the characteristics on the basis of which a given area became the reserve. On the other hand, when it comes to nature parks and regional parks, economic activities are permitted if they do not endanger the important characteristics and roles of the area. In forest parks, only those interventions and activities are permitted that have the aim of conservation or maintenance of the forest park. In the procedure of proclamation of a protected area, the obligatory content of the expert base proposal regarding protection includes an overview of consequences that would stem from the reaching of the act on proclamation, in particular when it comes to ownership rights and the existing economic activities. Given the fact that this procedure is subject to public insight, the representatives of sectorial activities can impact upon the determination of possible problems and methods of their resolution.

As for the permitted extraction of wild species from nature and their use, special regulations in the sphere of hunting and freshwater and marine fisheries, as well as the provisions of individual management plans, ensure the sustainability of such use, without threatening the populations to the extent that they would become threatened. When it comes to permitted use of species outside of the category of hunting or fishing species, regulations are reached on the basis of the Nature Protection Act.

Physical planning (Spatial planning)

The main cooperation between the nature protection and the physical planning sector is taking place during the drafting and adopting of physical planning documents through integration of nature protection requirements into the spatial planning documents[27]. More intensive cooperation has been developed in cases of preparation of physical plans for protected areas.

Physical plans are subject to the procedure of *Strategic Environmental Assessment* (SEA) which is the most important mechanism of introducing nature protection issues in physical planning. This procedure is still relatively new in Croatia and its implementation should be significantly strengthened in future. Nature Protection Act (NPA) proscribes the obligation to perform the *Ecological Network Impact Assessment* (ENIA) for all spatial plans. For spatial plans for which the *Strategic Environmental Assessment* is conducted Nature Impact Assessment is its integral part, whilst for the other spatial plans *Nature Impact Assessment* is being conducted through issuing and incorporating the nature protection requirements in spatial plans. One of the weaknesses is the practice of frequent revisions of physical plans in order to introduce small range of changes. For amendments to spatial plans, *screening* to establish the need for *Strategic Environmental Assessment* is required. In the previous period, in the process of screening decision that strategic environmental assessment is not necessary would occur, although there was a justified need for its implementation. Most of such cases occurred due to poor education of the regional administrative bodies and certain deficiencies in the legislative framework. The new Environmental Protection Act (2013) corrected these deficiencies and trainings and educations of competent authorities are being continuously conducted.

27) In the period 2008-2012 nature protection measures and requirements have been integrated into 347 different physical plans.

Strategic objective	
Adoption of spatial (physical) plans of the areas characterized by distinctive features for all national parks and nature parks, evaluation of the area from the nature protection standpoint, incorporation of nature protection requirements and measures, and information resulting from evaluation of the area, into physical planning documents	
NBSAP strategic guidelines	**Activities**
8.4.1 Carry out evaluation of the area (at the level of the counties and the City of Zagreb) in terms of nature protection or conservation and improvement of threatened and protected species populations, threatened and rare habitat types and conservation of landscape values, and define priorities related to planned designation of new protected areas.	Targeted evaluations were done through preparation of physical plans on county level (for 4 county physical plans). Systematic evaluation still needs to be performed. In the period 2008-2012, 347 expert baseline studies on nature protection measures and requirements to be incorporated into different physical plans have been prepared and incorporated in spatial plans.
8.4.2 Adopt the remaining spatial plans for the areas characterized by distinctive features (and/or amendments to existing plans) for all national parks and nature parks	All NP and PP are covered by spatial plans, additionally for all 8 national parks and for 6 nature parks have *spatial plans for the areas characterized by distinctive features* in place. In the period 2008-2012 spatial plans for following protected areas have been adopted: National Park Sjeverni Velebit (OG 35/12) and Nature Parks Lonjsko polje (OG 37/10) and Vransko jezero (OG 58/12).
8.4.3 Establish the correlation between spatial plans for the areas characterized by distinctive features and management plans for national parks and nature parks with regard to plan content	Accomplished through the process of preparation of physical plans for national and nature parks.
8.4.4 Conduct training of regional and local governments for the implementation and application of the provisions of physical planning documents and issuance of approval for projects in the area, particularly with aspect to the new evaluation of county areas, protected areas and the ecological network	Trainings and educations of competent authorities are being continuously conducted.
8.4.5 Improve implementation and supervision of nature protection measures and requirements that are incorporated into spatial plans	Supervision of implementation of the nature protection requirements is done through granting final approval in the process of adoption of the spatial plans.
8.4.6 Improve the level of public awareness of biological, geological and landscape diversity and the importance of conservation of the area, and encourage public participation in the development and adoption of spatial plans	Implemented through regular procedures proscribed by relevant legislation. Note: Data about the situation in space have been published in the Report on the situation in space of the Republic of Croatia 2008-2012 (OG 61/13).
Assessment of NBSAP implementation	
Cooperation between nature protection and physical planning has improved during the reporting period.	

Agriculture

Comparing to data from NR4, there is important new information related to agriculture sector in Croatia. While in period 2000-2006 there has been a strong negative trend in utilized agricultural area (UAA) (from 2,064,000 to 1,216,000 ha), in this reporting period the trend turned into the positive one. UAA has increased from 2008 to 2012 for 3%. On the other hand, there is a negative trend of the livestock numbers. Agricultural land under organic production is still small comparing to 3 times larger average in EU countries but the trend is positive, increasing from 0.8% in 2008 to 2.4 % in 2012.

Out of 177,003 farms registered in 2008, even 97% are small family farms with average area of 5.6 ha. This is favourable situation from the point of view of biodiversity conservation. It would be important to plan these activities strategically, especially having in mind the fact that even 1/3 of Natura 2000 sites is covered with agricultural land.

According to Croatian Bureau of Statistics the total consumption of mineral fertilizers in Croatia decreased from 401,164 t in 2008 to 278,872 t in 2012 (30% decrease). There is no precise data on consumption of pesticides. In 2013 Croatian Government adopted the *National plan for sustainable use of pesticides*[28]. It includes the measure to analyse the risk of use of pesticides in Natura 2000 sites and determine sites which require certain restrictions. An accent is also put on education of farmers on biodiversity conservation issues related to the use of pesticides.

28) http://www.mps.hr/UserDocsImages/BILJNO%20ZDRAVSTVO/HR-NAP.pdf

One of the main weaknesses of mainstreaming biodiversity into agriculture is a fact that the nature protection requirements have not been incorporated into adequate documents related to management and disposal of agricultural land (e.g. Program of disposal of agricultural land of individual municipalities/ towns and National program of land consolidation).

However, after the new Act on Agricultural Land from 2013 transferred responsibility for disposal of state owned agricultural land from local level (municipalities and towns) to the newly established Agency for Agricultural Land, the process of nature protection requirements incorporation into documents related to management of agricultural land within the protected areas has started. On the long term this could make easier mainstreaming biodiversity protection issues into agriculture.

Cooperation between the Ministry of Environmental and Nature Protection and the Ministry of Agriculture was improved in the course of preparation of the Rural Development Programme of the Republic of Croatia for the period 2014-2020. Proposal of agri-environment-climate was developed under the surveillance of the intersectorial working group. Ministry of Agriculture incorporated these measures into the draft National program that is expected to be adopted in 2014.

Table 8. *Utilized agricultural area in Croatia by categories (Source: Croatian Bureau of Statistics)*

Use category/Year*	Area (ha)					
	2008.	**2009.**	**2010.**	**2011.**	**2012.**	**Trend**
Arable land and gardens	855.416	863.023	899.594	892.221	903.508	↑
Vegetable gardens	5.337	5.315	4.902	4.233	2.933	↓
Permanent grasslands (meadows and pastures)**	342.430	343.306	345.389	346.403	345.561	↑
Orchards	35.933	36.659	32.889	32.560	30.846	↓
Vineyards	32.741	34.380	32.709	32.485	29.237	↓
Olive groves	14.971	15.304	17.096	17.200	18.100	↑
Nurseries and basket willow	1.263	1.595	1.256	981	788	↓
Utilized Agricultural Area	***1.289.091***	***1.299.582***	***1.333.835***	***1.326.083***	***1.330.973***	↑

** Utilized Agricultural Area in Croatia includes total of agriculture land being used in stated year*
*** It is estimated that the area is larger because more farms use jointly the state land for livestock grazing*

Strategic objective	
Conserve biodiversity on agricultural land surfaces through sustainable management	
NBSAP strategic guidelines	**Activities**
6.1.1 Continue co-operation between the competent authorities in charge of nature protection and those in charge of agriculture with regard to the adoption and implementation of the Agricultural and Environment Protection Programme	The draft Rural Development Programme of the Republic of Croatia was prepared for the programme period 2014-2020, to be adopted in 2014. It supports nature-friendly agricultural production and includes agri-environment-climate prepared in cooperation with nature protection sector through the WB NIP project.
6.1.2 Conserve sites hosting representative threatened habitat types within the CRO-NEN and NATURA 2000 network	Implemented only for few sites, e.g. incorporation of grassland protection into the draft Management plan for Natura 2000 site Odransko Polje through the project IPA MAN-MON.
6.1.3 Maintain a favourable water regime, including high levels of groundwater in areas of bogs and fens, wet grasslands and tall forbs habitats	Not implemented
6.1.4 Decrease the trend of the loss of land surfaces and diversity of near-natural and semi-natural grasslands as valuable anthropogenic habitats which are very rich in biodiversity	There have been several examples of active management of hay meadows and pastures in protected areas and sites of ecological network. Nature protection requirements issued by the MENP in the process of preparation physical plans define important localities for biodiversity where land use should not be changed.
6.1.5 Promote organic agricultural production and other forms of agriculture that contribute to the conservation of biodiversity, and assist producers in promotion and market penetration	All management plans of protected areas adopted in the reporting period contain measures for maintaining and supporting traditional agriculture and nature-friendly methods
6.1.6 In agricultural areas, encourage conservation of biological taxa important for the habitat type, and ensure that alien species and genetically modified organisms are not introduced into nature	There is inter-sectorial cooperation in GMO-related issues through National Council for GMO's
6.1.7 Educate agricultural producers on the importance of conservation of biodiversity in agricultural practice	Since 2010 the Agricultural Advisory Service continuously works on education of farmers related to implementation of cross-compliance requirements which also include requirements of the Birds and the Habitats directives
6.1.8 In agricultural production, use protective agents and mineral fertilizers in a sustainable manner	National plan for sustainable use of pesticides was adopted by the Croatian Government in 2013 and the new Act on sustainable use of pesticides from 2014 requires proper education and holding evidence of used pesticides
6.1.9 Ensure implementation of nature protection measures in the field of agriculture	The process of incorporation of biodiversity conservation measures into programmes for management of state-owned agricultural land has been initiated recently.
Assessment of NBSAP implementation	
Improvement in inter-sectorial cooperation was achieved through preparation of agri-environment-climate and incorporation of biodiversity conservation measures into management plans of protected areas.	

Forestry

According to the Croatian Bureau of Statistics (CBS), there has been an increase of average of cut wood in forests from 2008 to 2012 for 16%. This trend is also visible form analysis from CLC mapping (see Box 4). The forest biomass used for energy production is also increasing during last decade. This indicates potential negative influence on forest biodiversity, especially on species dependent on all stands and deadwood. Promising is the trend of decreasing surfaces for large-scale tree felling during the process of completed felling.

In 2012, the FSC certificate of the state-owned company Croatian Forests (Hrvatske šume d.o.o.) for sustainable and responsible management of state forests which make 78% of all forests and forest land in Croatia, was extended for the period of five years. Significant cooperation with the forestry sector was achieved via the PHARE project on Natura 2000 in Croatia, followed by establishing of the *Working group for the definition of forest areas within the Natura 2000 Croatia*.

Nature protection requirements continue to be integrated into forestry management plans[29], in terms of protection measures for individual threatened species, habitat types, protected areas, and sites of the ecological network. Following the good cooperation with forestry sector, but also vast and more detailed consultations about management of forest areas in line with Natura 2000 requirements led to common vision of integrating conservation measures for Natura 2000 forest areas into forestry management plans.

The Forest Act includes certain regulations that contribute to biodiversity conservation such as: designation of forests with special purpose which include forests in protected areas and the most valuable forest sites for genofond (production of seeds). Additionally, protective forests are being designated for ecosystem services they provide like protection against erosion, protection of waters etc, with modified management.

29) In the period from 2008 to 2012, nature protection requirements have been integrated in 603 forest management plans (base proposals and management programs for state forests, and forest management programs for privately owned forests).

Strategic objective	
Conserve the existing biodiversity of forests and ensure sustainable exploitation of this biological resource through incorporation of biodiversity protection measures and ensure co-operation between the forestry and nature protection sectors	
NBSAP strategic guidelines	**Activities**
6.2.1 Use and manage forests on the principle of conserving biodiversity components of forest ecosystems, with the focus on protected areas, ecological network areas and future NATURA 2000 areas	In 2010, SINP established a *Working group for the definition of forest areas within the Natura 2000 ecological network in Croatia*. The working group included the representatives of expert and scientific institutions in nature protection and forestry sectors, relevant ministries as well as the Union of Private Forest Owner Associations. In addition to defining the forest areas for the Natura 2000 network in Croatia, the working group also prepared draft proposals of protection measures for individual forest species and forest habitat types defined as target species and target habitats for individual Natura 2000 sites in Croatia. Measures defined for forest birds were incorporated into the *Ordinance on conservation objectives and basic measures for conservation of birds in sites of ecological network* that was enacted in 2014. Despite some isolated efforts, not one Program was prepared for the protection of forest ecosystems in protected areas - document prescribed for protected areas with no commercial forest management. New Nature Protection Act from 2013 changed this document into Program for forest protection, to be prepared according to forestry sector legislation and methodology.
6.2.2 Monitor the state of forest ecosystems in protected areas, ecological network areas and future NATURA 2000 areas	Through the project IPA-MANMON (2012-2013), monitoring programs for 8 Natura 2000 forest species (*Lucanus cervus, Rana latastei, Strix uralensis, Dendrocopus medius, Dryocopus martius, Ficedula albicollis, Haliaeetus albicilla* and *Ciconia nigra*) and 2 forest habitat types (91E0 i 91F0) have been prepared In 2010 a regulation is adopted, defining methodology of monitoring of damages of forest ecosystems. Croatian Forestry Institute was appointed as National coordination centre for such monitoring. In the period from 2008 to 2012, systematic monitoring of the state of lowland flood forests and damage to forests in the territory of Gorski Kotar continued, with the Forest Research Institute Jastrebarsko (as of 2010, Croatian Forest Research Institute) being the key implementer
6.2.3 Resolve the issue of landmines in forested areas	Demining activities were continued. Through cooperation between the MENP and the Croatian Mine Action Centre and Governmental Demining Office, priority was given to demining of national parks and nature parks. During the reporting period more than 1/3 of potential mined area of national and nature parks was demined, including forest areas, and there are project prepared that will follow this activates in upcoming period.
6.2.4 Improve co-operation among relevant sectors at the national and international levels in connection with the implementation of the NATURA 2000 programme and conservation of biodiversity	Significant cooperation with the forestry sector was achieved via the PHARE project *NATURA 2000 in Croatia* (2008 - 2010). A thematic workshop was held for the forestry sector on the preparation of the Natura 2000 proposal for Croatia. A thematic brochure was also published. In 2010, SINP established the inter-sectorial Working group for the definition of forest areas within the Natura 2000 in Croatia.
Assessment of NBSAP implementation	
Cooperation between sectors of nature protection and forestry has significantly improved, especially in the area of inventory, management and monitoring issues related to Natura 2000.	

Hunting

Currently there are 1066 hunting grounds on total of 5,472,198 ha or 96.69% of territory of Croatia. According to data of the Ministry of Agriculture, during the reporting period there has been significant increase of hunting bags of the most game species like the Brown bear, different waterbirds and others. Number of hunters has also increased from 57,870 in 2009 to 64,617 in 2012.

Nature protection requirements continue to be integrated for game management plans (hunting management plans, game breeding programs and game protection programs)[30].

Positive example of cooperation between nature protection and hunting sectors is within management of large carnivores' populations, especially decision process on hunting quotas and implementation of monitoring protocols. It is still lacking when it comes to systematic inventories and monitoring of game and strictly protected species. In the upcoming period it is planned to continue cooperation broadening it with preparation of management plans for game species listed in Annex IV and V of the Habitats Directive like Beaver and Wildcat or Annex I of the Birds Directive - Rock Partridge.

The Hunting Act includes some nature protection-related mechanisms, such as: closed seasons for hunting, permanent closed season for certain game species that are protected under EU directives and NPA (Beaver). Additionally, protected areas where hunting is not allowed are excluded from hunting grounds and the buffer zone of 300 m around them is prescribed. Also, hunting is generally not allowed on the sea and on water area of fishponds.

30) In the period from 2008 to 2012, nature protection requirements have been integrated in 550 game management plans (hunting management plans, game breeding programs and game protection programs).

Strategic objective	
Conserve the existing biodiversity of fauna and ensure sustainable use of this biological resource through incorporation of biodiversity measures and ensure co-operation between the hunting and nature protection sectors	
NBSAP strategic guidelines	**Activities**
6.3.1 Implement the programme for scientifically based determination of game population counts, and establish a monitoring system	Not implemented
6.3.2 Monitor the state of game in protected areas where hunting activities are not permitted	Game protection programs were prepared and adopted for 5 protected sites, including 2 national parks, 2 special reserves and 1 horticultural monument (park)
6.3.3 Improve co-operation among relevant sectors at the national and international levels with regard to implementation of the NATURA 2000 programme and biodiversity conservation	Through the PHARE project *NATURA 2000 in Croatia* (2008 - 2010) a thematic workshop was held for the forestry sector on the preparation of the Natura 2000 proposal for Croatia. Representatives of hunting sector also participated and hunting issues were also discussed. Cooperation is also ongoing through implementation of the Management plan for the Brown bear and management plans with action plan for the Wolf and for the Lynx. Meetings of experts in charge of bear management is organised on an annual basis for the purpose of exchanging experiences and developed joint management programmes for the following year.
6.3.4 Improve the work of and co-operation between the inspection authorities responsible for the hunting sector and the nature protection sector	Nature Protection Act provides legislative framework for cooperation within nature protection inspection and sectorial inspection services.
6.3.5 Develop fauna management plans for species with a stricter protection regime pursuant to European Union Directives	Not planned for this reporting period.
6.3.6 Evaluate the status of allochthonous game on the islands and mainland, and begin resolution of this issue	The expert group was established and action plan for eradication of the Wild boar from islands of Cres and Krk was prepared in 2010, implementation still needs follow up.
6.3.7 Protect waterfowl and their habitats against the use of lead shot pellets	In 2010 the use of lead shot was forbidden in wetland areas, implementation still needs follow up.
Assessment of NBSAP implementation	
Progress in cooperation with the hunting sector was achieved in the process of preparation of Natura 2000 and in management and monitoring of populations of large carnivores. Nature protection requirements are regularly issued into all game management plans.	

Freshwater fisheries

Commercial fishery is present only on Danube and Sava rivers - in 2011 there was 90% of the catch registered from Danube and only 10% from the Sava River. During last several years, especially in 2011 and 2012, there is an increase in requested permits for commercial fishing. In 2011 there were 25 permits issued for commercial fishing on Danube and 8 permits for Sava River with total reported catch of 50 t. Four Red List species are represented in the commercial catch: Carp (*Cyprinus carpio*) - EN, Sterlet (*Acipenser ruthenus*) - VU, Asp (*Aspius aspius*) - VU and Ide (*Leuciscus idus*) - VU. Recreational fishing is implemented through issuing fishing permits for about 38,500 anglers with average catch of 596 t per year.

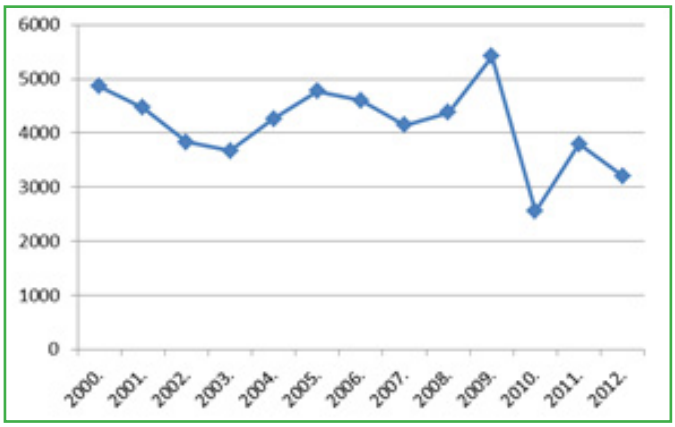
Aquaculture includes carp fishponds and trout fishponds. While production on carp fishponds is decreasing during the last decade, trout fishponds are constantly increasing. The draft *National strategic plan for development of aquaculture* aims at significant increase of both types of production, approximately tripling current production.

Cooperation between nature protection and freshwater fishery sector was improved especially regarding the issues of ornithological important carp fishponds. All large complexes of such fishponds were included in ecological network Natura 2000 as SPA's. National support scheme *Conservation of Fish Pond Ecosystems*, established by the Ministry of Agriculture in 2008 through inter-sectorial cooperation, was implemented regularly each year and contributed significantly to change the attitude of fisheries towards birds from 'fish-eating pests' to valuable resource of additional income. It is important to strengthen this cooperation further in order to ensure adequate financial mechanism from EU funds after the national support scheme is completed in 2016.

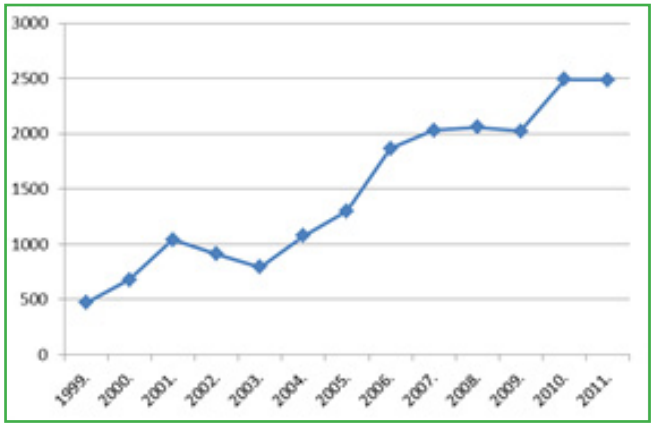
However, despite there is the legal obligation according to the Nature Protection Act, nature protection requirements are usually not being requested during the process of preparation of management plans in freshwater fishery sector.

Additional problematic issues include current low safety level on trout fishponds in place before 2008 when the legal obligation to preform risk assessment has been put in place.

The Freshwater Fishery Act was not changed since 2005. It proscribes some measures for protection of fishes like: closed seasons for fishing, restricted sizes of fishes that are allowed to be taken from open waters, restrictions for fishing activities on certain sites important for fishes, restrictions for certain fishing gear. Although it is forbidden to introduce alochthonous species (by definition these which are foreign to individual fishing waters), the practice of ranching natural waters with foreign species is ongoing.



Production in carp fishponds in t/year. Source: CBS



Production in trout fishponds in t/year. Source: CBS

Strategic objective	
Conserve and, where possible and appropriate, re-establish the natural biodiversity of terrestrial waters to the greatest extent possible	
NBSAP strategic guidelines	**Activities**
6.4.1. Strengthen biodiversity conservation measures in regulations and documents in the field of freshwater fisheries	During the reporting period there were only few requests for issuing nature protection requirements and measures for plans in regard to fisheries management.
6.4.2 Prevent the introduction of alien species into open waters, particularly those in the Adriatic Basin, and commence their removal	Legislative framework in place.
6.4.3 Enable the existence of semi-intensive and/or extensive breeding in carp fishponds as a prerequisite for maintenance of their ornithological value	Ministry of Agriculture introduced the national support scheme *Conservation of Fish Pond Ecosystems* in 2008. The scheme ensures support to ornithological important carp fish ponds per unit of production surface on an annual basis, under the condition that the production is semi-intensive (production between 500 and 1000 kg/ha). In 2013 all ornithological important carp fishponds were designated as Natura 2000 sites (SPA's).
Assessment of NBSAP implementation	
Implementation Strategic objective has shown positive trend, especially progress achieved related to conservation of ornithological important carp fishponds.	

Box 28. CARP FISHPONDS - IMPORTANT SEMI-NATURAL WETLANDS

Croatia has approximately 12,000 ha of semi-intensively managed carp fishponds that represent important wetland habitats for large number of threatened species. They are situated in continental part of Croatia, along large lowland rivers. Most of them were built in the first half of 20th century and today they have characteristics of semi-natural wetland habitats which also represent significant landscapes of lowland Croatia. Rich vegetation as well as diverse and dynamic water regime of individual ponds, contribute to diversity and quality of habitats for birds (open water, reedbeds, floating vegetation, periodically emptied ponds with extensive mudflats and shallow water etc).

Large complexes of carp fishponds are included in ecological network Natura 2000. They are important sites for more than 40 birds from Annex I of the Birds Directive and for additional 24 regularly occurring migratory waterbirds. Among threatened birds that are highly dependent on carp fishponds are EU priority species - the Ferruginous Duck (*Aythya nyroca*) and the Bittern (*Botaurus stellaris*), as well as other species threatened in Europe like the White-tailed Eagle (*Haliaeetus albicilla*), the Whiskered Tern (*Chlidonias hybridus*), the Spoonbill (*Platalea leucorodia*) and many others. Also, these fishponds are important sites for other Natura 2000 species like the Otter (*Lutra lutra*), the European pond terrapin (*Emys orbicularis*), the Four leaf clover (*Marsilea quadrifolia*) and others as well as for Natura 2000 habitat type amphibian vegetation *Isoeto-Nanojuncetea*.

Natura 2000 species of carp fishponds completely depend on the current semi-intensive way of production. One of the NBSAP targets is to enable continuation of nature-friendly production through financial support to fisheries. Based on proposal made by the inter-sectorial working group including scientists, the Ministry of Agriculture introduced the national support scheme *Conservation of Fish Pond Ecosystems* in 2008. Its purpose was to stabilize this production segment while in the same time preserving biodiversity of carp fish ponds and also to eliminate the inefficient practice of court resolution of disputes between the state and the fisheries that suffer from damage caused by fish-eating birds. The scheme ensures support to ornithological important carp fishponds per unit of production surface on an annual basis, under the condition that the production is semi-intensive (between 500 and 1000 kg/ha).

Draganići fishponds - a part of Natura 2000 site. Photo: D. Krnjeta

Ferrugineous Duck is globaly threatened species that is highly dependent on carp fishponds in Croatia. Photo: D. Krnjeta

Marine fisheries

In the marine fisheries sector, during the reporting period, the most important activities were related to harmonization of national legal framework with the provisions of the EU *acquis*, resulting in more efficient fishery policy and sustainable management of fishstocks/biomass reserves. Mediterranean Regulation has been transposed into Marine Fishery Act. Among other measures, Mediterranean Regulation proscribes prohibition of fishing with trawl nets, dredges, purse seines, boat seines, shore seines or similar nets above all Natura 2000 sites, all protected areas, seagrass beds, coralligenous habitats and mäerl beds.

According to the Ministry of Agriculture and Croatian Bureau of Statistics the total catch of fish and other marine organisms from 2008 to 2012 has amounted to 281,307 tones, showing increase from the previous five-year period when it amounted 173,707 tones. In 2012 there have been 3222 fishermen with privilege to perform commercial fishing. The majority of the catch in commercial fishing (about 85%) is achieved by purse seine nets which aim to catch small pelagic fish, primarily sardines and anchovies. Less than 10% of the catch is realized by trawl fishing gears, while gillnets achieved only 1.3% of the total catch. In the reporting period, the catch of small pelagic fish has increased what can be related with the population renewal, but also with government subsidies for fishing and investments in modernization of the fishing fleet. In recent years, the decline in biomass index for considerable number of demersal species has been recorded. The fall of biomass was mainly due to a decrease of biomass of hake, shrimp and musky octopus, which are all extremely economically important species. The decline of biomass was also evident in economically less important and unimportant species. A significant decline in biomass is particularly recorded in cartilaginous fish that in the Mediterranean, including the Adriatic are the most vulnerable group of fish. In addition to sharks, the impact of fishing is reflected on incidental catches of other large marine vertebrates, such as marine mammals and marine turtles.

Table 9. *Catch of fish and other marine organisms in commercial fishing during the period 2003 - 2012 (in tons) (Source: Adapted from Ministry of Agriculture and Croatian Bureau of Statistics)*

Group	2003.	2004.	2005.	2006.	2007.	2008.	2009.	2010.	2011.	2012.
Blue fish	19.593	26.174	28.621	31.646	33.041	42.688	49.459	46.711	64.306	56.780
Other fish	1.457	2.830	4.573	4.857	4.893	4.831	4.137	4.098	4.493	4.357
Crustaceans	184	274	258	298	451	461	529	543	505	487
Bivalves	94	121	90	132	133	80	93	108	167	185
Molluscs	488	728	1.094	904	1.621	916	1.101	900	1.023	1.165
Other marine organisms	7.275	1.810	25	19	23	35	45	35	41	28
TOTAL	***29.091***	***31.937***	***34.661***	***37.856***	***40.162***	***49.011***	***55.364***	***52.395***	***70.535***	***63.002***

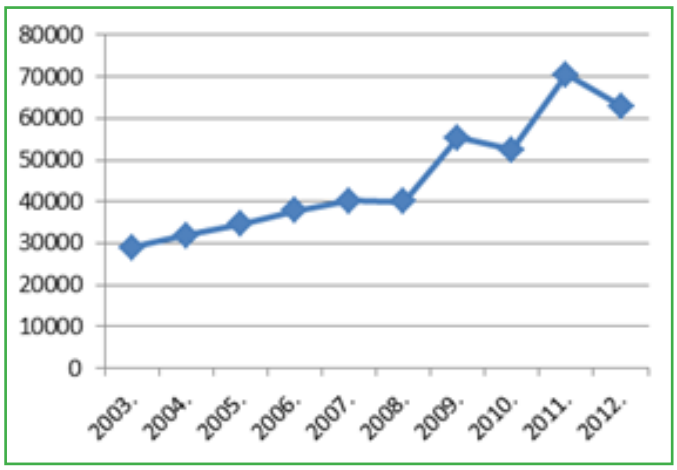


Figure 18. *Catch of fish and other marine organisms in commercial fishing*

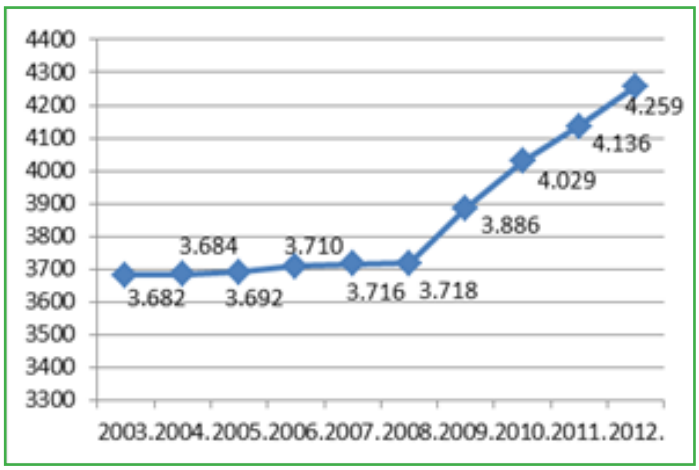


Figure 19. *Number of vessels in commercial fishing*

During the period 2008-2012 a total amount of collected Red coral was 6 074.1 kg and a total amount of collected sponges was 153,388.9 kg. The data on collected sponges must be taken with reserve because there is no standardized way in which the data on collected sponges are recorded by the fishermen. Even though the quantity of collected Red coral is in accordance with the permitted annual collection quota, based on the scientific research Red coral is extremely endangered and the population of the species have been put under strict protection.

During the period 2008-2012 mariculture in the Republic of Croatia has slightly decreased. Production of Seabass and Gilthead seabream is stable or with minimum decrease. Decrease in Bluefin tuna production (for about 45%) is result of multiannual international recovery plan of tuna biomass in seas at global level. *The International Commission for the Conservation of Atlantic Tunas* (ICCAT) has reduced catch quotas for all participants in tuna fishing. Production of Mediterranean mussel is stable, while production of European oyster has increased.

Table 10. *Mariculture production during the period 2008 - 2012 (Source: Ministry of Agriculture)*

Year/ species	White fish (t)		Blue fish (t)	Shellfish (t)		TOTAL
	Seabass (*Dicentrarchus labrax*)	Gilthead seabream (*Sparus aurata*)	Bluefin tuna (*Thunnus thynnus*)	Mediterranean mussel (*Mytilus galoprovincialis*)	European oyster (*Ostrea edulis*)	
2008.	2.500	2.500	3.711	3.000	50	11.261
2009.	2.800	2.200	4.200	2.000	50	11.250
2010.	2.800	2.400	3.592	2.000	55	10.847
2011.	2.775	1.719	2.312	3.000	150	9.956
2012.	2.453	2.173	1.907	3.000	150	9.683
TOTAL	***23.820***		***15.722***	***13.455***		***52.997***

Cooperation between nature protection and marine fishery sector is showing slow progress. The Nature protection sector is included in the preparation of the National strategic plan for aquaculture for the period 2014-2020 and in the preparation of management plans for fishing. Cooperation between the nature protection and marine fishery sector in regulating and controlling fishing in protected areas, in particular in nature parks and special reserves still needs improvement.

Exceptionally, in parts of the fishing sea that are also protected areas limitations of fishing and farming of fish and other marine organisms are allowed in line with the nature protection requirements where these activities are permitted by the regulations which are in a line with the Nature Protection Act.

The most important measures to regulate fishing in the Croatian sea are temporal and spatial fishing restrictions, control of catch and fishing effort, defining the technical construction characteristics of fishing tools, prescribing temporary or permanent closed fishing season, prescribing minimum fishing length. Spatial fishing restrictions include protection of special habitats of fish and other marine organisms regulated by the Ordinance of Ministry of Agriculture. Starting from this year Croatia will introduce incentives for the temporary cessation of fishing activities supporting in this way recovery of fish stocks.

Cooperation between nature protection and marine fishery sector is showing progress. Nature protection sector is included in preparation of National strategic plan for aquaculture for period 2014-2020 and preparation of management plans for fishing.

As an important component of marine biological resources monitoring, Croatia has established permanent monitoring of commercial fishery. Since 1996, the Republic of Croatia has established monitoring of bottom settlement within the EU MEDITS programme, and monitoring of the commercial fishery was established as of 2002/03 through the DemMon project. From 2012/2013, in the Republic of Croatia, the monitoring of demersal resources (as well as other segments of fishing) has been established in accordance with DCF, as in other EU countries.

However, there is need to make more systematic methodology on data collection on by-catch of strictly protected species. In this regard, in order to reduce the negative impacts of fisheries on strictly protected marine species, education of fishermen how to deal with accidentally caught cetaceans and sea turtles has started.

Strategic objective	
Ensure sustainable management of biological resources in the Adriatic Sea, taking account of the need to conserve threatened marine species and habitat types	
NBSAP strategic guidelines	**Activities**
6.5.1 Use of biological resources of the Adriatic Sea is based on sustainable management principles	Te study *Integrated shellfish farming plans for the areas of Malostonski Bay, Krka river estuary, and the marine area of the north-western part of Zadarska County* has been prepared (within the COAST project). In addition to integrated shellfish farming plans for each area, Action Plans for the period 2009-2012 were also prepared. The study *Use and conservation of sea areas and seabed in the territory of Split-Dalmatia County, with an emphasis on mariculture in the multi-sectorial context of Integrated Coastal Area Management* has been prepared. Draft Management plan for bottom trawl fisheries and draft Management plan for surrounding purse seine nets have been prepared.
6.5.2 With the aim of conserving marine biodiversity, incorporate protection requirements and measures into plans/ programs related to marine fisheries, and into spatial plans where these relate to use of the sea and coastal areas	Nature protection requirements are being incorporated into physical plans, and partly into plans/programs related to marine fisheries. In 2014 nature protection requirements were integrated for the *Draft Management plan for bottom trawl fisheries and Draft Management plan for surrounding purse seine nets*.
6.5.3 Focus scientific/research programs and projects on the exploration of specific, valuable, economically important and exploited, vulnerable, inadequately known and threatened communities, taxa and habitats	Republic of Croatia has established permanent monitoring of commercial fishery for coastal, demersal and pelagic fisheries. Within the NETCET project, education of fishermen on conservation of cetaceans and marine turtles has started. Natura 2000 sites have been designated in the internal waters and territorial sea of the Republic of Croatia. Within the IPA-Marine project, analysis of future research needs has been made. Through the state budget certain researches have been conducted by the scientific and expert institutions, CSOs and individuals whose interest is sea and marine biodiversity. Through the document *Initial assessment of the status and pressures of the marine environment*, protection of particular sensitive areas has been proposed. Through the activities regarding inventory, mapping and collection of data on marine habitats and species from the Annexes of the Habitats Directive in Splitsko-dalmatinska County, potential "no-take" zones have been proposed. COAST project included an inventory and description of the fishery resources of the high seas of the Adriatic and the Vis archipelago and recommendations and proposal for sustainable use and the areas of limited use. Within MedMPANet project, in order to improve MPA management at local level through filling gaps in fisheries knowledge, fieldwork on the assessment of coastal fisheries resources was performed and the fishery study was produced "Assessment and monitoring of coastal fisheries resources and socio-economic research of local fisheries at selected areas of Primorje-Gorski Kotar County". Within the ADRIAMED project scientific cooperation of Adriatic sea neighbouring countries has been established to support responsible fisheries in the Adriatic sea. One of the initiatives set up is proclamation of Jabuka Pit - protected fishery area, presented as one of the most important habitats for some shared demersal stocks of the Adriatic Sea.
Assessment of NBSAP implementation	
Implemented activities relate to research and monitoring of marine biological resources, especially commercial species. Cooperation between sectors of nature protection and fishery is showing constant progress.	

Box 29. PROJECT COAST "CONSERVATION AND SUSTAINABLE USE OF BIODIVERSITY IN THE DALMATIAN COAST"

The project was implemented in the period 2007-2013. It was developed with the support of the United Nations Development Programme (UNDP) in cooperation with the Ministry of Environmental and Nature Protection and other competent ministries, four Dalmatian counties, and a number of local organizations, companies and individuals. It was conducted with the financial support of the Global Environment Facility (GEF). In cooperation with its partners, the COAST project managed to develop a green vision for rural areas of Dalmatia, founded upon the extraordinary natural wealth of the region, while at the same time confronting many obstacles in rural areas that suffer from an acute shortage of development possibilities. Notable examples of cases where valuable nature and environment are preserved, while innovative green products and services result in new investment and jobs, can be found in the traditional economic sectors of Dalmatia: agriculture, tourism, fisheries and mariculture.

Use of genetically modified organisms (GMOs)

Genetically modified organisms (GMOs) potentially pose a threat to native biodiversity. There was no registered deliberate release of GMOs into environment in Croatia. No GMO crops have been registered either. All 21 county in Croatia adopted decisions to be GMO-free, the last three of them in the reporting period (2009-2010). Contained use of GMOs in laboratories is implemented under proscribed conditions that include biosafety.

Detailed information on use of GMOs in Croatia can be found in the *Second Regular National Report on the Implementation of the Cartagena Protocol on Biosafety* that was submitted to the CBD in 2011 (http://bch.cbd.int/database/record.shtml?documentid=102638)

Strategic objective	
Ensure incorporation of biodiversity measures into all activities related to the contained use, release into the environment, placing on the market and cross-border transport of genetically modified organisms (GMOs), by applying the precautionary principle.	
NBSAP strategic guidelines	**Activities**
6.6.1 Establish a comprehensive legislative and institutional control system for the use of GMOs	Legislation on GMOs has been harmonized with EU directives and Biosafety Protocol. Institutional framework is established according to national legislation, including Council for GMOs, Committee for Contained Use of GMOs and Committee for Release of GMOs into the Environment. Three laboratories are currently authorised to work on detection of GMOs, quantification and risk assessment.
6.6.2 Establish and maintain the national BCH mechanism (biosafety clearing-house mechanism)	Technical, programme and administrative support for the establishment of a functional national BCH mechanism was ensured by the Ministry of Environmental and Nature Protection. The website on GMOs was redesigned and modernised to serve as the national BCH mechanism (www.gmo.hr).
6.6.3 Provide continuous training for employees of competent institutions, inspection services and the general public	A thematic workshop was held on experimental fields and monitoring of GMOs after releasing into environment and putting on the market
Assessment of NBSAP implementation	
Planned activities were mostly implemented. Legislative and institutional frameworks are fully established.	

Water management

Water management is a sector with significant impacts on biodiversity which are most frequently connected with the management of river basins, flood protection works and measures, extraction of river sediments, construction and maintenance of waterways, and the construction of water reservoirs and hydropower facilities. Melioration drainage and irrigation can have an impact on the natural water regime. The extraction of water for water supply may also have a significant impact on biodiversity.

Water resources in Croatia are managed by the state-owned company Hrvatske vode (Croatian Waters). The *Water areas management plan of Republic of Croatia 2013-2015*, prepared according to EU legislation, was adopted by Croatian Government in 2013 (OG 82/13). It covers two water areas: the water area of the Danube River and the Adriatic water area. For both of these, reports with the analysis of their characteristics have been prepared, determining the natural characteristics of all waters, overview of the impact of human activities on the state of waters, and economic analysis of water use. Water bodies were singled out as fundamental units in terms of water management goals and measures. The results of analyses of water area characteristics also include the assessments of the state of surface water bodies, including transitional and coastal waters, and the state of groundwater bodies, with the identification of anthropogenic loads and impacts on the characteristics of water bodies. The process of SEA was undertaken for this Plan.

According to this document, melioration systems today cover 1,049,411 ha, which is only 2/3 total planned area - about 624,381 ha is still to be meliorated, with potential negative effect on biodiversity. Water as the natural resource is being used based on more than 600 concessions issued for public water supply (20%), technological purposes (65%) or use of water power (5%), which cover altogether 1330 x 10^6 m^3 of water annualy (61% underground and 31% ground water). The document also states that the used quantity of water is not significant because much more is being generated naturaly on the territory of Croatia (25 x 10^9 m^3 annualy). Anyway, the problem exists in coastal karstic area of Croatia during the long dry summers when capacities of water springs and underground water decrease while the water consumption significantly increases. Additional problem is the fact that currently about 44% of water in public water supply system is being lost so strategic objective is to decrese this loss gradually to 15-20%.

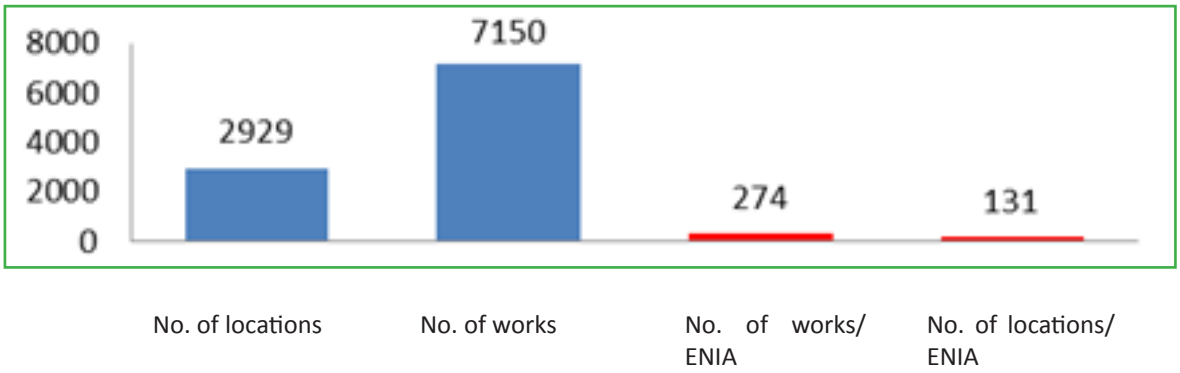
The progress in inter-sectorial cooperation was achieved in several cases. Intensive collaboration has started on assessment of annual programs of water maintenance works (see the box). During the reporting period, Croatian Waters worked on the development of methodology for evaluation and classification of the ecological status of surface waters in accordance with the Water Framework Directive (WFD). In cooperation with SINP and the Government of the Kingdom of the Netherlands, the Croatian Waters also worked on developing the capacities for hydromorphological monitoring of watercourse restoration through the MEANDER project (*Capacity Development for Hydromorphological Monitoring and Measures in Croatia*). Outputs of the project include *Guidelines for hydromorphological monitoring and evaluation of watercourses* and *Guidelines for restoration of watercourses.*

In the reporting period there were several projects dealing with revitalization of waters in the area of Drava and Danube rivers implemented by Croatian Waters, often in cooperation with other institutions, including NGO's.

Box 30. ANNUAL PROGRAM OF WATER MAINTENANCE WORKS

State owned water management company Croatian Waters (Hrvatske vode) prepares Water Management Plan - Annual Programme of Water Maintenance Works for the Protection Against Harmful Effects of Water. These annual programs must incorporate nature protection requirements according to the Nature Protection Act. For the first time such requirements were requested by Croatian Waters in 2011. Inter-sectorial cooperation was established through the operational working group of representatives of Croatian Waters, SINP and competent Ministries for nature protection and water management. The group focused on the standardization of the terms of reference and the preparation of baseline study for the evaluation of planned works. Given the fact that the determination of nature protection measures is a complex procedure from an expert point of view, a range of consultation meetings were held, including representatives of Croatian Waters (the Directorate, Water Management Departments and Local Water Management Offices) as well as state and county-level public institutions for the management of protected areas which are engaged for assisting and supervising works in relation to nature protection issues. In these meetings, the classification of works was prepared, and proposed nature protection measures were analyzed for maintenance works in individual areas. A large number of planned works was divided into 11 groups and 50 related nature protection measures and recommendations were developed with the help of a range of EU manuals. Works that could have significant effect on ecological network were defined and directed to the procedure of Nature Impact Assessment. In 2012 there were 7150 individual works on 2929 locations. Among these, 274 works on 131 location were directed to the NIA procedure.

In 2013 the Cooperation agreement was signed between Croatian Waters and the SINP, aimed at conservation of waters and water-dependent habitats. Pilot-projects are to be implemented in the framework of Annual Programme of Water Maintenance Works.



2012. Annual Program of Water Maintenance Works. Source: SINP

The procedure of *Ecological Network Impact Assessment* (ENIA) for interventions and plans for the ecological network is in place since 2007, upon proclamation of the National Ecological Network (see chapter on ENIA). When it comes to interventions impacting upon biodiversity of water ecosystems, the fighest number of requests for screening pertained to the works in connection with the construction of water treatment facilities (157). However, a number of requests (82) pertained to various water regulation works (such as the construction of bank fortifications, water flow regulation, sand and gravel extraction, etc.), followed by the construction of water supply networks and water wells (74). The second part of the procedure - *Appropriate Assessment* - most frequently pertained to the interventions on various water regulation works (31), followed by irrigation interventions (7), small-scale hydroelectric power plants (6), larger hydroelectric power plants (5), and river ports (4). In the period from 2008 to 2012, there was only one intervention that involved the procedure of overriding public interest with the proposal of compensation requirements. The request for the intervention was declined.

There are still some issues to be solved, mostly related to overall assessment of certain types of activities like regulation of watercourses and extraction of river bed sediments. Now assessment is done on the project basis so it is difficulty to evaluate cumulative effects.

Strategic objective	
Through co-operation with the water management sector, conserve biological and landscape diversity of aquatic ecosystems, in particular threatened wet and wetland habitats, and karst habitats	
NBSAP strategic guidelines	**Activities**
6.7.1 In the process of water exploitation and management, and maintenance of waterways, apply the principles of conservation for components of biological, geological and landscape diversity of aquatic ecosystems, with an emphasis on protected areas, ecological network sites and future NATURA 2000 areas	The Water Basins Management Plan of Republic of Croatia was adopted by the Government in 2013 following the adoption of Strategic Environmental Assessment (SEA)
6.7.2 Prevent disruption to river ecosystems caused by excessive extraction of alluvial deposits from river beds	Extraction of alluvial deposits from river beds is being evaluated by intervention through the Nature Impact Assessment procedure.
6.7.3 Ensure the existence of river ecosystems during the creation of waterway development plans	Manual of good practices in sustainable waterway planning - PLATINA - was translated into Croatian language; Danube forum was established in order to enable stakeholders consultation process in early phase of planning of waterways. Nature protection requirements for development plans of river navigation were not issued.
6.7.4 Implement protection against floods through a system of natural retentions and conservation of natural floodplain areas, to the greatest extent possible	Not implemented
6.7.5 When planning hydromelioration works, take account of the conservation of biodiversity	Included in the regulatory framework of EIA and ENIA procedures.
6.7.6 Consider the possibility of implementing joint programmes of the nature protection and water management sectors in protected areas	Cooperation was implemented during preparation of nature protection requirements for the Annual Programme of Water Maintenance Works for the Protection Against Harmful Effects of Water
6.7.7 Strengthen co-operation between the legal water inspection service and nature protection inspection service in the implementation of nature protection requirements and measures in the field of water management	Nature Protection Act provides legislative framework for cooperation within nature protection inspection and sectorial inspection services.
6.7.8 Strengthen the institutional framework of the water management sector and nature protection sector with regard to protection of aquatic habitats, and in particular wetland habitats	A number of meetings and workshops were organized in the framework of collaboration in preparation of nature protection requirements for the Annual Programme of Water Maintenance Works for the Protection Against Harmful Effects of Water, including organisations on regional level. Relevant education was implemented through TAIEX program.
Assessment of NBSAP implementation	
Implementation Strategic objective has shown positive trend. Development of inter-sectorial cooperation was enhanced during preparation of nature protection requirements for the *Annual Programme of Water Maintenance Works for the Protection Against Harmful Effects of Water*.	

Box 31. SAND MARTIN (*Riparia riparia*) - CROATIAN RED LIST SPECIES THREATENED BY RIVER EMBANKMENT WORKS

Sand Martin (*Riparia riparia*) usually nests in colonies, which can often be small (less than 50 pairs) but often can number up to a thousand pairs or even more. Their nest is a tunnel, usually in a steep bank of some lowland river.

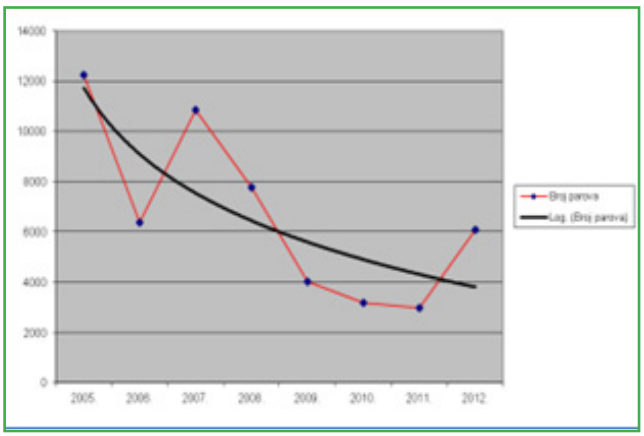
In Croatia the Sand Martin nests in the steep banks of Drava, Mura, Sava and Danube River, on the surrounding gravel banks and rarely in smaller landslides. Its most important nesting places are on the Drava River which still have parts with natural banks maintained by the river flow. The Sand Martin population in Croatia is continuously decreasing - the estimated 25,000-30,000 pairs in the 1980s have now been changed to 5000-8000 pairs. The main reason for the population decrease is the destruction of nesting habitats caused by river regulation and embankments. The population is also most likely affected by the decrease of its prey population, especially water insects, caused by water-drainage of river sidearms and oxbows, river pollution and other reasons. It is especially expressed in the middle and lower course of Drava River.

Sand Martin was included in the new Red List of threatened birds of Croatia from 2013 with the IUCN status VU.

Sand Martin on the entrance of the nest-hole. Photo: T. Klanfar

A part of a Sand Martin colony on the 62nd rkm of the Drava River (1100 pairs). Photo: I. D. Grlica

Embankment works on the site with active Sand Martin colony on the 220th rkm of the Drava River. Photo: I. D. Grlica



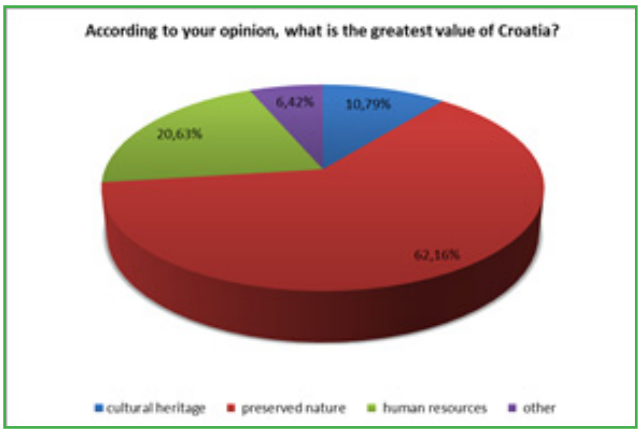
Population of the Sand Martin on the Drava River. Data: I. D. Grlica

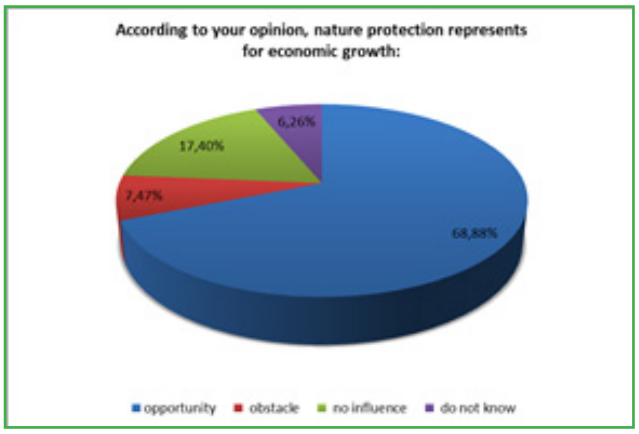
Tourism

Biodiversity of Croatia is one of its most valuable resources with great potential for regional development but still there is continuous progress to find proper balance with exploring the biodiversity in sustainable "green" way versus the "grey" infrastructure interventions. Tourism is still oriented to projects related to providing touristic infrastructure mainly in coastal area.

Box 32. HOW PEOPLE IN CROATIA PERCEIVE NATURE?

For the purposes of preparation of the Report on the State of Nature 2008-2012, the survey of public opinion on a representative sample at the national level, including questions about the attitude towards natural values in Croatia. According to survey results, most respondents (62.16%) believe that preserved nature is the biggest value of Croatia while a considerable majority of respondents (68.88%) characterize nature protection as an opportunity for economic growth.





Source: SINP

During the reporting period there were a lot of activities related to improvement of visitor infrastructure trough development of facilities for visitors in protected areas like information centres, educational trails and information panels[31]. Having in mind that protected areas, particularly national and nature parks, provide the core potential for regional development, investment in nature education facilities and infrastructure for visitors will ensure education and raising of public awareness, thus reaching the objectives of sustainable management and providing benefits to the local and regional economy by attracting inward investment and enhancing local image and quality of life. This is particularly important for the parks that need diversification of activities in order to diminish burden from visitors overflow during high season, as well as parks that still have no adequate visitor infrastructure in place. Additionally, the new overarching framework in management of national and nature parks was the adoption of new visual identity - Parks of Croatia - which will definitely further underpin their potential for regional development (see more on chaper related to Proteced Areas).

31) Until the end of 2012, 101 educational trails have been built inside protected areas (63 only in the reporting period) and 911 information panels (247 in the reporting period), mostly in national parks and nature parks.

All 8 national parks as well as 6 out of 11 nature parks, have the system of entrance tickets in place which enables them to monitor number of visitors. During the reporting period, all national parks register an increase of annual number of visitors. Outstanding in terms of increase of number of visitors are NP Plitvička jezera and NP Krka, followed by NP Brijuni, NP Paklenica and NP Mljet. With an exception of NP Plitvička jezera and NP Krka, annual visitor numbers do not exceed 200,000 per park. Monitoring of visitor numbers, their impacts and perceptions needs to be improved. Zoning in the framework of management plans of protected areas defines types of touristic and recreational activities allowed in particular zones Apart from some local initiatives and individual efforts of private organisations and CSOs to organise certain touristic offer related to natural values, the only systematic work is being done through management of protected areas, primarily national parks and nature parks.

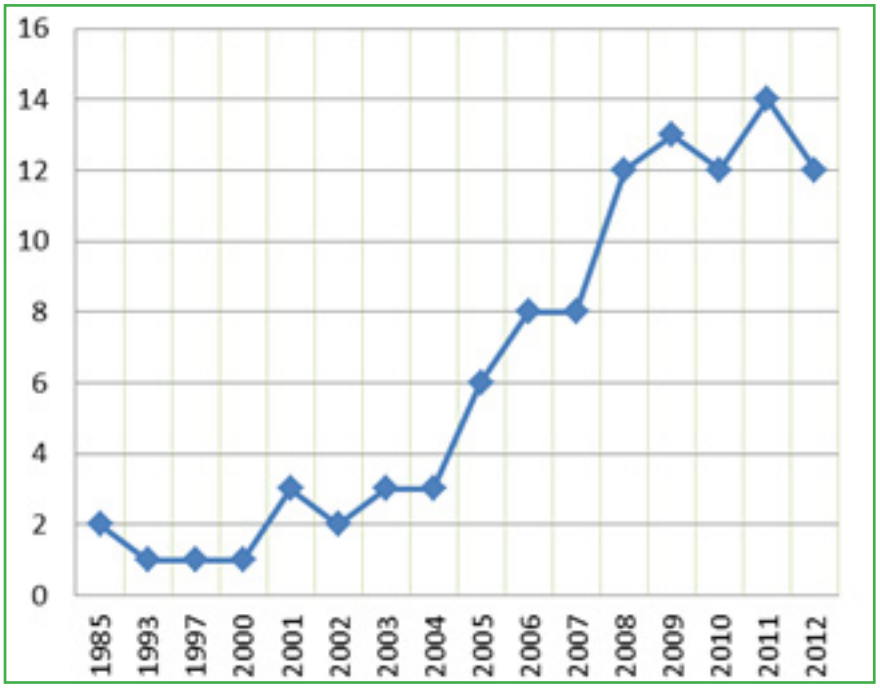


Figure 1. *Number of educational trails in protected areas*

Table 11. *Number of visitors of national parks in period 2003-2012 has been constantly increasing (visitors registered via the sold entrance tickets)*

	NP Brijuni	NP Krka	NP Mljet	NP Plitvička jezera	NP Risnjak	NP Sjeverni Velebit	NP Paklenica	NP Kornati	Total/ year
2003	146.928	555.641	83.692	721.265	12.710	6.293	102.183	63.018	**1.691.730**
2004	162.959	577.877	99.662	749.209	12.945	6.356	108.414	74.434	**1.791.856**
2005	157.420	677.621	86.383	854.914	14.982	10.862	113.736	61.465	**1.977.383**
2006	168.431	670.104	83.832	866.218	15.359	9.724	104.071	77.096	**1.994.835**
2007	176.925	700.828	87.816	925.561	20.593	11.949	109.933	49.411	**2.083.016**
2008	180.276	694.785	91.788	948.891	18.308	13.739	115.943	10.811	**2.074.541**
2009	162.664	650.423	88.475	939.747	17.846	15.920	110.350	12.550	**1.997.975**
2010	145.152	668.027	96.391	962.322	13.356	15.416	112.665	13.622	**2.026.951**
2011	156.549	683.739	95.498	1.083.451	15.864	19.336	118.288	14.096	**2.186.821**
2012	150.943	732.999	97.148	1.157.019	16.359	16.620	114.321	13.641	**2.299.050**

Eco-tourism still needs to be explored by the State as potential valuable enough to invest more efforts for its development. Some pilot-projects were financed by the Ministry of tourism but there was no systematic monitoring of such initiatives.

Strategic objective	
Given the great importance of tourism as an industry in the Republic of Croatia and also taking account of its negative impacts, promote development of sustainable tourism and eco-tourism	
NBSAP strategic guidelines	**Activities**
6.8.1 Increase the importance of nature protection at all levels of the tourism sector	Further mainstreaming nature protection requirements into physical plans (existing legislative obligation);
6.8.2 Develop tourism that is acceptable for the protection of biodiversity in protected areas and ecological network areas	Certain pilot-projects of ecotourism in protected areas were implemented but not systematically monitored. Some were financed by the Ministry of Tourism. The methodology for management planning was developed, including standards for zoning of protected areas. During preparation of management plans for protected areas, existing visiting models were analysed and actions for improvement planned. Planned development of the unique methodology for monitoring of number of visitors to protected areas is in progress; there is still no overall monitoring of influence of visitors on natural values of protected areas. Planned development of standards and criteria for development of ecotourism in protected areas was not realised.
6.8.3 Educate visitors, through visitor educational centres in protected areas, about natural values and the importance of conserving protected areas	During preparation of management plans for protected areas, existing models for education of visitors, interpretation facilities and guiding services were analysed and actions for improvement planned.
Assessment of NBSAP implementation	
Progress is mostly related to the improvement of visitor management in protected areas.	

Transport

Due to the potential impact that each type of transport (roads and railways, waterways, marine and air transport) can have on biodiversity, cooperation between these sectors is of the significant importance, and as such has shown some improvement in this reporting period. Mainstreaming of biodiversity into this sector can be realized through the process of planning related corridors or locations as well as through planning and implementation of mitigation measures. This process implies close cooperation between nature protection and relevant transport sectors. Planning of transport corridors and locations of airports is done in the framework of physical planning process.

Main corridors and locations have already been incorporated into physical plans before the SEA procedure was established in Croatia so for their realization, assessment is done through the EIA procedure on the project basis. In 2012 there were in total 26,910 km of roads, out of which 1,254 km of motorways, 6,581 km of state roads, 9,809 km of county roads, and 9,046 km of local roads. Comparing to 2009, there was new 55 km of motorways built and no new railways.

The most important impact of roads and railways on biodiversity are fragmentation of habitats and killing animals in traffic. Having in mind that the Large carnivores (Wolf, Bear and Lynx) are the most affected species by habitat fragmentation, and the fact that more than 400 km of motorways pass through area of their distribution, mitigation measure has been ensured through building of wildlife crossings over motorways that enables animals to be connected with all parts of their fragmented habitat. Today there are 11 such crossings, 2 of them built in the reporting period. These crossings are regularly monitored, including the use of camera traps that document what is happening on individual crossings. Monitoring proves that crossings are highly effective and used regularly by large carnivores and other animals. Anyway, although they are marked and access to people is restricted, it turns out that people are also using these crossings in various inappropriate ways, causing decreased functionality for animals. Therefore, there is a need to ensure long-term maintenance of these crossings.

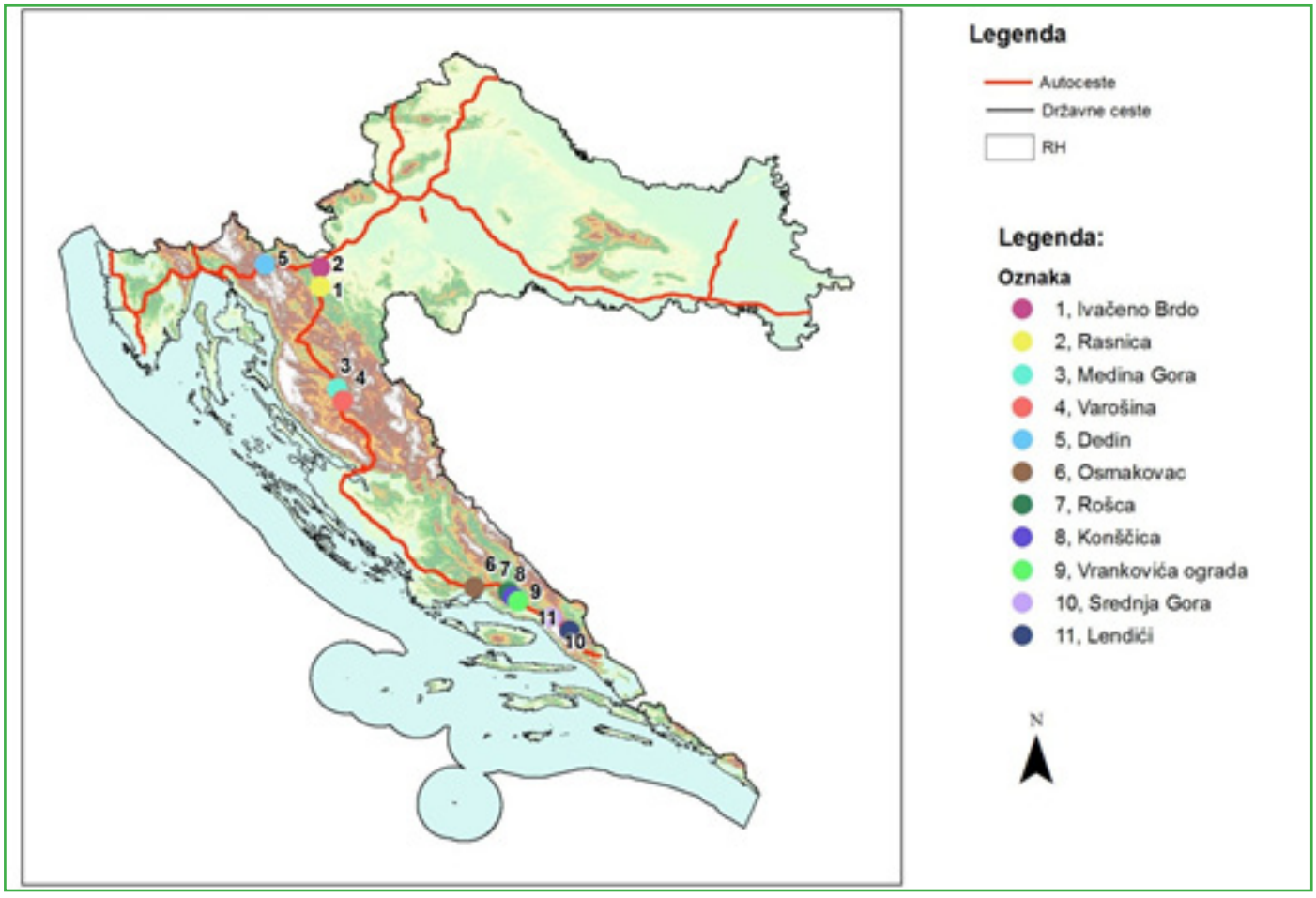


Figure 19. *Altogether 11 wildlife crossings have been built across the motorways. Source: SINP*

Monitoring results point out that the animals most often killed in car collisions are Red deer, Roe deer, different birds and large carnivores which often reach motorways by digging and passing beneath the bordering fence. To conclude planning of mitigation measures and their monitoring is satisfactory but implementation of measures needs improvement.

Regarding waterways, the most problematic are projects of their maintenance or improvement. Such projects are not being strategically assessed on the level of individual watercourses but are divided in many smaller projects whose cumulative effect is not taken into consideration during the planning process (e.g. 8 projects on Danube and 9 projects on Drava River are planned as well as building of 137 new and restoration of 46 existing water regulation buildings on Sava River). Activities of these projects include removal of river sediments, deepening the river bed, fixing of river banks and correcting or cutting off river meanders. Although all navigable rivers in Croatia are transboundary and there are international technical bodies collaborating on their management, still water management sector significantly prevails in this process while nature protection can be more adequately taken into account.

In marine transport there are two very important nature protection issues to be taken into account - problem of ballast waters from large ships entering Adriatic from outside waters and spreading of invasive species. Ballast waters introduced into Adriatic Sea each year in the area of four large Croatian ports are estimated at 2.18-2.48 million m^3. This quantity will probably enlarge in future, taking into account planned development of infrastructure in these ports that will enable receipt of more ships as well as larger ones.

To deal with the problem of collisions of aircrafts with birds airport in Zagreb uses trained birds of prey to dispel other birds and minimise threat from collisions. Collisions are being monitored and reported regularly on large airports in Croatia. The Commission for the Prevention of Aircraft and Bird Collisions is preparing a standardized Bird Strike Report every year.

Strategic objective	
Reduce the impact of transport infrastructure on wild taxa and natural habitats	
NBSAP strategic guidelines	**Activities**
6.9.1 Systematically monitor the impact of roads, railways and other communications on taxa and habitats	Regular monitoring of wildlife crossings over motorways and other important locations for animal crossing (tunnels, viaducts) was implemented. National Committee for Large Carnivores held meetings and advised governmental institutions on regular basis, including issues of wildlife crossings and traffic collisions. The planned evaluation of effects of waterways on biodiversity and new transport corridors was not done; planned protocol for monitoring of influence of traffic corridors on animals was not developed.
6.9.2 Ensure permeability of constructed and planned roads for wildlife in order to enable daily movements and seasonal migration	2 new wildlife crossings over the motorways were built in reporting period.
Assessment of NBSAP implementation	
Implementation Strategic objective has shown positive trend especially in construction of wildlife crossings.	

Energy

Croatia has in 2009 adopted an Energy Development Strategy until 2020 with the objective of increasing investments in new energy production projects in order to cut its dependence on energy imports, including large infrastructure projects which potentially can have negative impact on biodiversity, and are considered of national importance.

Hydropower plants

Today there are 26 HE power plants managed by of state-owned organization Hrvatska elektroprivreda (HEP) as well as 29 large dams which are mostly part of these plants. Mainstreaming of the nature protection is done through mechanism of EIA and ENIA on the project level. Additionally since 2013 there is the obligation to preform SEA on the strategy level which also includes *Nature Impact Assessment* as its integral part. There are a number of HE power plants that are yet to be built according to the Strategy, which has the objective of increasing investments in the construction of energy infrastructure in order to cut dependence of Croatia on energy imports. Such projects often have transboundary effects. International cooperation exists for all three rivers as the part of SEA and EIA procedures. Additionally form the biodiversity side comprehensive transboundary management plans for the those rivers (Sava, Drava and Neretva rivers) are still needed.

Besides large infrastructural projects, Energy Development Strategy is supporting the construction of small HE power plants of less than five MW on six watercourses. There is a proliferation of these small hydropower plants which potentially can have negative impact on biodiversity. Its effects on biodiversity will be assessed trough EIA and ENIA procedures on the projects basis.

Renewable Energy Sources (RES)

Currently there are 148 active RES power plants in Croatia, out of which, according to aproved power, 93% goes for wind power plants. Comparing to the NR4 when it was reported only 20 MW of installed power from wind energy with planned 300 MW for the year of 2010, recent data indicate the planned increase of 15 times more.

Planned locations have been strategically assessed only for wind potential. Effects on decreasing natural habitats and threatening a number of species, is preformed trough EIA and ENIA procedures on the project basis. By the end of 2012 wind power plants were built on 8631.68 ha, while the new ones are planned on even 62,319.95 ha.

Recomendationas on the Preparation of Environmental Impact Assessment Studies for Wind Power Plant Interventions have been prepared by nature protection experts as the guide for the ceritifed companies and published on the MENP web site (2010). Regular monitoring of animal mortality has also been prescribed after the construction of wind power plants. The preliminary results did not show any collision (expect in one specific site where the works have been stopped and futher research is in progress).

Table 12. *Analysis of existing and planned use of RES. Source: Ministry of Economy, October 2013*

RES	Existing power plants		Planned power plants		Total RES power plants	
	No.	Power (MW)	No.	Power (MW)	No.	Power (MW)
Wind	14	254.45	81	3911.56	95	4177.31
Solar energy	123	5.15	339	83.21	462	88.36
Biomass	3	6.74	103	242.75	106	249.49
Biogas	8	7.14	60	85.80	68	92.94
Geotermal energy	0	0.00	1	4.71	1	4.71
TOTAL:	***148***	***284.78***	***584***	***4328.03***	***732***	***4612.81***
(%)		***6.17***		***93.83***		***100.00***

Electric power lines

Due to the potential negative impact on biodiversity that electric power lines can have especially referring to the collisions of birds with high-voltage transmission lines and electrocution of birds on medium- voltage transmission lines, in the reporting period the cooperation was established with Croatian energy company - HEP group, including monitoring of potential bird mortality and adaptations of power lines system in order to minimize negative effects for birds.

The HEP staff has been recording birds' mortality since 2005 but field visits were applied for the incidents in which malfunction of the electric power line system caused bird mortality that required an intervention. Since 2007 killed birds on the island of Cres were regularly recorded in the framework of cooperation between HEP and NGO *Eko-Centar Caput insulae Beli*. During 12 months in period 2007/2008, 181 electrocuted birds were found, including 7 Griffon Vultures (*Gyps fulvus*). 7 more Griffon Vulture were killed in the period 2009-2012. During this project the most problematic poles were identified in order that HEP can implement mitigation measures like putting adequate isolation on conductors.

Griffon Vulture killed by electrocution on Cres Island. Photo: G.Sušić

Plastic isolation put on thepower-line pole. Photo: V.Radek

Strategic objective	
Use of energy sources with the minimal potential impact on biodiversity	
NBSAP strategic guidelines	**Activities**
6.10.1 Base exploitation and management activities in the energy sector upon the principles of conservation of components of biological and landscape diversity, with special emphasis on protected areas, ecological network areas and future NATURA 2000 areas	Nature protection requirements are being issued and included into physical plans which define locations of power plants; EIA and ENIA procedures are implemented on project basis. Recommendations on the Preparation of Environmental Impact Assessment Studies for Wind Power Plant Interventions have been prepared with standards for research activities and preparation of environmental impact studies, and including monitoring protocols. Recommendations for planning the RES power plants (wind and solar) to be included in different physical plans in early planning process (prepared during 2011-2012). Mitigation measures for birds and bats are being issued as a part of permits for building of wind power plants, e.g. "cut-in speed" measure. In the framework of ENIA procedure for electric power lines, mitigation measures are proscribed according to UNEP-CMS guidelines. HEP is recording cases of animals mortality by power lines and implements technical adaptations of lines on key sites in order to minimise potential collisions and electrocutions.
Assessment of NBSAP implementation	
Implementation Strategic objective has shown positive trend.	

Mining

About 3.13% of Croatian land area is covered by exploitation fields of mineral row materials. In 2012 there were 668 registered locations. More than 50% exploitation fields go for rock quarries that exploit rock for building purposes.

There is need to strengthen cooperation between nature protection and mining sector and it, especially in cases of exploitation in old existing fields located in protected areas, procedure of recovery of exploitation fields and inspection issues.

Strategic objective	
Ensure sustainable exploitation of mineral raw materials by incorporating biological and landscape diversity conservation measures and through co-operation between the mining and nature protection sectors 2	
NBSAP strategic guidelines	**Activities**
6.11.1 Improve co-operation between relevant sectors at the national and local level with regard to planned and sustainable use of mineral riches, while observing biodiversity conservation measures	Cooperation was partly implemented through the project SARMa (Sustainable Aggregates Resource Management). Nature protection measures are incorporated on the project basis through regular EIA and ENIA procedure.
6.11.2 Plan exploitation with parallel area reclamation, and reclamation or reclassification of all abandoned (unreclaimed) pits	Implemented on project basis through regular procedure of EIA and ENIA.
6.11.3 Improve co-operation between the mining and nature inspection sectors	Implemented only through regular activities of both inspections.
Assessment of NBSAP implementation	
Implementation Strategic objective has shown positive trend in the establishment of legislative framework .	

4.3. Cross-cutting issues

Legislative framework

Strategic objective	
Complete and update the national legislation and align the sectorial legislation to ensure the effective implementation of the Convention on Biological Diversity in the Republic of Croatia	
NBSAP strategic guidelines	**Activities**
7.1.1 Fully align the national legislation in the area of nature protection and sectorial legislation with the EU legislation	National legislation was harmonised with EU legislation and international agreements. Mainstreaming of biodiversity in different sectoral legislation is preformed regularly. Due to the vast legislative framework there is a need for further harmonisation.
7.1.2 Fully align the national legislation in the area of use of GMOs with the relevant legislation of the European Union and the Protocol on Biosafety	National legislation in the area of use of GMOs was fully aligned with the relevant legislation of the European Union and the Protocol on Biosafety.
7.1.3 Establish additional financial mechanisms in the area of nature protection	Integrated through existing Environmental Protection and Energy Efficiency Fund
Assessment of NBSAP implementation	
National legislation was harmonised with EU legislation and international agreements.	

Institutional framework

There were no substantial changes in nature protection institutional framework during the reporting period, with the exception of the change pertaining to the competent Ministry - in December 2011, the competent Directorate for Nature Protection was transferred from the Ministry of Culture, where it had been since 2004, into the newly formed Ministry of Environmental and Nature Protection.

In 2013, there were approximately 900 CSOs registered as organizations in the sphere of "ecology". In most cases, they simultaneously deal with issues of environmental protection and nature protection, and the issue of environmental protection is more prominent. In addition to CSOs active at the local level, there are also approximately thirty organizations dealing not only with such activities, but also with advocacy and efforts aimed at policy impact in nature protection, and expert activities such as research and biodiversity status monitoring.

Strategic objective	
Establish an integral institutional framework for the protection of biological and landscape diversity at the national and county levels	
NBSAP strategic guidelines	**Activities**
7.2.1 Strengthen administrative capacities of all services responsible for nature protection activities	There were internal reorganisations of services responsible for nature protection activities for more efficient governance in nature protection.
7.2.2 Strengthen institutional capacities of competent authorities in charge of nature protection	Seminars and workshops related to the CITES implementation are organised on regular basis since 2005. Since 2010 the Education program for the employees of the nature protection sector containing seven theme modules has been developed[32].
7.2.3 Establish an integral and recognizable nature protection system	The planned web site devoted to nature protection was established: www.zastita-prirode.hr, with information on nature protection legislation, projects and other activities in the field of nature protection. In this year established, the new overarching framework in management of national and nature parks was the adoption of new visual identity - Parks of Croatia - which will definitely further underpin their potential for regional development.
7.2.4. Promote co-operation with non-governmental organizations	Cooperation of nature protection institutions such as MENP, SINP and PI for management of protected areas and CSOs was significantly improved. CSOs are being systematically included in preparation of management plans for sites or species. Regarding preparation of legislation, they are included only through the mechanism of public insight when they can comment draft documents. The quality of consultation procedures still needs to be significantly improved by involving CSOs in drafting and adopting of by-laws and participation during EIA and ENIA procedures.
7.2.5 Develop financial mechanisms for institutional strengthening	Integrated through existing Environmental Protection and Energy Efficiency Fund
Assessment of NBSAP implementation	
Implementation of this strategic guideline shows certain progress in strengthening institutional capacities of competent authorities in charge of nature protection. Co-operation with non-governmental organizations was promoted by including them systematically in preparation of legislation and management plans for sites or species.	

32) The implementation of these modules started through the WB NIP project.

Inventorying and monitoring

During the reporting period, systematic inventory activities were concentrated on species and habitat types for which sites of Natura 2000 are designated. Apart from that work, there were other researches performed by individual scientists, scientific institutions and CSOs. There have also been records of new species for Croatia and even a number of new scientifically described species. Biospeleological inventory is of special interest as new taxa are constantly being discovered in caves of Croatia.

Through the WB NIP project the extensive work started in 2013 by SINP and external consultants on compilation of existing inventory data for certain taxonomic groups, including these not covered by EU directives. The aim is to collect and georeference all literature and other distributional data and to perform detailed gap analysis required for efficient planning of further inventory activities. Nature Protection Information System is being constantly developed by SINP, including development of CRO-Fauna database where all fauna-related information will be stored. CRO-Habitats database has been prepared. CRO-Flora database, maintained by the Faculty of Natural Science in Zagreb, has been functional and available through web application for longer period now.

In the reporting period there were activities for further development of comprehensive national monitoring system. New monitoring programs have been created within the IPA MAN-MON project and their testing and implementation started in 2013 with the support of the Environmental Protection and Energy Efficiency Fund. High-quality implementation of monitoring is facing obstacles such as the lack of the continuity of financing and lack of human resources and experts for individual groups of flora, fauna and habitats.

As the EU member state, Croatia is obliged to define conservation status and implement continuous monitoring of all species and habitat types listed in Annexes of the Habitats Directive. Reports are submitted to the European Commission every six years. Besides, according to Birds Directive, each member state must report on conservation status of all bird species naturally occurring in the territory of a Member State. For Croatia, reporting includes 580 species and habitat types - 238 species from Annexes II, IV and V of the Habitats Directive (including added species upon the proposal of Croatia), 74 habitat types from Annex I (including added habitats upon the proposal of Croatia) and 268 bird species (349 bird populations in total). The first reporting period for which Croatia needs to report is 2013-2018 and report must be submitted in 2019.

According to the Environmental Protection Act (OG 80/13) the Croatian Environment Agency is responsible for creating and updating the National List of Indicators (NLI), in co-operation with other responsible Government bodies as well as expert and scientific organizations. The National List of Indicators was prepared with respect to the list of indicators of the European Environment Agency (EEA) and other relevant European bodies.

Strategic objective	
Inventorying and ensuring systematic monitoring of the state of all components of biological, landscape and geological diversity	
NBSAP strategic guidelines	**Activities**
8.1.1 Conduct inventorying and monitor the status of components of biological, landscape and geological diversity	For the purpose of the establishment of Ecological network Natura 2000, for 226 species from the Annex II of the Habitats Directive and Annex I of the Birds Directive, as well as for 74 habitats from the Annex I of the Habitats Directive, existing inventory data were evaluated and for many of them new field data collected. The rest of species were processed only partially. 13 species have been included in the Annexes II and IV of the Habitats Directive upon the proposal of Croatia, and five of them (about 40 %) have been researched and inventoried during the reporting period. Within the IPA MAN-MON project monitoring protocols for 24 species and for 3 habitat types have been prepared. In 2012 monitoring of 43 bird species and 21 species belonging to other groups was implemented (about 11.7% of total species of the Annexes of the Habitats and Birds Directive). In 2013, the implementation of monitoring for additional 7 non-bird species began, and it is expected that 22 new monitoring programs would be completed soon. Within the MedMPANet project draft monitoring protocols for two marine habitat types - *Posidonia oceanica* beds (1120*) and coralligenous community (as part of the type 1170 - Reefs) have been prepared. About 700 inventory projects, including monitoring the status of individual components of biodiversity in protected areas have been carried out. In 2012 the component of the WB NIP project started, aimed at processing historical inventory data for 13 groups of species and collecting new inventory data for 9 groups of species. Environmental Protection and Energy Efficiency Fund also began to support intensively the implementation of such projects.
8.1.2 Continue establishing the national system for monitoring the status of components of biological, landscape and geological diversity	Manual for inventory and monitoring of dragonflies, butterflies, freshwater and brackish crustacean have been prepared and presented. Partner cooperation is realized in the framework of organized monitoring activities - for example, monitoring of Snake's-head fritillary (*Fritillaria meleagris*).
8.1.3 Improve the nature protection information system	Work on the establishment of the Nature Protection Information System is continued. In collaboration with the Faculty of Science of the University of Zagreb, maintenance of Flora Croatica Database (CRO-Flora) is insured. Preparation of CRO-Fauna database has been intensified, regarding development of database itself and related applications (Georef), while the work on establishment of CRO-Speleo database has started. Standard Data Form database with the data on Ecological Network Natura 2000 has been prepared and all relevant data filled-in. CRO-Habitats database was prepared but not yet functional while the SINP GIS database on habitats was regularly maintained. Databases on protected areas (SINP database of protected areas, Register of protected areas and PAMS database) have been further developed. An internal database for reporting data in case of encountering dead, sick or injured strictly protected marine animals has been established and is regularly updated. Unique base should be incorporated into the CRO-Fauna database
8.1.4 Monitor the impacts of climate change on biodiversity	Not achieved
8.1.5 Urge the scientific community to conduct national studies for the purpose of inventorying, determining distribution of species and habitat types, and population sizes	Scientific community is regularly included in inventorying, determining distribution of species and habitat types, and population sizes but mostly on project level by the nature protection in institutions.
8.1.6 In the course of monitoring biodiversity status, use the list of indicators	A draft list of National Biodiversity Indicators has been revised in 2011.
Assessment of NBSAP implementation	
Significant activities have been implemented regarding inventorying and monitoring of Natura 2000 species and habitat types and regarding development of Nature Protection Information System.	

Box 33. EXAMPLES OF RECORDS OF NEW SPECIES AND OF NEW SCIENTIFICALLY DESCRIBED SPECIES IN CROATIA IN THE REPORTING PERIOD

Records of new moss species in Croatia

- *Calypogeia sphagnicola* (Arnell & J.Perss.) Warnst. & Loeske
- *Ditrichum gracile* (Mitt.) Kunze

New scientifically described plants species

- *Allium croaticum* Bogdanović, Brullo, Mitić et Salmeri
- *Allium telmatum* Bogdanović, Brullo, Giusso et Salmeri
- *Astragalus croaticus* Alegro, Bogdanović, Brullo et Giusso

Calypogeia sphagnicola, Photo: Ž. Modrić Surina

Allium telmatum, Photo: I. Boršić

New scientifically described freshwater fish species

- *Telestes karsticus* (Marčić et Mrakovčić, 2011)
- *Squalius janae* (Bogutskaya et Zupančić, 2010)
- *Alburnus neretvae* (Buj, Šanda et Perea, 2010)

Telestes karsticus, Photo: P. Mustafić

Some of the new scientifically described cave fauna species

- *Minosaphaenops croaticus* (Lohaj et Jalžić, 2009), Snježnica Mountain
- *Tychobythinus lukici* (Hlaváč et Jalžić, 2009), Brač Island
- *Euconnus (Tetramelus) longipedes* (Hlaváč et Jalžić, 2009), Mljet Island
- *Scydmoraphes speluncarius* (Hlaváč et Jalžić, 2009), Mljet Island
- *Trirhacus helenae* (Hoch, 2013), Mljet Island

These species of Coleoptera have been found so far only in the type localities or in a few additional caves. They represent new endemic species of Croatian cave fauna. *Trirhacus helenae* is a new cave-dwelling planthopper from Croatia, known from a single cave on Mljet Island. This is the first record of a troglobitic planthopper not only from Croatia, but from the whole of the Dinarides Region, and 2nd cavernicolous yixiid species from the Mediterranean region.

Minosaphaenops croaticus, Photo: G. Dunay

Scydmoraphes speluncarius and Euconnus (Tetramelus) longipedes

Box 34. EURASIAN LYNX (*Lynx lynx*)

Eurasian lynx (*Lynx lynx*) population in Croatia is part of the Dinaride population of this species and it stems from three female and three male animals reintroduced to Slovenia from Slovakia in 1973. It is believed that the Eurasian lynx population in Croatia has been growing in the period since reintroduction to mid-1980s, with annual hunt quotas being approved until 1998.

The report on the status of Eurasian lynx population in 2011 and 2012, points to the renewed threat of extinction of this species so it was included among critically endangered species (CR) in Croatian Red List. Key threats to the survival of the Dinaride population include the lack of prey (primarily hunting game), habitat fragmentation (construction of roads and fencing of hunting grounds), and poaching in particular.

Given the small effective population size, the occurrence of inbreeding, and small numbers, new animals should be introduced into the Dinaride Eurasian lynx population in the next several years, in cooperation with neighboring countries, in order to ensure its survival.

Methods for monitoring of the Lynx in Croatia include radio-collars. Lynx called Tomo is one of collared animals. Photo: B. Raos

Box 35. IPA ADRIATIC PROJECT NETCET (NETWORK FOR THE CONSERVATION OF CETACEANS AND SEA TURTLES IN THE ADRIATIC)

The project started in 2012, and it will be ongoing until the end of 2015. The project is coordinated by the city of Venice and managed by 13 partners situated in several countries of the Adriatic basin (Italy, Slovenia, Croatia, Montenegro and Albania). The main objective of the NETCET project is to develop common strategies for the conservation of cetaceans and sea turtles in the Adriatic through a pan-Adriatic cooperation. Expected results of this projects are: shared standardized scientific knowledge and effective collaboration between the organizations involved in cetaceans and sea turtles conservation in the Adriatic; greater institutional capacity for the conservation of cetaceans and sea turtles in partner states; improved knowledge of Adriatic cetaceans and sea turtles populations, their hot-spots and major threats; increased technical capacity for sea turtle recovery in the Adriatic and effective treatment of stranded/ injured sea turtles in high level structures and increased information available for citizens through the centers; increased coastal communities' awareness of the presence and conservation needs of these species and widespread adoption by fishermen of correct handling procedures; improved conservation and management of cetaceans and sea turtles conservation and their habitats in the Adriatic through effective regional cooperation.

Education

The current state of representation of nature protection in the comprehensive educational system in Croatia has been determined by analyzing available teaching plans and programs for primary, secondary and higher education, and for life learning. Additional nature protection activities and projects implemented in schools were also analyzed, as well as personal communication with individual teachers.

In the period from 2008 to 2012, nature protection was included in 11 higher education institutions in total (universities, polytechnics, colleges), through 74 officially approved study programs, in 114 courses. Out of them, 48 courses are comprehensively covering the issue of nature protection (study programs educating future experts in biology, sea/fisheries/aquaculture ecology, agronomy, forestry and hunting) while the programs of 66 courses cover only some segments.

In period from 2008 to 2012, undergraduate and graduate study programs dedicated to nature protection were completed by 464 students; in addition, 42 students completed undergraduate programs, MA, doctoral and specialist studies. The positive trend is visible in the education of academically educated experts, in particular when looking at the total number of persons who completed their studies.

Strategic objective	
Promote and develop all institutional and non-institutional forms of education on the protection of biological, landscape and geological diversity for all citizens	
NBSAP strategic guidelines	**Activities**
8.2.1 Improve understanding, importance and foster inclusion of the concept of biological, landscape and geological diversity and its protection and conservation at all levels of the school system	Representation of individual nature protection topics improved in secondary school programmes, through the revision of existing courses and introduction of new optional courses covering these issues, in particular in the fourth grade of the general grammar school programme. New graduate and post-graduate study programs were introduced which are partially or fully dedicated to nature protection. Many schools implement different voluntary nature protection programs (e.g. international programs GLOBE and Eco-schools); since 2005 there is a program of monitoring of threatened plant Snake's head fritillary (*Fritillaria meleagris*) implemented by schools in 9 counties, coordinated by SINP
8.2.2 Promote institutional and non-institutional education about biological, landscape and geological diversity and its protection and conservation	See 8.1.1 Education programs for visitors of protected areas were developed and implemented but this process still needs significant improvement.
8.2.3 Enable and encourage professional training and science education of employees touching upon nature protection issues within their sphere of activity	Education programs for staff of protected areas were developed and implemented by SINP. Additional there is a regular programs for education and specialisation of supervisory (ranger) service.
8.2.4 Strengthen co-operation among state administration bodies, professional and scientific institutions, educational institutions and non-governmental organizations for the purpose of education in the field of nature protection	New study programs were introduced in the Forestry Faculty.
Assessment of NBSAP implementation	
In the reporting period there was significant increase of the representation of nature protection, in terms of the number of courses dealing with this issue at higher-education institutions in Croatia. Still, systematic cooperation needs to be established.	

Public information and participation

Information of public on nature protection is mostly implemented through web sites of relevant institutions. The most comprehensive information is available on web sites of the MENP (www.mzoip.hr; www.zastita-prirode.hr) and SINP (www.dzzp.hr). SINP is also maintaining thematic web sites e.i. www.natura2000.hr (on Natura 2000 with relevant databases), www.invazivnevrste.hr (on invasive alien species) and www.velikezvijeri.hr (on large carnivores) while the MENP additionally informs on GMO-related issues through the website www.gmo.hr .

In 2009 the SINP set up on its website the Catalogue of Information, containing a systematic overview of nature protection data that the Institute produces, has available, supervises and/or updates. Since the establishment of the Catalogue, until the end of 2012, there were 1949 received and processed requests for information and/or data of SINP, with a clear tendency of doubling of the number of requests every year.

The Catalogue of Information of the MENP was set up in 2012, and it contains an overview of the information available to the Ministry, with the description of the content, purpose, method of provision and possibility of fulfilling the right of access to information, per structural units of the Ministry.

In the course of 2013, SINP published all completed spatial databases on its website, which has significantly improved the availability of such information to the widest public, decreasing the pressure that would otherwise stem from users focusing on the SINP Catalogue of Information. In addition, the technical solution for ensuring on-line availability of expert base proposals and publications of the Institute is currently being developed.

Awareness raising on nature protection is ongoing via dedicated publications as well, in a very intensive manner. During the reporting period, SINP thus printed a range of information and education materials intended for various user groups: books (14), picture books (2), manuals (12), brochures (23), leaflets (5), and posters (17). All public institutions managing protected areas are also intensively informing and educating the public using this approach. As a rule, all publications are presented to the public in a suitable manner, and most publications are available on websites of various institutions.

Regarding public participation, it can be concluded that despite certain efforts invested in the training of civil servants during the previous period, and despite a range of established advisory mechanisms and structures, efficient and high-quality mechanisms of citizen and CSO participation in the processes that shape public policies and in decision-making processes are still not fully developed.

Strategic objective	
Ensure informing of the public about, and its participation in, the matters related to the protection of biological and landscape diversity	
NBSAP strategic guidelines	**Activities**
8.3.1 Promote and improve the quality of education and public awareness on biological, landscape and geological diversity, and intensify public involvement in decision-making processes	A number of public awareness activities were implemented on different occasions like celebrations of certain nature protection dates. Significant activities realised through the project PHARE on implementation of Natura 2000 in Croatia (www.natura2000.hr). Public participation was promoted during preparation of management plans for sites and species. SINP has organized in 2013 the survey of public opinion at the national level on the attitudes and information awareness among citizens regarding nature protection
8.3.2 Establish the mechanisms for the international, regional and national exchange of information about biological, landscape and geological diversity, and protection and conservation activities	Nature Protection Information System is constantly being developed with several databases being available to public (Natura 2000, Protected areas; Map of habitat types; CRO-Flora) Nature protection information is available on web sites of the MENP (www.zastita-prirode.hr) and SINP (www.dzzp.hr and www.natura2000.hr).
8.3.3 Support non-governmental organizations in their nature protection and promotion activities	Due to the financial crisis, since 2012 financing of environmental CSOs was suspended form the environmental (state) budget, which was regularly undertaken till then. CSOs are annually supported in their nature protection and promotion activities by Environmental Protection and Energy Efficiency Fund (EPEEF). EPEEF grants 40% co-financing of projects, only in exceptional cases 60% (islands) and 80% (areas of special State concern). This model of co-financing is for most environmental NGOs challenging since small environmental CSOs without working staff have difficulties with co-funding.
8.3.4 Encourage participation of mass media in public education, informing and involvement on issues of the protection of biological, landscape and geological diversity	There is systematic cooperation of nature protection institutions with press (especially Croatian News Agency - HINA) and electronic media. International and national dates important for nature protection are being regularly celebrated.
8.3.5 Encourage volunteerism and other forms of non-institutional education and public social engagement in the protection of biodiversity	There were only sporadic activities implemented to encourage volunteerism like program for schools for monitoring of the Fritillary or action for hunters on registering tracks of large carnivores.
Assessment of NBSAP implementation	
Related activities are being constantly implemented but they should still be significantly strengthened.	

Box 36. SURVEY OF PUBLIC OPINION, 2013

For the purposes of preparation of the Report on the State of Nature 2008-2012, SINP has organized in 2013 the survey of public opinion at the national level on the attitudes and information awareness among citizens regarding nature protection. This was the first time that such survey was implemented at the national level.

The survey was conducted by phone, on a random, nationally representative sample of 4,300 citizens of Croatia older than 15, which constitutes somewhat over 0.1 % of the population older than 15 and is considered to be the representative sample at the national level.

According to survey results, most respondents (62.16%) believe that preserved nature is the biggest value of Croatia. The respondents who chose the response option "other" (6.42%) typically responded by mentioning the sea, potable water sources, peace, geographical position and tourism, that essentially represent parts of preserved nature. A considerable majority of respondents (68.88%) characterize nature protection as an opportunity for economic growth. Nature protection is favoured by women; younger and better-educated respondents; as well as those with higher average monthly earnings, and the respondents from urban settlements. It is telling that Ličko-senjska County, as the county with the highest percentage of protected areas, also has the highest percentage of respondents who believe that nature protection constitutes an opportunity for economic growth, which points to the fact that the respondents with the biggest experience of coexistence within protected areas perceive the nature protection sector as positive and very useful in their daily lives.

The research has also shown that the respondents are fairly well acquainted with the concept of biodiversity - thus 48.16% of respondents know what biodiversity is, while another 28.95% of respondents have heard about that concept, but do not know what it is. The concept of Natura 2000 has a poorer recognition level among respondents. If we take into account the fact that this nature protection mechanism is still a novelty in Croatia, such a result is to be expected. There are 5,49 % of respondents who know about the Natura 2000 ecological network, while as many as 77.16 % of respondents have never even heard about this concept. In European Union countries, 6 % of respondents know what Natura 2000 is (EEA, 2010), which means that Croatia is at the very top in terms of the level of awareness regarding this nature protection mechanism. Same as in the case of the concept of biodiversity, respondents in the age group between 22 to 60 years of age (5.88%) and better-educated respondents (13.01%) are better acquainted with the concept of Natura 2000. What is particularly interesting is the fact that respondents from rural areas are also better acquainted with the concept of Natura 2000 (5.56%).

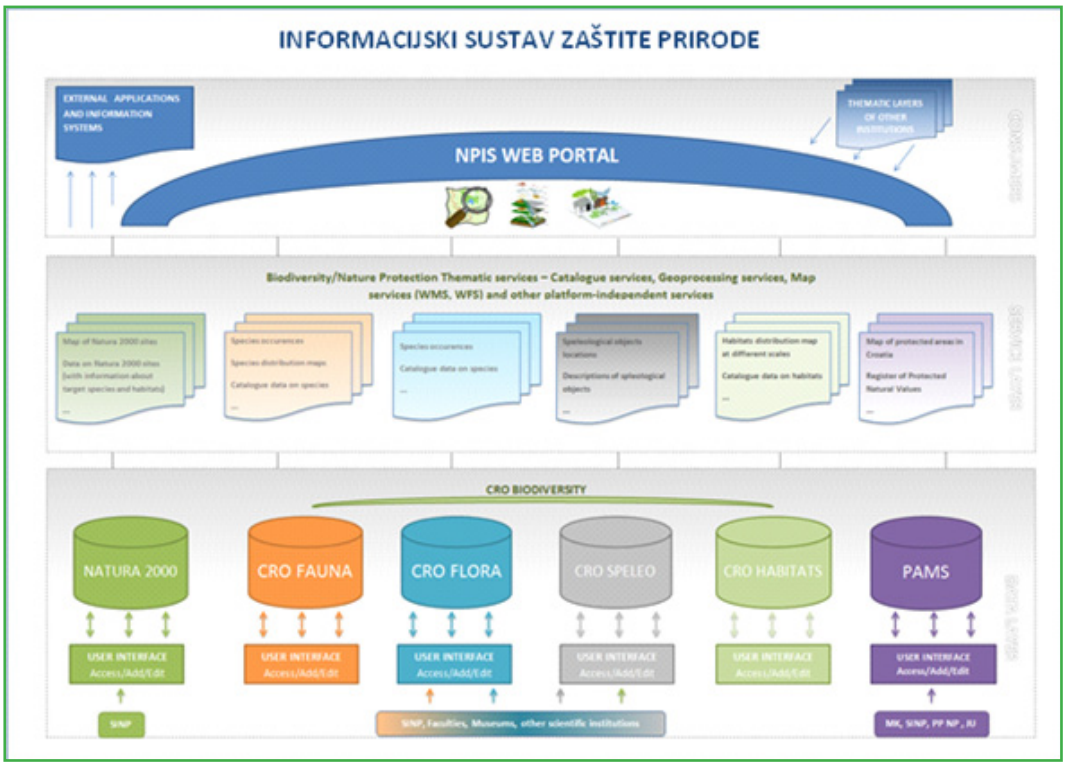
Most respondents in the survey (61.23%) chose nature protection as the key role of protected areas, followed by tourism and visits (24.30%), and education and research (10.37%). The biggest percentage of respondents in the age group older than 60 identified protected areas (66.55%) as the key objective in nature protection.

Most respondents receive information on nature protection via broadcasting media (74.37%), daily and weekly press (44.86%), and via internet (43.42%). It is significant that only 20.58 per cent of respondents receive information through education. The internet is mostly used by the youngest respondents for the purpose of obtaining information (as many as 70.24% of respondents between 16 and 21), while the oldest age group receives information predominantly via daily and weekly press.

Box 37. NATURE PROTECTION INFORMATION SYSTEM

As of 2004, through its regular activities, and through national and international projects, the SINP is systematically implementing a range of activities with the aim of establishing and improving the comprehensive Nature Protection Information System (NPIS). This system consists of a group of databases, applications and web services intended for storage, maintenance and sharing of data in connection with various components of biodiversity, geodiversity, landscape diversity, and nature protection in the Republic of Croatia.

The conceptual scheme represents three basic levels of the system: database level, service level, and user level. The database level brings together various topic-based databases (on flora, fauna, habitats, speleological cadastre, protected areas, ecological network, etc.). The service level represents technical mechanisms intended for data exchange among various components of the NPIS and external systems. This level serves data to the final level, represented by various users and consumers of the web service (such as the NPIS web/geo portal, and other applications and external systems).



Conceptual scheme of the Nature Protection Information System

Most activities pertaining to the improvement of the NPIS have been focused primarily on the development of corresponding databases as storage sites for data on biodiversity, geodiversity and landscape diversity, collected over the years through regular activities of SINP, various domestic and international projects, work of other institutions in the nature protection sector, and through the activities of other expert and scientific institutions and CSOs. Further development of the NPIS is focusing on the establishment of a web service for data exchange, and on the setting up of the NPIS web/geo portal, as a central web solution that would ensure public access to updated and verified spatial and non-spatial data on biodiversity, geodiversity landscape diversity and nature protection in Croatia.

Ecological Network Impact Assessment (ENIA)

Croatia has established the process of *Ecological Network Impact Assessment* (ENIA) in 2007, upon proclamation of National Ecological Network. ENIA was designed according to the relevant mechanism of the Habitats Directive and it was additionally harmonized with it by the new NPA from 2013.

ENIA is a procedure which is used to assess whether there is likelihood that the implementation of a plan, program or project independently or together with other plans, programs or projects, might have a significant impact on conservation objectives and on the coherence of the territory of the ecological network, as well as for the strategies which have obligation to preform SEA. The ENIA assessment is not obligatory for plans, programs or projects which are directly contributing to the management of the ecological network, ENIA procedure is fully integrated in the EIA and SEA mechanisms[33], meaning that if EIA and SEA are obligatory procedures, ENIA is included as the constituent part.

The procedure is conducted by the MENP or by the administrative body of the county or the City of Zagreb, depending on criteria proscribed by the NPA. Obtaining prior opinion from expert body for nature protection - SINP- is an obligatory part of the procedure. If potential significant impact of a plan, program, project or strategy cannot be excluded during the screening phase, the applicant is directed to the *appropriate assessment procedure* (AA) when separate study is performed. It identifies potential significant negative impacts on the ecological network and prescribes mitigation measures according to best practices given Public is informed on the procedure via MENP web site and their participation is envisaged during the public consultation as defined by the Nature Protection Act.

If *appropriate assessment* shows that the project is not acceptable for ecological network, and that the negative impacts cannot be mitigated, the procedure of determining the overriding public interest and compensatory measures can be initiated by the applicant. Final Decision on overriding public interest is given by the Government, and according to that decision MENP is obliged to issue permission that the project is acceptable but with obligatory compensatory measures in place. If Natura 2000 priority species or habitat types are threatened, the prior opinion of the European Commission is needed.

In period 2008-2012, *screening* was performed for 1229 requests and only 130 requests were sent to *appropriate assessment*. Only one request was directed to determining the overriding public interest.

33) In line with Environmental Protection Act and Nature protection Act

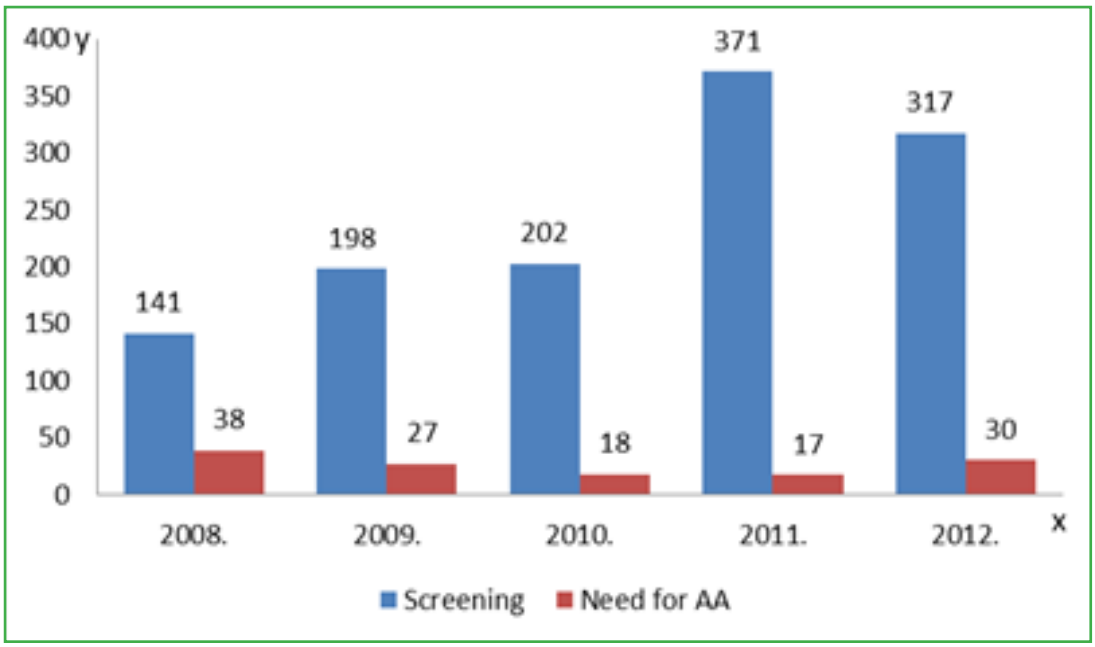


Figure 20. *Total number of requests for screening in the period 2008 - 2012*

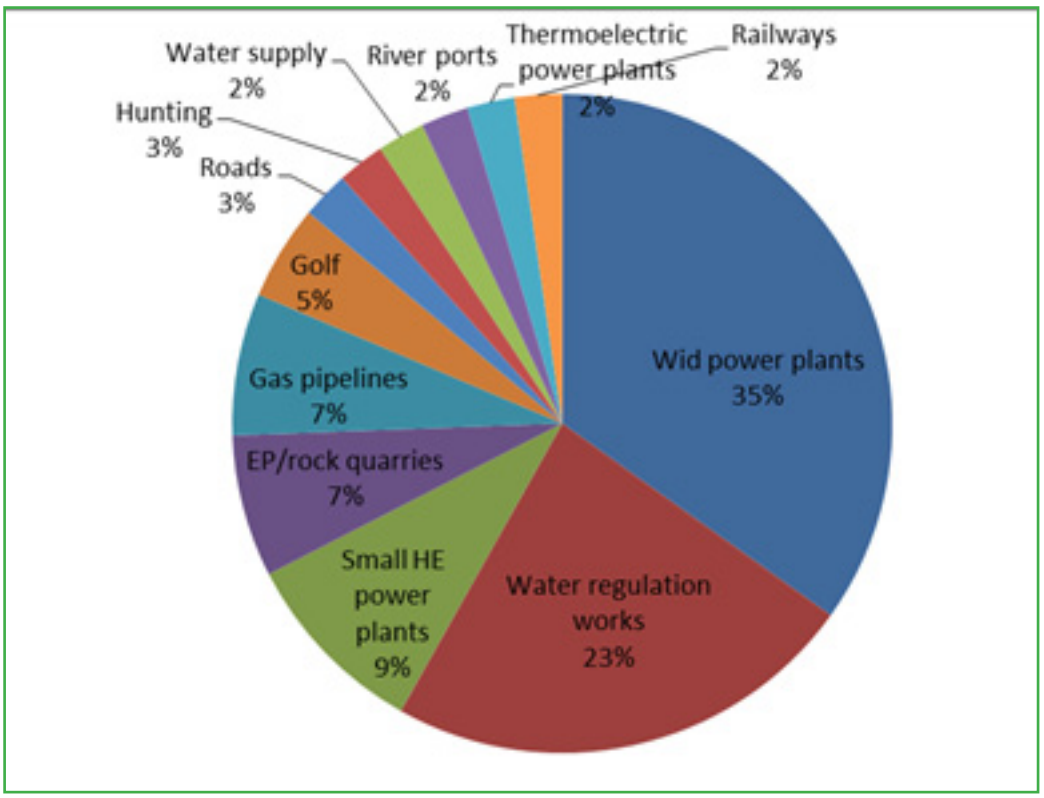


Figure 21. *Types of interventions in AA procedures with opinions issued by SINP*

Regarding assessment of strategy, plans and programs, there have been several procedures implemented so far. The SEA for the strategies became obligatory in 2013. Legislative framework for transboundary SEA procedure is in place.

Strategic objective	
Establishment of the instrument for the nature impact assessment of projects, plans and programmes	
NBSAP strategic guidelines	**Activities**
8.5.1 Establish the mechanisms and the system for implementation of the nature impact assessment	Nature Protection Act from 2013 additionally harmonised the procedure of ENIA with the Habitats Directive as well as with procedures of EIA and SEA according to the Environmental Protection Act Ordinance on the appropriate assessment of the impact of plans, programmes and projects on the ecological network was adopted in 2009, and it is applied only when is not in conflict with the new NPA from 2013. The new Ordinance is in preparation. Procedure for authorising persons for preparation of ENIA studies was prescribed in 2010 by the Ordinance on conditions for issuing approval for performing expert work of environmental protection. Regulation on ecological network was adopted in 2013
8.5.2 Strengthen the principles of protection of biological, landscape and geological diversity within the environmental impact assessment procedure	Assessed within the framework of *Environmental impact assessment* and *Ecological Network Impact Assessment*.
8.5.3 Train regional and local governments for implementation of the nature impact assessment	Several thematic workshops for regional and local governments on implementation of the ENIA were held in period 2008-2009 as a part of the PHARE project on implementation Natura 2000 in Croatia. Additionally (mostly project based) regular EIA and SEA thematic workshops are held. From 2009, MENP-NPD conducted trainings for regional and local authorities (for ENIA implementation) in 5 Croatian counties.
8.5.4 Improve the level of public awareness of the importance of the nature impact assessment, the ecological network and the international ecological network Natura 2000	A number of educational and promotion materials was published in period 2008-2011 as a part of the PHARE project on implementation Natura 2000 in Croatia and IPA project "Identification and setting-up of the marine part of Natura 2000 network in Croatia".
Assessment of NBSAP implementation	
Action plans were mostly satisfactory implemented, and primarily focused on establishing adequate legislative and administrative framework for ENIA procedure.	

4.4. NBSAP implementation

See evaluation of NBSAP implementation in Chapter 3.

Strategic objective	
Ensure effective implementation of the Strategy	
NBSAP strategic guidelines	**Activities**
9.1.1 Take necessary steps for continuous monitoring of Strategy implementation	National list of biodiversity indicators was prepared in 2009 and revised in 2011. Additional indicators for continuous monitoring of NBSAP implementation were not developed
9.1.2 Give priority to financing the projects relevant for Strategy implementation	Multi-annual strategic plans of the MENP are based on targets and action plans of the NBSAP and financing is planned accordingly. As for other sectors, they do not take NBSAP into consideration but their plans are based on their sectors' documents.
9.2.1 Ensure financing of the Strategy implementation within the budget of the respective state administration body	See 9.1.2; tendering processes for financing of CSO projects by the MENP and the Environmental Protection and Energy Efficiency Fund included NBSAP action plans as priorities for financing. Support measures for NBSAP-related agri-environment-climate under the EAFRD will be in place for the period 2014-2020.
9.2.2 Ensure funding of nature protection activities from non-budgetary sources	Croatia has positive experience regarding Environmental fiscal reform (EFR) referring to a range of taxation and pricing measures based on "polluter pays principles". Environmental Protection and Energy Efficiency Fund secures additional funds to finance projects, programs and similar activities in the field of conservation, sustainable use, protection and improvement of the environment and nature.
Assessment of NBSAP implementation in	
NBSAP 2008 implementation has showed positive trend. There is an overall continuity in the progress, for part of activities process started in this reporting period with full implementation envisaged in the next reporting period.	

Part III: Progress towards the 2020 Aichi Biodiversity Targets and contributions to the relevant 2015 targets of the Millennium Development Goals

Progress towards the 2020 Aichi Biodiversity Targets

In the Part II of this Report the NBSAP implementation was analyzed and national activities on biodiversity protection presented. In Part III national activities are put in correlation with Aichi Biodiversity Targets and contribution of Croatia to their implementation was evaluated. This evaluation was more qualitative than quantitative due to lack of available information to use systematically relevant indicators. The revision of NBSAP 2008 (plan to start in 2014 will put an accent on defining general and specific strategic objectives to be clear and accompanied with target values and indicators as well as on relating them to Aichi and EU 2020 Biodiversity Strategy targets.

As it was reported in NR4, Croatia has defined a list of environmental indicators, including biodiversity indicators. For the purpose of evaluation of the progress towards Aichi targets, relevant national indicators[34] are mentioned along with each target.. The most of these come from the national list of biodiversity indicators (BR) but some other indicators are relevant such as protected natural values (ZPV), agriculture (PO), marine environment (ME), fishery (RA), tourism (TR) or instruments and measures of environmental policy (IMP). Anyway, for most of these it was not able to give trends because needed data are still not systematically collected and processed. As for indicators proposed by CBD in the Indicative list of indicators for the strategic plan for biodiversity 2010-2020 (UNEP/CBD/COP/DEC/XI/3), relevant ones are also mentioned in the table but trends were mostly described only generally as needed quantitative data were not available.

Assessment of progress is presented in the table for each NBSAP strategic goal. Overall assessment of NBSAP contribution to Aichi targets indicates that since 2010 Croatia made significant progress in related activities and contributed especially in enlarging the area with special protection status (protected areas and ecological network) as well as in establishing quality legislative framework, harmonized with EU *acquis*. Overall continuity in the progress regarding cooperation with other biodiversity-related sectors has been achieved. Although there is legal obligation and already established practice with majority of sectors to issue nature protection requirements for inclusion into all sectorial management plans and physical planning documents, possibilities to influence and control their implementation needs to be improved. SEA procedure for sectorial plans and strategies is relatively new in Croatia and its implementation should be significantly strengthened in future. Besides mainstreaming biodiversity into sectors, the framework for inter-sectorial management of sites of ecological network should be established as a priority, including collaborative preparation of management plans. National framework for monitoring and reporting is not fully established and it is likely that the first evaluation of favorable conservation status (FSC) of threatened species and habitat types will be available within the next reporting to EU according to Birds and Habitats directives. On the other hand, there were intensive activities on evaluation of threat status of species according to IUCN criteria and preparation of red lists and red books.

In conclusion, it is evident that Croatia made significant progress in establishing all kinds of national frameworks needed for efficient biodiversity protection but its future efforts should be concentrated primarily on strengthening mainstreaming of biodiversity, on management of sites of particular importance for biodiversity and on monitoring activities designed for international reporting requirements.

34) http://www.azo.hr/Indicators08

Aichi Biodiversity Target	National activities	Assessment of progress	National or global indicators	O.A.*
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society				
Target 1 - By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably	8.3.1.a); 8.3.2.a); 8.3.2.b); 8.3.4 Besides the NBSAP activities, national survey of public awareness was performed in 2013	• High level of public awareness was identified. • No. of public awareness - related activities was increased. • Significantly more information was made available to public through new or improved web sites. • 3 new databases of the Nature Protection Information System were made available through web services (Natura 2000; protected areas; map of habitat types). • Cooperation with public media was intensified. • There was increased no. of publications, most of them also available on web sites. • (*See Chapter: Public information and Participation*)	BR 18 - Public awareness about nature protection CBD (C) - *Trends in awareness and attitudes to biodiversity** * No quantitative trends available so far but in 2013 the first national survey of public awareness was performed which will serve as starting point for further monitoring. Results indicate to surprisingly high level of awareness of values of biodiversity (*see Box 36*).	↑
	8.3.1.b)	• Legislation framework for public participation in decision-making processes is fully established. Public involvement is obligatory in the process of adoption of: laws and by-laws; physical planning documents; strategic documents; management plans of PAs/Natura sites; proclamation of PAs; implementation of ENIA/EIA/SEA procedures. • Although the trend is positive, the level of public participation is still low and the process of including their requirements needs improvement. • (*See Chapter: Public information and Participation*)	BR 18 - Public awareness about nature protection CBD (C) - *Trends in public engagement with biodiversity ** * No quantitative trends available but increased no. of comments and interventions of public, received during relevant procedures, are registered on web sites of MENP and counties.	
Target 2 - By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.	8.5.1; 8.5.2 Besides the NBSAP activities, activities are related to regular implementation of mechanisms according to the Nature Protection Act (NPA) and Environmental Protection Act (EPA)	• There is the obligation, according to the NPA, that all physical planning documents and sectorial management plans for use of natural resources, incorporate nature protection requirements issued by the MENP; trend in implementation since 2010 is positive as new sectors are included in the process, like water management (annual program of works) and partly agriculture (tenders for use of agriculture land). • ENIA and EIA procedures are obligatory and are regularly being implemented. • SEA procedure is obligatory but its implementation still needs improvement; SEA for policy strategies is obligatory from 2013 therefore no procedure was implemented yet; procedures were finalized for 1 county physical plan, 1 national plan (water management) and 5 national operational programs for EU funds; although the small no. of procedures, trend is positive comparing to 2010. • (*See Chapter: Nature Impact Assessment*)	IMP 1 - Environmental Impact Assessment IMP 2 - Strategic Environmental Assessment CBD (C) - *Trends in integration of biodiversity and ecosystem service values into sectorial and development policies* CBD (C) - *Trends in policies considering biodiversity and ecosystem service in environmental impact assessment and strategic environmental assessment*	↑
Target 3 - By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.	3.1.4.7; 3.1.5.2; 6.4.3; 9.2.1; 9.2.2.	• Support for agriculture is now linked with environmentally-friendly agricultural practice rather than overall agricultural production which favoured intensive rather than sustainable agriculture. • Existing incentives prior to 2010 were continued, regarding: national support scheme *Conservation of Fish Pond Ecosystems* which ensures support to ornithological important carp fish ponds; donations of shepherd dogs and electrical fences to reduce damages from large carnivores (not in all years, depending on available resources); compensations for damages made by large carnivores; support for the preservation of autochthonous varieties and breeds of plants and animals and incentives for organic and integrated agricultural production, • New incentives for biodiversity conservation have been designed as a part of mesaure Agri-environment-climate under EAFRD and are incorporated into draft version of Rural Development Programme of the Republic of Croatia for the period 2014-2020. • Regarding the overall assessment of incentives, including subsidies, harmful to environment Croatia is one of the 12 EU countries that participate in the European Commission study on Environmental Fiscal Reform. We expect that the results of this study will contribute to the evaluation of incentives and subsidies harmful to biodiversity, providing good basis for further reforms in this area.	BR 17 - Financing of biodiversity conservation and protection PO 1 - Area under mesaure Agri-environment-climate PO 4 - Areas under organic farming CBD (C) - *Trends in identification, assessment and establishment and strengthening of incentives that reward positive contribution to biodiversity and ecosystem services and penalize adverse impacts*	↗
Target 4 - By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	6.1.1; 6.1.4; 6.1.5; 6.1.8; 6.4.1; 6.4.3; 6.5.1.b; 6.5.2; 6.7.1; 6.7.2 Besides the NBSAP, Activities are related to regular implementation of mechanisms according to the NPA and EPA	• Croatian Forests Ltd, that manages all state-owned forests (2,018,987 ha or 35.67% of Croatia), has renewed in 2012 the FSC (*Forest Stewardship Council*) for the whole area under their management, for the next 5 years; forests also cover 35% of Natura 2000 area. • Area under organic production is growing - from 0.8% of utilized agricultural area in 2008 to 2.4% in 2012. • More than 25% of Natura 2000 is covered by agricultural area; its management includes biodiversity conservation measures, list of which will be further extended in the forthcoming period. • All large carp fishponds (10.650 ha in 2012) have semi-intensive and nature-friendly production that maintains their high ornithological value. • There is an obligation, according to the NPA, that all sectorial management plans for use of natural resources, incorporate nature protection requirements. However, in some sectors, like marine and freshwater fisheries, their implementation needs to be improved... • There is an obligation, according to the NPA and EPA, to integrate biodiversity conservation requirement into sectorial and inter-sectorial plans, programs and strategies through implementation of the procedures of SEA, EIA and ENIA. • Sustainable use is ensured through issuing permits for collection and use, as well as through control over collection and use of plants, fungi and animal species not covered by special legislation. • CITES provisions are fully implemented in the area of international trade.	PO 1 - Area under Agri-Environment scheme* PO 4 - Areas under organic farming RA 2 - Catch of the fish and other marine organisms RA 4 - Production in aquaculture Š 5 - Forest areas under certification for sustainable management CBD (B) - Trends in extent to which biodiversity and ecosystem service values are incorporated into organizational accounting and reporting CBD (C) - *Ecological limits assessed in terms of sustainable production and consumption* *not yet operational	↗

* Overall Assessment in terms of trends in progress towards achievement of Aichi Targets: **↑ satisfactory; ↗ increasing; → continuing**

Aichi Biodiversity Target	National activities	Assessment of progress	National or global indicators	O.A.*
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use				
Target 5 - By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	3.1.2.1, 3.1.2.2, 3.1.2.3	• The most of natural HTs are decreasing: watercourses and adjacent wetlands due to regulation works; coastal habitats due to building and tourism-related activities; grasslands overgrowing due to ceasing of traditional use - mowing and grazing; • Fragmentation of habitats was increased due to increased building of highways and other roads • (*See chapters: Ecosystems and habitats; Transport*)	BR 3* - proportion of habitat types classes BR 4* - proportion of threatened HTs in Croatia BR 5* - proportion of HTs of EU interest BR 15** - fragmentation of natural and semi-natural areas CBD (B) - Trends in fragmentation of natural habitats CBD (C) - *Trends in the proportion of natural habitats converted* * based on the Map of HTs from 2004; no trends available, except from analysis in changes of CLC (2006-2012) ** not yet functional but increase of building of highways and other roads is registered	→
Target 6 - By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.	6.5.1.a);6.5.1.b); 6.5.3.a); 6.5.3.b); 6.5.3.c)	• Preparation of management plans for individual fishing tools or fishing areas in order to establish long-term sustainable exploitation and to ensure the protection of marine biological resources has started. • Draft Management plan for bottom trawl fisheries and draft Management plan for surrounding purse seine nets have been prepared. • In order to reduce the negative impacts of fisheries on strictly protected marine species, education of fishermen how to deal with accidentally caught cetaceans and sea turtles has started. • In order to improve MPA management at local level through filling gaps in fisheries knowledge, fieldwork on the assessment of coastal fisheries resources was performed; Assessment and monitoring of coastal fisheries resources and socio-economic research of local fisheries at selected areas of Primorje-Gorski Kotar County" (Fishery study) • As an important component of marine biological resources monitoring, Croatia has established permanent monitoring of commercial fishery. • Biomass of demersal fish species records decline (especially commercial important species such as hake, shrimp and musky octopus). The decline of biomass is also evident in economically less important and unimportant species, especially in cartilaginous fish which are caught mainly as bycatch. • For the spawning of the fish species temporary suspension of fishing is established (eg anchovies and sardines closure period is observed from 15th December to 15th January). • Starting from this year Croatia will introduce incentives for the temporary cessation of fishing activities supporting in this way recovery of fish stocks. • (*See Chapter: Marine Fisheries*)	RA 1 - Capacity of fishing fleet RA2 - Catch of fish and other marine organisms CBD A - *Trends in population of target and by-catch aquatic species** CBD C - *Trends in catch per unit effort*** CBD C - *Trends in fishing effort capacity**** * Trends in biomass are being registered ** In some segments of fishing fleet, catch per unit effort decreased. *** In some segments of fishing fleet, fishing effort increased	↗
Target 7 - By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	6.1.1; 6.1.4; 6.1.5; 6.1.8; 6.4.1; 6.4.3; 6.5.1.b; 6.5.2; 6.7.1; 6.7.2 Besides the NBSAP, Activities are related to regular implementation of mechanisms according to the NPA	• Croatian Forests Ltd, that manages all state-owned forests (2,018,987 ha or 35.67% of Croatia), has renewed in 2012 the FSC (*Forest Stewardship Council*) for the whole area under their management, for the next 5 years; forests also cover 35% of Natura 2000 area. • Area under organic production is growing - from 0.8% of utilized agricultural area in 2008 there to 2.4% in 2012. • New incentives for biodiversity conservation have been designed as a part of Agri-environment-climate program under EAFRD and are incorporated into draft version of Rural Development Programme of the Republic of Croatia for the period 2014-2020. • More than 25% of Natura 2000 is covered by agricultural area; its management includes biodiversity conservation measures, list of which will be further extended in the forthcoming period.. • All large carp fishponds (10.650 ha in 2012) have semi-intensive and nature-friendly production that maintains their high ornithological value. • There is the obligation, according to the NPA, that all sectorial management plans for use of natural resources, incorporate nature protection requirements.	BR 8 - Trend of grassland birds populations* PO 1 - Area under Agri-Environment scheme* PO 4 - Areas under organic farming RA 2 - Catch of the fish and other marine organisms RA 4 - Production in aquaculture Š 5 - Forest areas under certification for sustainable management CBD (B) - Trends in area of forest, agricultural and aquaculture ecosystems under sustainable management CBD (C) - *Trends in proportion of products derived from sustainable sources* *not yet operational	↑
Target 8 - By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity	6.1.5; 6.1.7; 6.1.8	• Total consumption of mineral fertilizers has decreased by 30% during the last 5-years period. • There is no precise data on consumption of pesticides. • National plan for sustainable use of pesticides was adopted in 2013. • Environmental, water management, agriculture, forestry, energy and industry sectors have set up standards for prevention of environmental pollution. • Marine strategy for Croatia is in the process of development which will include set of environmental targets and associated indicators for marine waters including coastal area as to guide progress towards achieving good environmental status in marine environment. The quality of coastal waters is being monitored and the new models were set up for the establishment of the Adriatic Sea monitoring program • (*See Chapter: Agriculture*)	KZ 10 - Exposure of ecosystems to acidification and eutrophication KAV 5 - Eutrophication of rivers and lakes KAV14 - Urban waste water treatment PO 7 - Use of mineral fertilizers PO 8 - Water pollution by nitrates from agriculture PO 9 - Use of pesticides in agriculture Š 6 - Use of pesticides in forestry CBD (C) - *Trends in proportion of wastewater discharged after treatment* CBD (C) - *Trend in emission to the environment of pollutants relevant for biodiversity*	↗

* Overall Assessment in terms of trends in progress towards achievement of Aichi Targets: **↑ satisfactory; ↗ increasing; → continuing**

Aichi Biodiversity Target	National activities	Assessment of progress	National or global indicators	O.A.*
Target 9 - By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	3.3.1.c); 3.3.2.a); 3.3.2.c)	• The number of registered invasive alien species is increasing, but due to lack of data the trend can still not be determined. • Control and eradication of some invasive animal and plant species is conducted. • Public awareness is increasing due to improved information activities (web page, publications etc) • The national survey of public awareness about nature protection from 2013 showed awareness of problem of invasive alien species; suggested priority actions relate to the need for further education, strengthening of prevention and timely detecting of invasive species. • Legislation framework regarding invasive alien species is established. The new NPA was improved by regulating the criteria for import and placement on the market of the alien species, as well as their introduction into the nature, taking into consideration the risk assessment protocols in order to predict their invasiveness. • (*See chapter: Invasive Species*)	BR 9 - Invasive Alien Species ME 17 - Introduction of alien and invasive species CBD B - *Trends in number of invasive alien species** CBD B - *Trends in the economic impacts of selected invasive alien species*** CBD C - *Trends in incidence of wildlife diseases caused by invasive alien species**** * The number of registered invasive alien species is increasing but due to lack of data the trend can still not be determined **No trends available so far, but there have been some calculations for certain invasive species on their economic impact. ***No trends available so far, but the most common invasive species causing human health problems are identified.	→
Target 10 - By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.	8.1.4.	• Reefs (Coralligenous habitat type) represent the target feature of 119 sites of Ecological network. • Draft monitoring program for Reefs - Coralligenous habitat type has been prepared in 2013. • In 2013 Red coral (*Corallium rubrum*) became strictly protected species. Baseline study for management and conservation of Red coral was prepared. • From 116 corals found in the Croatian part of the Adriatic, 84 of them are listed on the national Red list. Red Book of Corals of the Republic of Croatia is in preparation. • *Marine Fisheries Act* (Official Gazette No. 81/2013) proscribes prohibition of fishing by trawl nets, dredges, shore seines or similar nets over coralligenous habitat and mäerl beds, defined by the Mediterranean Regulation.	CBD B - *Trends in coral reef condition** *No trends so far CBD C - *Trends in climatic impacts on community composition** *No trends so far CBD C - *Trends in climatic impacts on population trends** *No trends so far Implementation of monitoring program for Coralligenous community will help to determine the trends in climatic impacts.	↗
* Overall Assessment in terms of trends in progress towards achievement of Aichi Targets: **↑ satisfactory; ↗ increasing; → continuing**				

Aichi Biodiversity Target	National activities	Assessment of progress	National or global indicators	O.A.*
Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity				
Target 11 - By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.	3.1.1.1.a); 3.1.1.1.b); 3.1.1.2.a); 3.1.1.2.b); 3.1.1.2.c); 3.1.1.3.a); 3.1.1.3.b); 3.1.1.3.c); 3.1.1.3.d); 3.1.1.5.a); 3.1.1.5.b); 3.1.1.5.c); 3.1.1.5.d); 3.1.1.5.e); 3.1.1.5.f); 3.1.1.5.g); 3.1.3.1.a); 3.1.3.1.c); 3.1.3.1.e); 3.1.3.1.g)	• There are 780 sites of ecological Network Natura 2000 covering 29.38% of the total surface of Croatia (including the sea). 36.67% of land territory and 16.39% of the Croatian internal waters and territorial sea is in the ecological network. • There are 419 protected areas in Croatia, classified in nine national categories and covering 8.56 % of the total surface of Croatia (including the sea). 12.20% of land territory and 1.94% of internal waters and territorial sea are protected. • Process of preparation and designation of management plans for protected areas and sites of ecological network has significantly intensified. • (*See Chapters: Protected Areas and Ecological Network*)	BR 2 - Areas of interest for the EU BR 16 - Marine Protected Areas CBA A - *Trends in coverage of protected areas* CBD A - *Trends in extent of marine protected areas, coverage of key biodiversity areas and management effectiveness*	↑
Target 12 - By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained	3.1.4.3.a); 3.1.4.3.b)	• Threat assessments for 2954 species have been prepared. 1336 species have been categorized as threatened (IUCN categories CR, EN and VU). Population trends and changes of status of individual species are still not known but will be available upon revision of red lists, using recent IUCN methodology. • According to EU directives, Croatia is obliged to monitor and report to the EC on conservation status of 506 species and 74 habitat types. A number of monitoring protocols have been prepared and implementation of some started • (*See chapters 1. and 4.1: Native Indigenous Species*)	BR 6 - State of conservation of threatened wild species from the Croatian Red List BR 7 - Abundance and distribution of selected species CBD A - *Trends in abundance of selected species* CBD A - *Trends in extinction risk of species*	→
Target 13 - By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	3.1.5.1.; 3.1.5.2.; 3.1.5.3.	• 27 indigenous breeds of domesticated animals are recognized and preserved in Croatia. • Threat assessment for 26 indigenous breeds of domesticated animals has been done using adjusted version of IUCN classification. • (*See Chapter: Domesticated indigenous species*) • *Operational Program for Establishment of Gene Bank of Domesticated Animals in the Republic of Croatia* has been prepared. • *National Program of Conservation of Indigenous and Protected Breeds of Domesticated Animals* was adopted in 2010 and partly implemented. • *National Program of Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture* has been adopted but not implemented. • For access to use of genetic material of native wild species in situ, legal and natural persons must obtain permission from the Ministry and meet the conditions for access and / or use of the genetic material, based on the NPA. • Incentives for breeding of all indigenous domesticated breeds are prescribed and provided. • (*See Chapter: Domesticated indigenous Species*)	BR 10 - Conservation of genetic resources in agriculture CBD B - *Trends in genetic diversity of cultivated plants, and farmed and domesticated animals and their wild relatives** CBD B - *Trends in number of effective policy mechanisms implemented to reduce genetic erosion and safeguard genetic diversity related to plant and animal genetic resources** *No trends so far	↗
* Overall Assessment in terms of trends in progress towards achievement of Aichi Targets: **↑ satisfactory; ↗ increasing; → continuing**				

Aichi Biodiversity Target	National activities	Assessment of progress	National or global indicators	O.A.
Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services				
Target 14 - By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	No activities were envisaged by NBSAP 2008. The study of benefits and values of freshwater ecosystems and biodiversity in the Danube basin was prepared through the project GEF/ UNDP *Support to the Implementation of the CBD Strategic Plan 2011-2020 in Croatia*	• The issue of ecosystem services is still quite new for Croatia. The topic has been indirectly integrated in the NBSAP 2008 within the chapter Protection of biodiversity and Sustainable use of natural resources. A number of activities related to assessment of the values of biodiversity and economic valuation of its ecosystem services have been initiated recently through implementation of different projects and studies. Evaluation of progress on this issue cannot still be performed. • Sustainable use of natural resources has been ensured through different mechanisms (*see Target 7*)	CBD C - *Trends in condition of selected ecosystem services*	→
Target 15 - By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	No specific activities were envisaged by NBSAP 2008. Relevant activities for protection of ecosystems: 3.1.2.1.a); 3.1.2.1.b); 3.1.2.2.b)	• Although no specific activities were envisaged by NBSAP 2008, it can be stated that ecosystems contributing to carbon stocks (e.g. forests, wetlands, Posidonia beds) in Croatia are generally in good condition to perform this function. • Preparations for new mapping of habitat types were performed and the project will start in 2014 • General conservation measures for habitat types are prescribed by the Ordinance on Habitat Types, Habitat Map, Threatened and Rare Habitat Types and on Measures for Conservation of Habitat Types (Official Gazette 119/09).	BR 3- Proportion of individual classes of habitat types CBD A - Status and trends in extent and condition of habitats that provide carbon storage	↗
Target 16 - By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.	No activities were envisaged by NBSAP 2008.	• Nagoya Protocol was not ratified by Croatia yet, but preparations are underway • The Nature Protection Act has provisions for fair and equitable use of research and development finding resulting from the use of genetic resources, and prevents anyone from becoming an owner of genetic material created from genetic material of wildlife taxa. • For access to use of genetic material of native wild species in situ, legal and natural persons must obtain permission from the Ministry and meet the conditions for access and / or use of the genetic material, based on the NPA.		↗

* Overall Assessment in terms of trends in progress towards achievement of Aichi Targets: **↑ satisfactory; ↗ increasing; → continuing**

Aichi Biodiversity Target	National activities	Assessment of progress	National or global indicators	O.A.*
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building				
Target 17 - By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.	9.1.1; 9.1.2.	• Croatia had its first NBSAP adopted in 1999 and the second in 2008 • Comparing to NBSAP 1999, proportion of implemented action plans of NBSAP 2008 has increased • Report on State of Nature 2008-2012 is being prepared and will serve as the basis for the revision of the NBSAP from 2008	CBD B - Trends in implementation of national biodiversity strategies and action plans, including development, comprehensiveness, adoption and implementation	↑
Target 18 - By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.	No activities were envisaged by NBSAP 2008.	• There are no local communities in Croatia that depend exclusively on the ecosystems capacity to support livelihood. • The Constitution of the Republic of Croatia and its legislative system ensures the right of local communities (including minorities) to demonstrate traditional knowledge, skills and customs and participate in biodiversity related benefit sharing.	CBD B - Trends in which traditional knowledge and practices are respected through their full integration, safeguards and the full and effective participation of indigenous and local communities in the national implementation of the Strategic Plan	---
Target 19 - By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	8.1.1.a); 8.1.1.b); 8.1.1.c); 8.1.2.a); 8.1.3.a); 8.1.3.b); 8.1.6.	• Inventory activities regarding species and habitat types for which sites of Natura 2000 are designated have been significantly increased (226 species and 74 habitat types). • Preparation of monitoring protocols for species and habitat types, mostly for those for which sites of Natura 2000 are designated, has been intensified. • Development of Nature Protection Information System was intensified (10 databases have been prepared or are in preparation; 3 made publically available through web services). • According to EU directives, Croatia is obliged to monitor and report to the EC on conservation status of 506 species and 74 habitat types. A number of monitoring protocols have been prepared and implementation of some started. • A draft list of National Biodiversity Indicators has been revised in 2011. • (*See Chapter: Inventorying and Monitoring*)	BR 5 - Proportion of habitat types of EU interest BR 7 - Abundance and distribution of selected species CBD C - *Number of maintained species inventories being used to implement the Convention** * The number of maintained species inventories increased.	↑

* Overall Assessment in terms of trends in progress towards achievement of Aichi Targets: **↑ satisfactory; ↗ increasing; → continuing**

Target 20 - By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	9.2.1; 9.2.2.	• Nature protection in Croatia primarily relies upon funding from the state budget, with the budgets of regional and/or local self-government units participating in the funding process to a lesser degree. • Croatia has positive experience regarding Environmental fiscal reform (EFR) referring to a range of taxation and pricing measures based on "polluter pays principles". Environmental Protection and Energy Efficiency Fund was established in 2004, in order to secure additional funds to finance projects, programs and similar activities in the field of conservation, sustainable use, protection and improvement of the environment and nature. • Currently, national parks (and few nature parks) collect entrance fees, and such income represents at the same time a significant part of their own income. Nature parks collect fees mainly for other services (guided tours, schools in nature, special programs, etc.). Numbers of projects were implemented with support of international funds, mostly from EU pre-accession funds.	BR 17 - Financing of protection and conservation of biodiverity	↗
* Overall Assessment in terms of trends in progress towards achievement of Aichi Targets: **↑ satisfactory; ↗ increasing; → continuing**				

Appendix 1. Information concerning reporting party and preparation of the fifth national report

Reporting Party	Croatia
National focal point	
Full name of the institution	Ministry of Environmental and Nature Protection
Name and title of contact officer	Ms Ana Kobašlić, Head of Service for Strategic Affairs in Nature Protection, Nature Protection Directorate
Mailing address	Republike Austrije 14 HR - 10000 Zagreb CROATIA
Telephone	+385 1 4866 125
Fax	+385 1 4866 100
E-mail	ana.kobaslic@mzoip.hr
Contact officer for National Report (if different from above)	
Full name of the institution	Ministry of Environmental and Nature Protection
Name and title od contact officer	Mr Nenad Strizrep, Assistant Minister
Mailing address	Republike Austrije 14 HR - 10000 Zagreb CROATIA
Telephone	+385 1 4866 102
Fax	+385 1 4866 100
E-mail	nenad.strizrep@mzoip.hr
Submission	
Signature of officer responsible for submitting national report	
Date of submission	

The draft version of the report was prepared by the State Institute for Nature Protection (SINP). Information was taken mainly from the Report on State of Nature of Republic of Croatia for the period 2008-2012 (RSN 2008-2012) prepared by SINP in 2013 with data used from SINP's databases and also obtained from different experts, organizations and relevant government bodies. Draft version of the report was revised by experts from the Nature Protection Directorate of the Ministry of Environmental and Nature Protection.

The advanced draft of the report was reviewed and approved by intersectorial coordination group consisting of representatives from different relevant sectorial ministries, agencies and civil society organizations.