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Sectoral Integration of Biodiversity in Croatia

Contents

1. Introduction

Croatia reported[1] that protection and conservation of all natural values of the Republic of Croatia are guaranteed by the Constitution. With the overall aim of conserving biodiversity, general and special provisions and measures of the Nature Protection Act of 2005, amended in 2008, anticipate an integration of conservation and sustainable use of biological and landscape diversity into other sectors. Equally, most sectoral regulations address issues of conservation and management of biodiversity. One of good practice examples is the Law on agricultural land which prescribes that state-owned grassland and meadows located within national and nature parks are to be managed by the respective protected area authorities, while agricultural land owned by the state in other protected areas are to be managed based on approval of the central government authority in charge of nature protection.

Pursuant to the Nature Protection Act, the use of natural resources is governed by management plans and physical plans, taking into consideration conservation of biological and landscape diversity. Resource uses that might cause land degradation and loss of soil fertility, damage to surface and underground geological, hydrological and geomorphological values, decline in plant, fungi and animal species in the wild, reduction of biological and landscape diversity, water pollution or contamination, as well as endanger its exploitation potential, are prohibited.

Resource management plans contain nature conservation measures and conditions. Nature conservation measures include: an overview of protected and inventoried natural values, ecologically important areas and specially valuable landscapes including description of their features and status assessment; an overview of areas where existence of natural values is expected, as well as recommendations for procedures to be applied in case of finding such values or proclaiming their protection status; protective measures and development directions for protected natural values, ecologically important areas and specially valuable landscapes; biodiversity conservation measures with emphasis on habitat types conservation measures, and a habitat map. Prior to developing a resource management plan, owners and holders of rights need to obtain nature conservation conditions from the Ministry.

Adoption of resource management plans in protected areas by their owners or holders of rights require prior Ministry approval. Projects and activities in protected areas that are undertaken on the basis of forest, hunting, fishing, water and mining management plans do not require prior approval if they already include nature conservation conditions.

[1] Croatia (2009). Fourth National Report of the Republic of Croatia to the Convention on Biological Diversity, Ministry of Culture, Zagreb, 2009, 118 pp.

2. Agriculture

The Nature Protection Act prescribes grassland management by way of species oriented grazing and mowing regimes and ecologically sound use of plant protection agents and mineral fertilizers, with the purpose of biodiversity conservation. With the same purpose, it prescribes preservation of valuable and threatened edge habitats of farmland (hedges, individual trees, tree groupings, ponds and meadow strips). During planning and implementation of agricultural land consolidation, it is necessary to conserve the existing habitats or create new ones to the largest possible extent (hedges, individual trees, tree groupings, ponds and meadow strips), and plan for their distribution and size in the way that ensures their highest possible relevance for biological and landscape diversity.

In areas without perspectives for intensive agriculture development, population resettlement and abandonment of meadows, pastures and small farmlands took place, which resulted in vegetation overgrowth with the tendency of reinvasion of forest vegetation which, in Croatia, presents a permanent natural condition. Such process has been distinctively present, endangering the survival of grasslands and the related plant and animal species.

Loss of habitats is not the only threat; species typical for agricultural land are frequently threatened by the use of plant protection agents and mineral fertilizers.

A new problem of agricultural impact to biodiversity occurred after 1990 with the introduction of genetically modified crops. Within a decade these crops spread around the world and significantly endangered the existing genetic diversity of domesticated taxa linked to agriculture, as well as natural biodiversity of the areas to which they were introduced. In the Republic of Croatia, officially there are still no genetically modified crops; however it is a matter of time when they will appear, given the high probability of their unintentional introduction, low control efficiency, and the EU practice which already allows introduction of certain quantities of genetically modified crops.

Data of the State Bureau of Statistics show a permanent reduction of agricultural land.

Difference between statistical data based on land area recorded as agricultural land in official registers, and the actual status was created due to abandonment and overgrowth of large agricultural plots as well as losses due to land use change in favor of areas intended for construction and infrastructure facilities.

The new image of the current state significantly changes different estimates based on the square unit of the agricultural land. For example, use of pesticides and mineral fertilizers turned out to be considerably larger than it was estimated earlier.

At the moment, one fourth of the total arable land either lies fallow or is unused. In mountainous and coastal areas more than half of agricultural lands aren’t farmed regularly, mainly due to landmine contamination and intensive resettlement.

Table 1. Reduction trends for certain agricultural land categories.

Category	Land area (ha)			
	2000	2002	2004	2006
Used farmland	1,101,000	1,126,000	1,110,000	866,000
Meadows	355,000	347,000	322,000	163,000
Pastures	479,000	482,000	443,000	110,000
Vineyards	59,000	58,000	50,000	31,000
Orchards	70,000	68,000	66,000	46,000
Total	2,064,000	2,081,000	1,991,000	1,216,000

As an EU candidate country, Croatia has started the development of its Agri-environmental Programme. Specific for the proposed Croatian Agri-environmental Programme are the incentives for extensive and semi-intensive production on carp ponds due to their significance for waterfowl conservation. In 2006, Ministry of Agriculture, Forestry and Water Management, Rural Development Directorate / Administration of the SAPARD/IPARD Programme started the development of the Agriculture and Rural Development Plan 2007 –2013 (the IPARD plan), which should include the National Agri-environmental Plan intended to serve as the link between the Agri-environmental Programme and the National Ecological Network.

Box 1. Success story – Agriculture and Rural Development Plan 2007– 2013 under the IPARD programme, Agri-environmental measures

Results of the analysis of Agri-environmental sector show that the environmental impact of agriculture in Croatia is much bigger than it was thought. Key stakeholder groups: farmers, agricultural extension services, local, regional and national authorities and policy makers have very little information on the Agri-environmental Programme. In addition, current attitudes towards agriculture, nature and the environment, as well as agricultural knowledge and skills are not grounds for introducing the Agri-environmental Programme, due to insufficient information and experience. Therefore, it is proposed a two-tiered approach – introduction of Agri-environmental measures in pilot areas, coupled with the introduction of knowledge transfer as a horizontal measure. Knowledge transfer needs to be aimed at key stakeholders (farmers, agricultural extension services, nature protection NGOs, local and regional authorities) and implemented in all Croatian counties, with focus on the suggested pilot areas. Measures in pilot areas are intended to solve the key two problems of the Croatian agriculture – loss of grassland biodiversity and environmental degradation resulting from application of inadequate agritechnical measures on ploughfields. Therefore the following demonstration sites and measures are proposed:

· Maintenance and conservation of grasslands in the Velebit Nature Park, aimed at preventing further overgrowth of grasslands abundant in plant and animal species, preservation or increase of existing valuable grassland habitats listed in the annexes to the Habitats Directive; prevention of reduction in landscape values due to the loss of open landscapes, and with the aim of conserving biodiversity of karst areas and vulnerable underground ecosystems,

· Demonstration measure for grasslands in the Lonjsko polje Nature Park, aimed at restoration and maintenance of wet grasslands as habitats of threatened species that are listed in the annexes to the Habitats Directive and Birds Directive,

· Demonstration measures on ploughfields in the County of Zagreb, aimed at preventing and reducing the existing negative environmental impacts resulting from inadequate agricultural practices, and increase ploughfield biodiversity values in order to preserve the characteristic mosaic landscape of the County.

Table 2. Status of integrating biodiversity concerns into the agricultural sector.

Year	Scope of integration
Activities	
2001	Adoption of the Act on Organic Farming of Agricultural Products and Foodstuffs
2002	Enactment of the Agricultural and Fisheries Strategy of the Republic of Croatia
2003	Enactment of the Rural Development Strategy of the Republic of Croatia
2003	First proposal of the Agri-environmental Programme completed, new proposal initiated
2007	Republic of Croatia included in the EU's IPARD programme
2008	Proposal of the national list of indicators for agriculture, soil and land protection
Assessment of National Strategy implementation	
NBSAP (1999) anticipated four action plans related to biodiversity conservation in the agricultural sector. These action plans have been partially implemented by adopting the Act on Ecological Production and the proposal of the National Agri-environmental Programme being developed within the IPARD programme.	
Guidelines for the following period	
· Maintain cooperation among nature protection and agricultural authorities in the enactment and implementation of the Agri-environmental Programme,	
· Preserve the sites harbouring representative threatened habitat types within the ecological network and NATURA 2000,	
· Maintain a favourable water regime, including high groundwater levels in the areas of bogs, wet grasslands and tall herb communities,	
· Reduce the trend of declining grassland areas and diversity of unimproved and seminatural grasslands as valuable anthropogenic habitats extremely rich in biodiversity,	
· Stimulate organic farming and other agricultural forms that contribute to biodiversity conservation and provide assistance to producers in the promotion and market positioning,	
· Stimulate conservation of biological taxa important for particular habitat types on agricultural areas, and prevent introduction of nonnative (allochthonous) species and genetically modified organisms into nature,	
· Educate agricultural producers on the importance of biodiversity conservation through agricultural practices,	
· Use plant protection agents and fertilisers in agriculture sustainably,	
· Ensure implementation of nature protection measures in agriculture.	

3. Forestry

Geographical position of the Republic of Croatia which is at the border of the Eurosiberian, North American and Mediterranean vegetation region caused an exceptional diversity of the forest habitats with 105 forest communities. It is in compliance with the National classification of habitats and about 4500 plant species and varieties. In comparison with the European forests, forest ecosystems in Croatia are in a very good state. The Zagreb School of Forest Cultivation is the basis for maintaining naturalness and stability of forest ecosystems. Also, the legislation supports natural composition of forests, general protection of nature and does not allow clear cutting of forests. It adheres to the principles of the sustainable management.

Integration of guidance of the nature protection in the managing of Croatian forest resources requires principles of implementing the FSC certificates for managing the forests which the Croatian Forests Ltd. received for the whole managing area.

The forests and forest area in Croatia are situated at 2.688.687 ha, which makes 47.5% of the Croatian continental surface. 2.106.917 ha (78%) is owned by the state and 581.770 ha (22%) is privately owned. The Croatian forests Ltd. are managing the forests in the Republic of Croatia and since 2006 the Forest Counselling Service controls the improvement of privately owned forests managing.

Box 2. Success story – Protection forests and special purpose forests

The Forestry Act prescribes three forest functions: production forests, protection forests, and special purpose forests. Protection forests are primarily intended for protection of the soil, water, settlements, objects and other assets, whereas special purpose forests include: forests and forest parts registered for production of forest seeds, forests within protected areas or natural values proclaimed on the basis of nature protection regulations, forests intended for scientific research, education, national defence or other specially regulated purposes.

Management of forests in protected areas and ecological network sites is prescribed in the Forest Management Documents including the programme of forest ecosystem conservation measures in protected areas and ecological network sites in line with the Nature Protection Act. Management of protection forests and special purpose forests differs from the basic management style for such forest types; basically these forests present an additional system of protected areas, which however hasn't yet been fully integrated into the nature protection system.

About 18.59% of forest surfaces in Croatia is protected by the Nature Protection Act and Forestry Act. The forest areas, important for all threatened species and habitat types at national or international level have been included in the National Ecological Network so they will be in the composition of the Croatian part proposal of the European Ecological Network NATURA 2000. Due to the fact that many forest certification principles are in compliance with the principles of the National Ecological Network and the NATURA 2000 network, the process of elaboration and implementation of plans for managing those parts of ecological networks that are covered in forests will be much easier than in other sectors. In that sense the cooperation with the forestry profession has already been made.

The forests in Croatia have been managed in compliance with the Forestry Act since 2005.

On the basis of the forest managing plans, the conditions for usage of forests, the forest grounds and the intervention in that area, the needed range of cultivation and forests protection, the possible percentage of usage and conditions for managing the animal world have been determined. In compliance with the Nature Protection Act it has been regulated that the elaboration of all forest managing plans has to integrate conditions and the nature protection measures brought by the Nature Protection Directorate of the Ministry of Culture according to the experts' backgrounds elaborated by the State Institute for Nature Protection.

All forests in the strict reserves, national parks and special reserves are excluded from the management in compliance with the directives of the Nature Protection Act. Management of forests in the protected areas will be defined by the Programmes for protection of forest ecological systems which are part of the Plans for managing the protected areas.

The basic strategic document of this sector is the National Forestry Policy and Strategy. The objective of the Strategy is an increase of the contributions for the national management by the sustainable management, usage and protection of forest resources and biological diversity.

Table 3. Status of integrating biodiversity concerns into forestry sector.

Year	Scope of integration
Activities	
2003	National Forestry Policy and Strategy adopted
2003	Start of cooperation with the forestry sector, especially in terms of setting up the ecological network and NATURA 2000
2005	Adoption of the second draft of the Croatian FSC forestry certification standard
2005	Enactment of the Forestry Act
2008	Proposal of the national list of indicators for forestry
Assessment of National Strategy implementation	
Action plans anticipated for the forestry sector have been partially implemented. This refers to the incorporation of nature protection measures and conditions into forest management plans and forestry legislation.	
Guidelines for the following period	
· Use and manage forests on the forest ecosystems biodiversity conservation principles, with special emphasis on protected areas, ecological network sites and future NATURA 2000 sites,	
· Monitor the status of forest ecosystems in protected areas, ecological network sites and future NATURA 2000 sites,	
· Address the problem of landmine contaminated forest areas,	
· Improve cooperation among relevant sectors at national and international level in relation to implementation of the NATURA 2000 and biodiversity conservation programmes.	

4. Hunting

Hunting grounds in the Republic of Croatia are situated on the surface of 5.508.518 ha. Exceptions are the protected parts of nature in which there is a prohibition of the hunting, sea and ponds with the coastal area which serves for exploitation of fish ponds, hotbeds, orchards and vineyards aimed for intensive production and pasture lands if they are surrounded by the fence which inhibits the natural migration of wild animals, mined surfaces and the security area up to 100m wide and other surfaces in which hunting is prohibited by a special act proclaiming their allocation. In Croatia, about 1060 hunting grounds have been established, of which there are 315 state areas and 745 joint areas. In 2008, 51.308 hunters and 926 trainees were registered.

The wild animals at hunting grounds are managed on the basis of 10 years planned acts (hunting management base or programme of the wild animals cultivation), and animals outside the hunting grounds are being managed in compliance with the wild animals protection programme. The brown bear is managed on the basis of the Brown Bear Management Plan for the Republic of Croatia and the derived Action Plan for Management for each year.

Box 3. Success story – Brown bear management in the Republic of Croatia

The brown bear in Croatia is wildlife protected species, as well as a game species. The Brown Bear Management Plan for the Republic of Croatia is a comprehensive document offering the fundamentals of the brown bear life and management in the Republic of Croatia. This plan is based on scientific and ecological knowledge, placed within the legislative, administrative, cultural, economic and social frameworks in Croatia. Management plan attempts to encompass the current knowledge related to brown bear management, as well as to promote modern, ecologicallybased wildlife management that includes protection and conservation of biological and environmental balance of natural habitats and their sustainable use. The purpose of the Brown Bear Management Plan is to determine a management goal within a framework established by international and national regulations, to define measures to be implemented for the conservation of natural habitats and the bear population, as well as measures enabling the coexistence of man and bear.

By implementation of the Nature Protection Act it has been enacted that during the making of hunting management documentation, the programme of the wild animals cultivation and the programme of the wild animals protection, the conditions and measures for the nature protection have to be integrated,

so that the assumptions for the compliance of hunting with the nature protection should be created. The Nature Protection Act forbids introduction of foreign species to the nature. The exceptions are allowed only after the risk estimation of introduction in the nature in compliance with the Ordinance on the method of preparing and implementing risk assessment studies with respect to introduction, reintroduction and breeding of wild taxa.

At this moment there is no special systematical observation of certain species which are on the hunting species lists of the Bern Convention, Birds Directives and Habitats Directives.

The Republic of Croatia is a full legal party of the African Euroasian Waterbird Agreement (AEWA) since the year 2000. In this Agreement, the Action plan has been brought in which the parties are obliged to the systematical decrease and termination of the shotgun pellets use and its replacement with the steel shots while hunting the wetlands birds in the swamps and other shallow water surfaces. The Republic of Croatia has to start with the activities in order to enact this Action plan.

Table 4. Status of integrating biodiversity concerns into hunting sector.

Year	Scope of integration
Activities	
2005	Brown bear management plan for Croatia adopted
2005	New Hunting Act and the Ordinance on Closed Hunting Season enacted
2006	Enactment of the Ordinance on Contents and Methods of Development and Approval of Hunting Management Programmes Game Rearing and Game Protection Programmes and the Ordinance on the content and maintenance of the central hunting records
2006	Start of development of the database on game types and quantities in state-owned hunting grounds
2008	Background document prepared for the Ordinance on the method of preparing and implementing risk assessment studies with respect to introduction, reintroduction and breeding of wild taxa.
Assessment of National Strategy implementation	
NSAP anticipated an action plan for incorporating nature protection measures into hunting sector. Enactment of the Nature Protection Act, and the Hunting Act of 2005, greatly contributed to implementation of this action plan and created preconditions for harmonisation of activities between the two sectors.	
Guidelines for the following period	
· Implement the programme of scientific determination of game population sizes and set up a monitoring system,	
· Monitor the status of game in protected areas where no hunting is allowed,	
· Enhance cooperation between relevant sectors at national and international levels in relation to implementation of the NATURA 2000 and biodiversity conservation programmes,	
· Enhance work and mutual cooperation between the hunting and the nature protection services,	
· Develop management plans for animal species that are subject to stricter protection regime according to the EU directives,	
· Assess the status of allochthonous game on islands and in the continent and start addressing the issue accordingly,	
· Protect waterfowl and their habitats against shotgun pellets.	

5. Freshwater fisheries

The freshwaters fisheries' management is related to the Danube area and part of the River Sava flow. Almost all management is conceded to the owners of the fishing rights, mostly fisheries associations. It is based on the fishing management. Recreational anglers are main participants in fishing and greatest fresh water users.

The fish cultivation is related to many carp ponds situated in the lowland part of Croatia. The surface and intensity of the production in the carp ponds has been decreased in comparison to the beginning of the 1990s, although a slight increase was seen in 2005 and 2006. At the same time, the number, surface and the production of the trout ponds increased.

Table 5. Number, exploited surface and fish production in carp ponds.

Year	No. of fishponds	Fishpond surface (ha)	Fish production (t)
1997	22	9118	2783
1998	24	9124	2909
1999	20	8967	2836
2000	18	8369	2713
2001	21	7887	3350
2002	19	7786	2549
2003	19	7663	2449
2004	19	7809	2318
2005	20	6623	3002
2006	19	6229	3202

The reduction in number of carp ponds directly influences biological diversity and protection of wetlands birds for which the Croatian wide semi intensive or extensive managing ponds are exceptionally valuable alternative wetlands habitats. The termination of production in the ponds leads to quick overgrowing of the shallow wetland surfaces and overgrowing and disappearance of open water surfaces which are habitats and source of food for numerous wetlands fisheating birds. The Republic of Croatia is obliged to protect the threatened and rare wetlands birds and their habitats according to the international conventions. In order to protect them, it was proposed that additional premiums should be approved for every hectare of the pond for those fish ponds that oblige themselves to the way of production in compliance with the nature protection principles.

Fishery, cultivation and protection of freshwater fish have been regulated by the Freshwater Fisheries Act. According to the Nature Protection Act, certain freshwater fish species are strictly protected and fishing species are on the list of the protected species. The Act regulates integration of measures and conditions of nature protection for the fish management as well as for other activities related to use of natural resources. That mechanism was implemented in mid 2005. The introduction of allochtonous species to the natural water was also prohibited, and so was transfer of these species from ponds to other wetlands habitats.

The basic strategic document for fishery is the Strategy of Agriculture and Fishery of the Republic of Croatia from 2002. The general objective of this strategy is to protect and develop Croatian freshwater fishery, whose production will satisfy Croatian needs, as well as actual demands of foreign markets, at the same time respecting market and ecological legitimacy.

Table 6. Status of biodiversity concerns integration into freshwater fisheries and aquaculture sector.

Year	Scope of integration
Activities	
2002	Agricultural and Fisheries Strategy of the Republic of Croatia enacted

2005	New Freshwater Fisheries Act enacted
Assessment of National Strategy implementation	
The NSAP anticipates an action plan for incorporating nature protection measures into freshwater fisheries sector. The plan has been partially implemented by means of the Nature Protection Act, which prescribes incorporation of nature protection measures and conditions into fisheries management documents.	
Guidelines for the following period	
· Strengthen the biodiversity conservation measures in regulations and documents of the freshwater fisheries sector,	
· Prevent introduction of nonnative (allochthonous) species into open water bodies, especially these in the Adriatic catchment, and start their eradication,	
· Enable survival of the semiintensive and/or extensive carp rearing, as a precondition for maintaining their ornithological value.	

6. Marine fisheries

According to the Marine Fisheries Act the marine fishery encompasses managing renewable biological sea resources, which integrate protection, fishery and cultivation of fish and other sea organisms.

Many types of tools are used for fishing. Nowadays it is officially used about 50 types of fishery tools which have significant synergetic, cumulative and competitive effects. Many species appear in the fishing bags while fishing. For example, more than 200 species appear in the trawl bags, and if coastal tools are used, there are about 120 species, of which half are economically interesting.

The majority of fish population in the Adriatic Sea are biologically unique but economically shareable among fleets of different countries, so that for long-term managing of renewable biological resources, cooperation is necessary among all fishery participants. Out of total number of registered fish species and subspecies in the Adriatic Sea, 120 are of great or small economic significance.

Out of total surface of the Adriatic Sea, which is 135.000 square kilometres, the fishing sea of the Republic of Croatia encompasses 55.360 square kilometres. The sea surfaces Brijuni National Park, Kornati National Park, Krka National Park, Mljet National Park, Nature Park Telaščica and Lastovo archipelago Nature Park are not included in the fishery sea of the Republic of Croatia. Fishery in the mentioned protected areas is regulated by the directives of the Ordinance on the Internal Order.

Certain strictly protected species, such as sea turtles and dolphins can be accidentally caught while fishing. By monitoring dolphin mortality in the period 1990 – 2008 it has been found that they equally die from natural causes and because of human activities – mostly from entanglement in fishing nets.

Table 7. Percentage of dolphin mortality in the Adriatic in the period 1990–2007.

Cause of death	Number	Relative share
Human activity	25	14.12
Natural causes	30	16.94
Unknown	122	68.92
Total	177	100.00

Other species gathered for commercial purpose include sponges and corals: in 2003 and 2004, collecting of 100 t of sponges and 450 kg of red corals was registered (per year). Except from tuna fattening, mariculture in the Republic of Croatia stagnated until 2006, when it increased in comparison to the previous years. In tuna fattening, numbers increased because of the increase of the breeding sites, so in

2006 it amounted to 6.700 t. The total production of shells in 2006 was estimated to 3.500 t of mussels and a million oysters.

Table 8. Status of integrating biodiversity concerns into marine fisheries and aquaculture sector.

Year	Scope of integration
Activities	
2002	Agricultural and Fisheries Strategy of the Republic of Croatia enacted
2002	With the support of the Government of the Kingdom of Norway, a project «Monitoring and Management of Demersal Resources along the Eastern Adriatic Coast – Croatian Territorial Waters (DemMon)» started
2003	Under the UN Convention on the Law of the Sea, the Ecological and Fisheries Protection Zone (ZERP) was proclaimed
2005	The Act on Amendments to the Marine Fisheries Act and implementing regulations enacted
2008	Proposal of the national list of indicators for the sea, fisheries and aquaculture
Assessment of National Strategy implementation	
Adoption of the Marine Fisheries Act and its implementing regulations as well as the Agricultural and Fisheries Strategy signifies partial implementation of the action plan for incorporating measures of rational and long-term sustainable use of biological resources into the marine fisheries sector.	
Guidelines for the following period	
· Use of biological resources of the Adriatic should be based on principles of sustainable management	
· With the aim of conserving marine biodiversity, conditions and protection measures should be built in plans/programmes in the marine fisheries sector, and in physical plans in the part addressing the use of marine and coastal areas	
· Scientific research programmes and projects should be directed towards research of specific, valuable, commercially exploited, vulnerable, insufficiently known and threatened communities, taxa and habitats.	

7. Use of genetically modified organisms (GMOs)

The basic acts which integrate the question on the use of GMO in the Republic of Croatia are Act on Genetically Modified Organisms and Food Act. The Ministry of Health and Social Care was nominated for implementation of the Act on Genetically Modified Organisms for central and coordination body for managing the professional work in relation to GMO. This Ministry is in compliance with the Act on Genetically Modified Organisms and Food Act and it is authorized for market launch of GMO or products that contain and consist of GMO or are of GMO origin and are used as food or food for animals. In compliance with the directives of the Act on Genetically Modified Organisms, the same Ministry is authorized for the use of GMO and products which contain and consist of GMO and are of GMO origin in cosmetics, pharmacy and health protection of people. The Ministry of Science, Education and Sports is responsible for use of GMOs in a closed system, whereas the Ministry of Culture is responsible for deliberate introduction of GMOs into the environment. Ministry of Agriculture, Fisheries and Rural Development is responsible for the use of GMO as reproduction material in the agriculture and veterinary as well as veterinary medicines and for the plants protection products. The Ministry for Regional Development, Forestry and Water Management is responsible for the use of GMO as reproduction material in forestry and the plants protection products in the forestry.

In compliance with the Act on Genetically Modified Organisms, in December 2008, the Government of the Republic of Croatia nominated the Council for genetically modified organisms which will be listed by the Committee for restricted use of GMO and Committee for introduction of GMO in the environment.

All Acts from the restricted GMO use area; intentional introduction of GMO to the environment, and majority of Acts from the GMO market launch area were brought.

For the efficient enacting of the Act on Genetically Modified Organisms and the Protocol on Biosafety it is necessary to establish the national mechanism for data exchange of biological security (BCH mechanism) and a unique website at the state level which consists of all necessary information about national legislation, the Protocol itself and supervisory bodies, projects, activities, etc.

Table 9. Status of integrating biodiversity concerns into the GMOs sector.

Year	Scope of integration
Activities	
2003	Croatia became a full party of the Protocol on Biosafety to the Convention on Biological Diversity
2003-2005	The UNEP/GEF project "Development of the National Biosafety Framework for the Republic of Croatia" implemented; all GMO-related draft bills according to the Nature Protection Act of 2003 prepared
2003	Food Act enacted
2005	For better enforcement efficiency, that part of the Nature Protection Act referring to GMOs was extracted and made into a separate Act on Genetically Modified Organisms.
2005-2009	Most regulations anticipated by the GMOs Act enacted
-	A web portal (www.gmo.hr) created, containing all results of the biosafety project, an overview of the Croatian GMO legislation and other related information.
Assessment of National Strategy implementation	
The Strategy does not significantly address the issue of GMO use. This issue is reflected in the action plan for the development of the GMO legislation, which has been implemented.	
Guidelines for the following period	
· Set up a comprehensive legislative and institutional system of GMO application control,	
· Set up and maintain a national BCH (Biosafety Clearinghouse) mechanism,	
· Continuously work on educating the staff of competent authorities, inspection services and the public.	

8. Water management

The water management can have a significant influence on preservation and improvement of biological and landscape diversity in the Republic of Croatia. The waterway set up consists of building, technical and management maintenance of the regulatory and protected water buildings and constructions for the hydromelioration drainage system, technical and waterway management, water property and other activities which make available the water flows and their use.

In the integrated management of waterways concept, which represents the base of the modern approach to the integrated water management, the biological and landscape diversity is one of the key segments and therefore a significant component of the European as well as National legislation and the practice in this sector. The Republic of Croatia as a party of the internationally important Ramsar Convention on Wetlands, undertakes the measures for wetlands birds habitats protection.

Water management activities can have a great influence on the biological and landscape diversity especially on the protected values and ecologically significant areas (i.e. areas of the Republic of Croatia ecological network). The integration of the conditions and measures for the nature protection, guidance for the ecological network preservation while implementing the plans of managing the water areas, preparation and enacting of demands and actions in water management is enacted by the Nature

Protection Act, Regulation on Proclamation of the Ecological Network and Ordinance on Nature Impact Assessment.

The impacts on the biological and landscape diversity are mostly related to the waterway management, works and flood protection measures, extraction of river deposits, maintenance and construction of waterways and their technical maintenance, hydromelioration drainage, irrigation and construction of accumulation and hydroenergetic objects.

The impact of hydropower plants and accumulation on water ecosystems can be multiple. It can lead to the change of water regime, reduction of deposits quantity, erosion and deepening of the parts of river beds of Drava, Sava, etc. Accumulations can cover valuable natural and subnatural areas, and dams can be obstacles for fish and other organisms. In the karst area, the construction of tunnels is connected to the hydroenergetic objects as well as conveying waters in the karst area waterways. This can lead to imbalance of the underground waters regimes in greater area.

Another problem is the waste waters impact on the biological and landscape diversity. The percentage of the system connectivity to the public drainage of 40% is still insufficient so one part of the polluted waste waters goes directly to the environment. There is a significant influence of the spotting pollution related to industry and tourism especially at the Adriatic coast. The dispersed pollution is related to the chemical products and fertilizers in agriculture, erosion of the polluted grounds, precipitation drains from the urban areas, roads, disordered waste disposals and the war consequences. It is possible that pollution will have a negative effect on wetlands, water habitats and karst and underground ecological systems.

Table 10. Status of integrating biodiversity concerns into water management sector.

Year	Scope of integration
Activities	
2005	Adoption of the Act on Amendments to the Water Act
2005	Water Management Strategy drafted
2005	Start of development of the river basin management plans
2008	Proposal of the national list of indicators for inland waters and wastewater
Assessment of National Strategy implementation	
Action plan for water management was not implemented.	
Guidelines for the following period	
· Water management and waterway maintenance operations need to take account of the principles of conservation of biological, geological and landscape diversity of water ecosystems, with particular focus on protected areas, ecological network sites and future NATURA 2000 sites,	
· Prevent disturbance of river ecosystems caused by excessive extraction of riverbed deposits,	
· During waterways development planning, ensure safe existence of river ecosystems,	
· Flood protection activities should be carried out as much as possible by using the natural retention systems and preservation of natural floodplains,	
· During hydromelioration planning, take account of biodiversity conservation needs,	
· Look into possibilities of joint implementation of programmes in protected areas by the nature protection and water management sectors,	
· Strengthen cooperation of water inspection and nature protection inspection services in the enforcement of nature protection conditions and measures related to water management activities,	
· Strengthen the institutional framework of the water management and nature protection sectors in relation to the protection of water habitats, especially wetlands.	

9. Tourism

In the Republic of Croatia, tourism is one of the most significant movers of the economic development. In the last ten years, tourism enabled creation of significant financial revenues, revitalization of many rural areas and protected areas promotion, especially national and the nature parks.

Simultaneously, the negative effects of tourism are recorded in the world as well as in our country. A significant increase and development of tourist capacities and activities and a large concentration of people often endanger valuable habitats and sensitive ecosystems as well as plants and animals species.

The strategy of Croatian tourism development recognises that Croatia owns exceptionally diversified and preserved natural tourist potential which has to be protected in order to contribute to the development of tourism in the long run. Therefore, a detailed analysis of tourism efficiency in certain areas, on certain plants and animal species, their habitats and the whole ecosystems is needed.

Due to the fact that Croatian coast and islands are still oriented to the mass tourism, the pressure on national areas, especially national and nature parks which are situated near the coast and on the islands has been increased.

Uncontrolled number of visitors and disregard of the space capacity can badly influence biological and landscape diversity in these areas. The establishment of the system is of significant importance as well as development of methodology for capacity estimates of the tourism reception and connected system of monitoring so as to ensure strict management of tourists' circulation.

Due to its geographical position, exceptionally mild climate and protected biological and landscape diversity, Croatia has exceptional potential for the development of ecotourism.

Therefore, it is necessary to define its development strategy and develop it systematically as a recognisable segment of Croatian tourist offer.

The development of tourism has increased the number of visitors in the protected areas. In the last 7 years, increase in the number of visitors has been registered in all national parks and especially in the Plitvice lakes NP and the Krka NP.

Better tourist promotion of natural and cultural values of the Republic of Croatia has built more attractive country identity and led to the increased interest of the visitors. The possibility of education of bigger larger number of people in nature protection significance and its preservation has presented itself. All national and nature parks enrich their tourist and educational offer for visitors from year to year. In all the parks there is a possibility of organized tourist guidance with expert explanations and organization of trips for visiting some especially interesting and attractive localities. Recently, the number of the educational paths increased significantly, so nowadays there are about 20 educational paths in national and nature parks.

Increased number of visitors in national and nature parks ensures larger revenues. This, in turn, enables accumulation and use of a significant part of these revenues for nature protection. National and nature

parks participate in infrastructure construction, research and monitoring by using these assets. In many protection areas there is a moderate increase of ecotourism. Although development of tourism in the protected areas represents potential danger, it also enables collection of financial assets, profit for the local community and it increases public conscience about the importance of preservation and protection of nature.

Table 11. Number of tickets sold / fees collected / visitors registered in Croatian national parks in the period 2000-2007

Year	Total
2000	1,122,830
2001	1,383,575
2002	1,561,224
2003	1,691,730
2004	1,791,856
2005	1,977,383
2006	1,994,835
2007	2,083,016

Table 12. Status of integrating biodiversity concerns into tourism sector.

Year	Scope of integration
Activities	
2003	Adoption of the Tourism Development Strategy until 2010
2004	Enactment of the Regulation on Planning and Protection of the Protected Marine Coastal Areas
2006	The Ministry of Tourism commissioned the Tourism Institute for a research on the attitudes and consumption patterns of the national and nature park visitors
2008	Proposal of the national list of indicators for tourism
Assessment of National Strategy implementation	
The Strategy did not specifically address impacts of tourism on biological and landscape diversity; therefore no action plans have been anticipated.	
Guidelines for the following period	
· Strengthen the nature protection significance at all levels of the tourism sector,	
· Develop tourism that is not conflicting with biodiversity conservation in protected areas and ecological network sites,	
· Educate visitors in visitor education centres set up in protected areas, particularly on natural values and the importance of protected area conservation.	

10. Transport

Transport becomes one of the management sectors which grow fast. All types of transport – road, railway, air and maritime/waterway transports – influence the components of biological diversity. The existing transport structure – 2.726 km of the railway routes, 30.000 km of the roads (highways, motorways and low capacity roads), waterways, 7 airports – directly influence the habitats.

The main negative effects of roads are loss or fragmentation of habitats that lead to population fragmentation, habitats quality degradation, disturbance caused by lights and noise, pollution by different agents, undesirable impacts on habitats, death of animals while crossing the roads and risks of endangering traffic participants. Habitats fragmentation has been recognized as one of the most

important causes of biological diversity decrease in Europe. In Croatia, hundreds kilometres of new highways were constructed in the last ten years. Those highways connect inland with northern and southern coast passing through Gorski Kotar, Lika and Dalmatia and crossing the habitats of the various animals groups.

Large carnivores which need large living space are especially sensitive to big infrastructure projects. The increase of the wild animals' mortality has been registered in recent years.

With the exception of habitats fragmentation, another problem is a poorly put up road security fence (for example, an inadequate wire fence along the highways which makes it possible for animals to go beneath or jump over the fence) which is dangerous for both animals and people in the traffic safety.

The highway capacity for wild animals is being observed in cooperation with the Croatian Highways Ltd company and the experts from the Veterinary Faculty of the University of Zagreb. In 2002, a study with guidelines for animals' crossings was made. In the beginning of 2007, the Ordinance on Wildlife Crossings was enacted. It prescribes protection measures, the persons obligated to carry out protection and the maintenance of wildlife crossings across public roads, other roads or structures that extend over known wildlife migration routes.

Birds are often killed on the roads. There is a negligible impact on some species, but for others it can be one of important factors for population quantity decrease in a certain area (for example, nighthawk, grey owl and barn owl). River traffic can have a negative influence on wetlands birds which are the most threatened birds in Croatia as maintenance of waterways includes river habitats (for example, destruction of shoals, channelling of rivers and establishing river banks), as well as swamps habitats, survival of which depends on these rivers.

Other animal groups influenced by traffic include amphibians which are often killed on the roads during migrations. Although this problem was not solved at the state level, on the basis of individual actions of the nongovernment organizations, a special sign that warns about amphibians crossing the road was put in relevant regulations.

Box 4. Success story – Wildlife crossings in Croatia

More than 400 km of motorways have been or are being built within a large carnivores' habitat, on the stretches from Karlovac to Rijeka and from Bosiljevo and Split towards Dubrovnik. The motorway network has fragmented the large carnivores' habitat into four separate areas, which greatly affects their spatial redistribution. Although these motorways affect habitat quality and migration possibilities for all animals, the number and length of wildlife crossing objects along the motorway routes theoretically ensure adequate permeability. Namely, during the construction of these motorways, the 'green bridges' were set up near tunnels and viaducts. A total of nine such wildlife crossings were built in the period from 1998 till the end of 2007.

Table 13. Status of integrating biodiversity concerns into transport sector.

Year	Scope of integration
Activities	
1998-2007	A total of 9 wildlife crossings was built on new motorways; start of permeability monitoring for wild animals
1999	The "Hyla" NGO implemented the project "Saving Amphibians on Roads" in Đelekovci near Koprivnica
2002	With the support of the Civil Engineering Institute of Croatia (IGH), a study and guidelines for wildlife crossings were prepared
2003, 2005	The Nature Protection Act prescribed protection of wildlife migration routes
2004, 2005	Management plans for large carnivores adopted, containing guidelines for habitat integrity conservation
2007	Ordinance on Wildlife Crossings enacted
2008	Proposal of the national list of indicators for transport
Assessment of National Strategy implementation	
The Strategy did not specifically address impacts of transport on biological and landscape diversity; therefore no action plans have been anticipated.	
Guidelines for the following period	
· Systematically monitor the impacts of roads, railways and other transport lines to species and habitats,	
· Ensure permeability of existing and planned transport routes for wild animals in order to enable their daily and seasonal migration.	

11. Energy

Due to the energy crisis, pollution of environment and climate changes related to the use of energents, the trend of passing from the conventional type of energy production to the renewable energy sources of wind, solar energy, geothermal energy and biomass is visible.

Regarding the same trends in Croatia, it is necessary to pay attention to the introduction of renewable sources of energy which don't produce greenhouse gas. However, controversial questions about the impact of the renewable energy sources on the biological diversity arose.

In the Republic of Croatia the legislative frame which regulates the area of renewable sources of energy has been established. In consuming electrical energy, the objective is to achieve that 5.8% of energy is ensured from the renewable sources without the hydropower plants use. The further objective is the increase of 15% until 2020 which is in compliance with the EU trends. It is strategically necessary to develop systems which enable and stimulate savings and reduction of energy consumption. It includes stimulation for the more efficient production systems, transfer and energy consumption. The Master plan for the energy efficiency will be established and the Act on efficient use of energy in direct consumption has been enacted.

Windpower plants – In Croatia, about 20 MW are temporarily being produced from the windpower plants, of which 300 MW are expected to be produced by 2010. The growing number of windpower plants represents bigger potential problem for different types of birds and bats. In Croatia, the selection of potential locations for the windpower plants has included the wind energy potential of certain locations as well and possible impacts on birds and bats have not been evaluated enough. The cumulative effects of setting many windpower plants in some areas have not been taken into account. The wind generators are planned to be installed on the mountain ridges or just below them, at the places which are, due to specific conditions (for example thermals) important for vultures, especially those that use sailing as a way of flying (for example eagles and griffon vultures). In addition, these cliffs,

situated above tunnels that are part of highways or other roads, are valuable corridors for road crossings. Existence of wind power plants; their work, noise, and access roads obstruct them. According to the Ordinance on Wildlife Crossings, this type of construction has to be subject to Nature Impact Assessment.

Hydropower plants – Nowadays, 35.845.700 thousands m 3 of water is being used for production of electrical energy annually, of which 97.4% is used from waterways, 2.2% is used from accumulations and the rest from other resources. By construction of hydropower plants and accumulation pools, national river flows have been significantly changed, which has a negative impact on the whole series of habitats and life communities that belong to them. For the programmes and plans of implementation of the Strategy for energy development for which public discussion was finished, it is necessary to elaborate strategic estimation of the impact on environment including nature impact assessment, in order to identify which of the planned hydropower plants have significant negative impact on species and habitats at the ecological network area. While planning the construction of hydropower plants, the procedure of environmental impact assessment was prescribed, together with nature impact assessment. The three hydropower plants on the River Drava: Varaždin HPP, Čakovec HPP and Dubrava HPP are the first hydropower plants in Croatia to receive the ISO 9001 and ISO 14001 certificates. Such certificates, especially ISO 14001 should be provided for all other hydropower plants in the Republic of Croatia.

Electricity lines – Since electric wires network in Croatia is becoming denser, the risk of birds suffering on the electricity lines and negative effects on threatened bird species increase. The Nature Protection Act anticipates protection measures for birds endangered by electric shocks. It is very important to make quality environmental impact studies while planning new electricity lines construction. It is also important to make real estimates of the negative effects of the planned intervention on the bird population and to integrate protection measures where it is necessary. It is necessary to take into account the same problems when replacing used electricity lines by new ones.

Biofuels – Recently the biofules have been discussed at all levels and in all sectors but for the biological diversity the conclusions and decisions made at the Convention of biological diversity are relevant. Biofuels Act with the proposal for adoption in the first quarter of 2009 has been drafted.

Isolated systems – In the protected nature areas the conditions are ideal for implementation of the pilot project of the renewable sources of energy use and replacement of the conventional energy sources by implementation of solar collectors, biomass use and small wind power plants especially for mountain huts, houses and shelters, telemetric firefighting stations, buildings, administration offices, parks and other infrastructure energy supply. Some objects are not connected to electric lines because it has not been built or the construction of the electricity network pillars has not been allowed. Therefore the fossil fuel aggregates, generators are used and their usage is problematic.

Table 14. Status of integrating biodiversity concerns into energy sector.

Year	Scope of integration

Activities	
2003	Enactment of the Act on the Fund for Environmental Protection and Energy Efficiency
2008	Proposal of the national list of indicators for energy sector
Assessment of National Strategy implementation	
The Strategy did not specifically address impacts of energy sector on biological and landscape diversity; therefore no action plans have been anticipated.	
Guidelines for the following period	
· Management actions in the energy sector should be based on the principles of conservation of biological and landscape diversity, with particular focus on protected areas, ecological network sites and future NATURA 2000 sites.	

12. Mining

Exploitation of mineral resources which covers stone technical and building materials, sand, gravel and brick clay has a negative impact on landscape and biological diversity. It is related to the surface diggings, quarries, gravel areas, clay and sand diggings. Exploitation of mineral resources takes place on 584 approved fields (the average of the exploiting field has a surface of 34 ha.) cover the surface of about 21 877 ha which, in relation to the total continental surface of the Republic of Croatia, amounts to 0,38%. Statistically, the mineral resources exploited fields don't cover a large surface in the Republic of Croatia but considering ways of excavating resources, they have significant impact on nature, i.e. biological, geological and landscape diversity. The existing open excavation surfaces are results of former exploitation. Many quarries, gravel areas, clay diggings and other mining objects were opened according to construction needs but their restoration and restructuring, which would be acceptable for the environment, failed because there were no activities of design and allotment of the final uncovered excavations.

Table 15. Status of integrating biodiversity concerns into the mining sector.

Year	Scope of integration
Activities	
2008	A proposal of the national list of indicators for industry, including mining, has been prepared.
Assessment of National Strategy implementation	
The Strategy did not specifically address impacts of mining on biological and landscape diversity; therefore no action plans have been anticipated.	
Guidelines for the following period	
· Improve cooperation among relevant sectors at national and local levels regarding planned and sustainable use of mineral resources, taking into consideration biodiversity conservation measures,	
· Plan for exploitation in combination with physical restoration, as well as remediation or land use change of all abandoned (unremediated) excavations,	
· Enhance cooperation between the mining and the nature protection inspection services.	

General intersectoral integration

13. Education

Education about nature protection is still not a priority although younger generations should take care about nature protection in the future. There is no constant and active cooperation among the state administration bodies authorized for education and protection of nature and their belonging expert institutions. This cooperation is needed for the implementation of education strategy for nature protection and respective changes of existing school programmes. Although there are thematic expert

congresses of educational workers held annually, expert trainings on nature protection are not very important. Institutions that work on nature protection have sporadically implemented educational activities about nature protection in the frame of different projects of nature protection, through extracurricular activities and in direct contact with certain schools.

In order to create interest for nature protection and necessity of its preservation, the existing school programmes should be supplemented with field education and stress out education about natural resources values that are situated in the region in which elementary and high schools are located. The next step is active integration in monitoring certain plants and animal species and habitats. For example, the GLOBE programme has been launched for monitoring physical and chemical parameters.

Box 5. Success story – Counting Barn Swallow and House Martin nests

All Croatian schools have been invited to join the action of counting Barn Swallow and House Martin nests in 2004. The idea was to develop interest of schoolchildren in biodiversity monitoring, and to make it more understandable to them by focusing on the species that are very common, well known and easy to identify. Protocols and monitoring forms were prepared. Data forms with instructions were distributed to regional education commissioners during a project presentation, and they were expected to further distribute them to all Croatian schools.

The nest counting action was combined with the call for schools to take part in the visual and literary artwork competition, with the topic of swallows. The results of nestcounting and best children's artwork were presented on May 21, 2004, on the occasion of the International Day for Biodiversity, including the exhibition of all children's works. The event was held at the Children's Conrner of the Zagreb City Libraries, under the auspices of the Ministry of Culture. The occasion was also used to present the leaflet containing the results of nestcounting and the poster. The schools that counted the most nests and those that managed to involve the largest number of pupils received books and binoculars, as prizes for their efforts.

The big interest of schools enabled collection of as many as 8,574 completed data forms. The total of involved schools was 249 (197 elementary and 46 secondary schools) with approximately 5,000 pupils. In order to be able to use the data for future monitoring purposes, all data have been entered into a special database. A GIS map of nests was also produced.

Based on the very good response of schools from all parts of Croatia, it was decided to continue the action in 2005, however with the selected schools only and in predefined areas. Continuing this activity through subsequent years would enable proper monitoring. Nest counting was conducted in May 2005, with a total of 53 involved schools that returned cca 5,000 forms. A total of 14,627 Barn Swallow and 3,117 House Martin nests were counted. As a sign of gratitude, teachers received certificates of acknowledgement and the book "Birds of Croatia and Europe".

The nature protection is more and more represented in the high education programmes but it is still insufficiently represented. University of Zagreb, University of Josip Juraj Strossmayer in Osijek, University of Split, University of Dubrovnik and Polytechnic College in Karlovac have subjects on the nature protection of those areas, conservation biology and natural resources management.

The professional congresses and seminars have been regularly held and educational excursions for the workers of the nature protection sector have been periodically organized.

Since 2003, the Ministry of Culture has been organising seminars for education of customs officers, border and criminal police and workers of the border veterinary and fitosanitary inspection due to the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).The professional meetings of the expert directors, the supervisors of protected areas, and public institutions are being organized on a regular basis. Since 2003, the seminars for damage experts of strictly protected large carnivores have been organized. Within the project of the communication of nature protection, many various seminars and workshops have been organized. Many activities have been made for education of experts for managing the protected water and wetlands habitats through different workshops and seminars in nature parks.

Table 16. Status of integrating biodiversity concerns into the education sector.

Assessment of National Strategy implementation
NSAP anticipated 9 action plans, which have only been partially implemented – predominantly focused to on-the-job training for nature protection officials.
Guidelines for the following period
· Enhance understanding, significance and presence of the concepts of biological, landscape and geological diversity and its conservation at all educational levels.
· Encourage institutional and extracurricular education on biological, landscape and geological diversity and its conservation.
· Enable and encourage professional and scientific training of staff dealing with nature protection issues.
· Strengthen cooperation among national authorities, expert and scientific institutions, educational institutions and NGOs in the area of nature protection education.

14. Research and monitoring

The data on biological and landscape diversity in the Republic of Croatia are collected by the scientific, high school and museum institutions but the collecting is not systematical and data availability is poor. Due to the insufficient valorisation of the expert work significance, inventorization of the biological and landscape diversity components, the interest of young scientists at scientific, highschool and museum institutions for classical taxonomy, floristic and faunistic studies declines.

State Institute for Nature Protection is authorized for coordination of the inventorization and monitoring of the biological diversity conditions on the basis of the Nature Protection Act. By establishing the State Institute, the collection of data has been institutionalized since 2003.

The prerequisites for creating of the central database have been created in the frame of the nature protection information system. In the period of implementation of Strategy by the end of 2007, red lists and red books of threatened species were made and some of them are yet to be created. Regarding the

evident lack of data, the accent has been put on the project financing of inventorying and monitoring the status of the threatened species and habitats.

The mobilization of a large number of experts for inventorying and monitoring of flora and habitats, sea habitats and part of fauna conditions is necessary. These handbooks are the first step in standardization of data collection methodology, as a basis for establishment of systematical monitoring.

The Croatian Environment Agency (CEA) is the central information body for coordination of the reports and reporting of the European Commission of the implementation of individual environment protection acts. The CEA reports to the European Environment Agency (EEA) and is in compliance with the demand of the European information and monitoring network (EIONET). The part of the data delivered by the Agency are the data about protected areas for the Common Database on Designated Areas (CDDA) which are collected in cooperation of the Ministry of Culture, Nature Protection Directorate and State Institute for Nature Protection. In compliance with the Environmental Protection Act, CEA is obliged to establish the Environmental Protection Information System (EPIS) in cooperation with other bodies of the state administration and other institutions. According to the Regulation on Environmental Protection information system, EPIS represents a series of the mutually connected electronic databases and sources of the data about conditions, pressure on the environment, regional characteristics and other data and information important for monitoring of the environment conditions at the national level.

Table 17. Status of integrating biodiversity concerns into research and monitoring.

Assessment of National Strategy implementation
NSAP anticipated a large number of action plans, which have only been partially implemented due to limited material and human resources.
Guidelines for the following period
· Conduct inventorying and monitor the status of biological, landscape and geological diversity.
· Continue the establishment of the national monitoring system for biological, landscape and geological diversity.
· Continuously improve the nature protection information system.
· Monitor the impact of climate change on biodiversity.
· Encourage scientific community to carry out national research with the purpose of inventorying and establishing species and habitat distribution and population sizes.
· Make use of the list of indicators during biodiversity monitoring.

15. Public information and participation

Public information systems have an important role in the protection of the biological, landscape and geological diversity. They can create support, pressure or public engagement by providing information to the general public. The increase of the electronic communication share is a global trend, and this potential should be used in educational, communication and public participation purposes for the protection of biological, landscape and geological diversity.

Information about the biological, landscape and geological diversity condition and availability of information are fundamental prerequisites for raising public awareness on biological diversity topics.

Legal prerequisites have been created for the public participation in decision making about nature and environment protection, but it is necessary to influence the public on integration in the procedures of

public inspection and public discussions. Implementation and full functioning of the Mechanism for exchange of information on biological diversity (Clearing House Mechanism – CHM) will contribute to this objective.

The important communication agents of the biological diversity concept are the nongovernment organisations which can include general public in the processes of biological, landscape and geological diversity protection.

Informing the general public and target groups about biological and landscape diversity protection has been implemented in the frame of various nature protection projects or celebrations of the important dates as Nature Protection Day, The Earth Day, Wetlands Day, promotion of scientific publications, temporary organisation of the thematic round tables, press conferences, etc.

Regarding the media coverage, nature protection is becoming increasingly popular. Daily newspapers follow events related to these issues, most often in the shape of short news, although recently there are new specialized editions of magazines which cover nature protection topics.

The Republic of Croatia is a party of the Aarhus convention. The obligation of informing the public and cooperation of the public in the decisions has been regulated by the Nature Protection Act, Environmental Protection Act and Act on Physical Planning and Construction while the procedures of the public participation have been enacted by the Regulations and Ordinances.

Table 18. Integration of biodiversity concerns into public information and participation.

Assessment of National Strategy implementation
Only some of the NBSAP action plans related to public information have been implemented, predominantly those related to cooperation with NGOs.
NBSAP did not anticipate action plans related to public participation in decisionmaking.
Guidelines for the following period
· Enhance and raise public awareness and education levels on biological, landscape and geological diversity and enhance public participation in decisionmaking.
· Set up mechanisms for international, regional and national data exchange on biological, landscape and geological diversity and on conservation actions.
· Encourage civil society organisations to implement activities related to nature protection and promotion.
· Encourage participation of the media in public education, information and participation related to biological, landscape and geological diversity.
· Encourage volunteering and other forms of extracurricular education and public actions in the area of biodiversity conservation.

16. Physical planning

In compliance with the new Act of Physical Planning and Construction, the documents of the physical planning cover the organisation, use and allotment of the space, measures and guidelines for arrangement and protection of the state, counties, the City of Zagreb, big towns, towns and communities areas. The documents of physical planning have been brought at the state level (Strategy for Physical Planning Development, Program of Physical

Planning of the Republic of Croatia, and the part of the physical planning in the areas with special characteristics) and physical planning at regional and local level. These documents include the physical planning of the county or the City of Zagreb and a part of the physical planning of the specific characteristics areas, physical planning of a big town area, community area, urbanistic and detailed physical planning. Regarding allotment, they are divided in strategic documents of physical planning (Strategy for Physical Planning Development, Program of the Physical Planning of the Republic of Croatia and the Physical Planning of Specific Area Characteristics, Physical Planning of Town and Community) and directives documents of physical planning (Urbanistic Physical Planning and Detailed Physical Planning).

In spite of the positive legislation in the Republic of Croatia, there is an intensive use and unselected 'occupation' of rural and coastal area (enterprise zones, training grounds, apartment settlements, wind power plant fields, golf playgrounds, large surfaces anticipated for tourist construction at the coastal area, etc.) Therefore, the necessity for nature protection is not only important as a representative protection (threatened species, sensitive habitats or corridors, categorized protected areas) but also as protection of individual nature areas.

The valid generation of the counties physical plans (adopted in the period 2000 – 2004) with the exception of fundamental planning (for example, candidacy of new protected areas) does not contain other serious instruments of protection and preservation of biological and landscape areas values. It is partially due to lack of data about biological and landscape values, but also because of the lack of sensibility of the physical planning documents designers that there should be a biology expert in the team for physical planning. Physical plans are dominantly dedicated to the constructed environment, they are concentrated on infrastructure, recreation, tourism, buildings, economic development and traffic. They rarely enact nature protection measures for the whole area including inadequate development (for example, numerous quarries, oversized enterprise and tourist zones, etc). Such physical planning determines the use and allotment of the planning and represents the basis for the development directions.

Act on Physical Planning and Construction and Nature Protection Act enact physical planning drafts of the specific characteristics areas for the protected areas (especially National and Nature parks). All national parks, except Northern Velebit National Park, and two nature parks – Učka and Kopački rit have valid physical plans, while physical plans for other nature parks are under preparation.

The Nature Protection Act enacts the obligation of issuing the conditions and nature protection measures to the physical planning holder and obligation of issuing the preliminary agreement in the procedure of adoption of physical planning which cover the protected area.

Upon the entry into force of the Ordinance the Habitat Types, Habitat Map, Threatened and Rare Habitat Types, and on Measures to Preserve Habitat Types in January 2006 and the Regulation on Proclamation of the Ecological Network in October 2007, in the procedure of establishing the prerequisites and nature protection measures, the State Institute for Nature Protection provides the

Ministry of Culture data about presence of the threatened and rare habitats types for in the area of the plan range, the proposal of measures for their protection, data about areas included in the national ecological network or represent the potential NATURA 2000 area. The data about wild species, their vulnerability and protection status have been also provided (Ordinance on Proclamation of Wild Taxa as Protected and Strictly Protected since January 2006). The data provided from the State Institute are integrated in the conditions and nature protection measures of the Ministry and are delivered to the physical planning holder with other data needed for elaboration of plans related to the nature protection area.

Table 19. Integration of biodiversity concerns into physical planning.

Assessment of National Strategy implementation
The action plan anticipated by NBSAP has only been partially implemented.
Guidelines for the following period
· Conduct territorial evaluation (at the level of counties and the City of Zagreb) focused on nature protection and conservation/enhancement of populations of threatened and protected species, threatened and rare habitat types and conservation of landscape values; define priorities for planning the proclamation of new protected areas.
· Enact the remaining physical plans (and/or amendments thereof) for areas of special features in all national parks and nature parks.
· Define interlinkages between physical plans for areas of special features and management plans of national parks and nature parks with regard to their content.
· Carry out capacity building of regional and local authorities for implementation and enforcement of physical planning provisions and project permitting, particularly with regard to new territorial evaluation of counties, protected areas and ecological network sites.
· Improve implementation and enforcement of nature protection measures and conditions built into physical plans.
· Raise public awareness on biological, geological and landscape diversity and the importance of spatial conservation; encourage public involvement in preparation and adoption of physical plans.

17. Nature Impact Assessment

The Nature Protection Act enacts implementation of Nature Impact Assessment. It is also in charge of those interventions that can have a significant impact on ecologically important areas or protected natural values. The evaluation procedure of interventions covered by the EIA, has been regulated by the Regulation on the Environment Impact Assessment while the procedure of evaluation of other interventions has been regulated by the Ordinance on Nature Impact Assessment.

In order to harmonize the Nature Protection Act with the EU Habitat Directive and enact the detailed procedure, the way and necessity of evaluation of acceptability for nature, in December 2008, the Act on amendment of the Nature Protection Act in which there are detailed phases of the acceptability evaluation for nature as it follows: the previous evaluation, the main evaluation with the evaluation of other suitable possibilities and identifying of the prevailing public interest and compensation conditions. The existing Ordinance on Nature Impact Assessment will be necessarily amended in compliance with the adopted amendments of the Nature Protection Act.

The Environmental Protection Act ensures complete preservation of the environmental quality, preservation of nature communities, rational use of nature resources and energy in the best suitable way for the environment as the fundamental condition of a healthy and sustainable development. The objectives of environmental protection are enacted by law and some of them are: plants and animal world protection, biological and landscape diversity and ecological stability preservation; sustainable

development of natural resources without bigger damage and threatening to the natural environment, protection and quality improvement of certain environmental components, improvement of natural balance and establishment of the environment regeneration capabilities, improvement of environmental conditions, ensuring healthy environment, etc.

One of the instruments that implement environmental protection in compliance with the Environmental Protection Act is the Environmental Impact Assessment that looks at all possible direct and indirect impacts of intervention on the soil, water, sea, air, forests, climate, health of people, plants and animal world, landscape, material assets and cultural heritage, taking into account relations between them. The estimation of the impact on environment has been implemented within the preparation of the intended intervention, before issuing the location licence or other act which would approve that intervention. The interventions with estimation of impact on nature have been implemented, the way of the evaluation of impact on the nature, the way of the implementation of the evaluation procedure about the necessity of evaluation of impact on the environment and the way of the work of the committee have been enacted by the Regulation on the Environmental Impact Assessment. For the interventions where the EIA and the nature impact assessment are obligatory, in compliance with the Article 36 of the Nature Protection Act, the two procedures have been implemented as a unique procedure. The request for the EIA contains the appropriate act issued in the procedure of the acceptability evaluation of the nature intervention – the previous evaluation (the certificate of the intervention acceptability or opinion of obligation of the main evaluation procedure implementation). The procedure of the main evaluation has to be implemented in compliance with the procedure of evaluation of impact on the environment and before the implementation of the resolution; the supervisory body must deliver the committee opinion of the intervention acceptability to the supervisory body for nature protection.

The strategic estimation of the plan and programme impact on the environment is an instrument which implements nature protection and it represents an innovation in relation to the former Environmental Protection Act. The significant environment impacts which can arise from the implementation of the plan or programme have been evaluated so the applicable decisions of the plan or programme acceptability should be enacted in reference with the possible significant impacts. The strategic evaluation is implemented during the elaboration of the plan and programme proposals before the establishment of the final proposal and reference to the implementation procedure. The way of implementation of the strategic evaluation has been enacted by the Regulation on strategic environmental assessment and the procedure of the acceptability evaluation has to be implemented as a unique procedure. The decision of the implementation of the strategic estimation procedure should contain an opinion of the obligation of main evaluation procedure implementation. The procedure of the main evaluation has to be implemented in compliance with the evaluation procedure of the impact on the environment.

Table 20. Integration of biodiversity into strategic planning and investment cycles.

Assessment of National Strategy implementation
NSAP did not anticipate separate action plans for strategic planning and investment cycles.
Guidelines for the following period

· Set up mechanisms and a system for Nature Impact Assessment.
· Strengthen the principles of conserving biological, landscape and geological diversity within environmental impact assessment procedure.
· Build capacity of regional and local authorities for implementing the procedure of Nature Impact Assessment.
· Raise public awareness on the importance of Nature Impact Assessment, the ecological network and the international NATURA 2000 network.