Action Plan for the conservation of the White-tailed Sea Eagle *(Haliaeetus albicilla)* along the Danube

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Action Plan for the conservation of the White-tailed Sea Eagle *(Haliaeetus albicilla)* along the Danube

Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)

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Development process

The White-tailed Sea Eagle is a flagship species as well as a symbol for nature protection in Europe. Since its dramatic population decrease, especially in the period between 1950-1970, numerous initiatives has contributed to securing the last breeding sites and individuals. This Action Plan is dedicated to all conservationists and stakeholders who have contributed to the recovery of this species since that time. Based on the results of their work and the recent recovery of the White-tailed Sea Eagle, today we are in the position to use this Action Plan to build up transnational co-operation and further conservation activities.

This Action Plan is the result of the initiative for the establishment of the Danube River Network of Protected Areas. Danube wide conservation activities for Danube flagship species such as the White-tailed Sea Eagle were identified as activities of joint interest by the Danube protected areas in several meetings and workshops in 2007 and 2008. At the International White-tailed Sea Eagle conference in Illmitz (November 2007), organised by WWF Austria and Neusiedler See-Seewinkel National Park, the need for transnational co-operation was underlined and the idea of a White-tailed Sea Eagle Action Plan for the Danube river gained new impetus.

With funding from the European Union under the programme for European Territorial Co-operation for South-East Europe (ETC-SEE), experts from Danube protected areas came together in the framework of the DANUBEPARKS project to take the first steps towards this Action Plan. Remo Probst (BirdLife & WWF Austria) and Ákos Gaborik (Duna-Drava National Park) designed questionnaires on population, conservation status, threats, etc. which were sent to all DANUBEPARKS partners. Based on the answers and the feedback of the experts of these protected areas, first analyzes were done and were presented at the workshops which took place in Duna-Drava National Park (Hungary) and in Kopacki rit Nature Park (Croatia) in January 2010. In this process, the Action Plan for the conservation of White-tailed Sea Eagle (Helander & Stjernberg 2002) was taken into account as important base and reference. An advisory board was created at these workshops, including at least one White-tailed Sea Eagle expert nominated for each Danube country.

Box 1: Funding and organisational support.

This Action Plan has been elaborated within the framework of the DANUBEPARKS project – The Danube River Network of Protected Areas. This initiative has been financed by the ETC-SEE programme. This instrument is to finance and implement the cohesion policy and to encourage regions and cities from different EU Member States to work together and learn from each other through joint programmes, projects and networks. The European Territorial Co-operation objective is financed by the European Regional Development Fund (ERDF):

http://ec.europa.eu/regional_policy/co-operation/index_en.htm

The process for the elaboration of this Action Plan has been supported by BirdLife International and WWF International, underlined by official letters of support in May 2010 and March 2011, respectively.

In close co-operation with the experts of the advisory board and DANUBEPARKS management, Remo Probst elaborated a first draft of the Action Plan which circulated in early February 2011. Feedback from the partners on this draft was discussed at the follow-up workshop in Persina Nature Park (Bulgaria) in March 2011. At this meeting the draft version was finalised.

The first presentation of this Action Plan took place at the International DANUBEPARKS White-tailed Sea Eagle Conference in October 2011 in Duna-Drava National Park in Hungary.

Anchoring this Action Plan on a policy level, it is the clear intention of the partnership. Therefore, the official support by the Council of Europe and the Bern Convention is seen as important step to strengthen the document and as important contribution on the way to its implementation.

Executive Summary

The White-tailed Sea Eagle population in Europe is roughly divided into a northern and a south-eastern population. The latter is situated foremost in the Danube countries and holds about 650 White-tailed Sea Eagle pairs, of which almost 200 are ecologically dependent on the river Danube and its remaining alluvial floodplain.

The goal of this Action Plan is to secure a viable population of the White-tailed Sea Eagle along the Danube. Through national action and international co-operation, White-tailed Sea Eagle habitats are to be secured and major man-made threats are to be eliminated. The Danube is to be saved as the backbone for White-tailed Sea Eagles in South-Eastern Europe, acting as a source breeding subpopulation as well as an important wintering place for eagles coming from the north-east of the continent. The saving of this flagship and umbrella species along the Danube should be a best practice example for transnational conservation of species and habitats. Based on the recovery of this species, transnational co-operation of stakeholders should be built up.

To ensure this, the Action Plan contains 37 objectives under the general headings of organisation, legislation, monitoring, habitat conservation, protection, research, rehabilitation, and evaluation. In Table 5 to Table 12 these objectives are described, as well as a rationale, geographical scope, priority and timeframe, and indicators of success. Furthermore, organisations responsible for implementation are addressed, such as the EU, governments, NGOs, protected areas, working groups, etc. The rating of threat factors as well as the listing of conservation issues is an expert-based approach.

Most important for the future may be seen saving and restoring habitats, the implementation and execution of nest protection zones, the reduction of man-induced mortality factors (poisoning, lead poisoning, collision, etc.), and the strengthening of international co-operation.

1. Introduction

The White-tailed Sea Eagle is a magnificent bird of prey, enjoying a wide range of interest all over its Palaearctic distribution. As a top predator of aquatic ecosystems it is of special conservation concern and further it has been proven to be a sensitive indicator of biocides and pollutants, such as DDT and PCBs. Threats to this slow-reproducing raptor are manifold, including habitat destruction, persecution, accidental killing and disturbance (Helander & Stjernberg 2002).

Although the species is widely distributed throughout the Palaearctic, about 50-74% of the global breeding population is in Europe (BirdLife 2004). European White-tailed Sea Eagles are roughly divided into the much larger north-eastern subpopulation and the southern Danube subpopulation inhabiting Bavaria, Austria, Slovakia, Hungary, Croatia, Serbia, Bulgaria, Romania, and the Ukrainian part of the Danube delta (Figure 1). In between, namely in central Germany, northern Czech Republic, southernmost Poland, and northern Slovakia, White-tailed Sea Eagles are very rare or absent as breeding birds.

This Danube subpopulation has about 650 breeding pairs, when adding adjacent areas like the Czech Republic, Slovenia, Bosnia and Herzegovina, Montenegro and Moldova, where main rivers like the Morava, Drava, Sava and Prut head to the Danube. Further, the White-tailed Sea Eagle breeds in small numbers (< 30 pairs) in Albania, Greece and Turkey (Mebs & Schmidt 2006) which may be added to the south-eastern subpopulation, leading to a total of breeding pairs close to 700.

Bearing in mind that White-tailed Sea Eagles are highly philopatric (breeding close to their place of birth) (Helander 2003) and that the Danube river system is a superb wintering place for northern eagles, it is important to implement regional measures to conserve and enlarge the White-tailed Sea Eagle subpopulation and its habitats along the Danube. This Action Plan intends to serve as a source for further conservation and research activities, integrating problems and solutions known from all countries along the Danube.

Figure 1: Map of White-tailed Sea Eagle breeding distribution in Europe. (Illustration: Melanie Weigand. With kind approval of Kosmos Verlag, taken from: Mebs & Schmidt, Die Greifvögel Europas, Nordafrikas und Vorderasiens 2006, Franckh-Kosmos Verlags-GmbH & Co. KG, Stuttgart).

Beside this, the Action Plan considers the role of the White-tailed Sea Eagle as an umbrella and flagship species. Protection measures for it should also contribute to improving the status of several other species characteristic of Danube floodplains, such as Black Stork (*Ciconia nigra*), Purple Heron (*Ardea purpurea*), Pygmy Cormorant (*Phalacrocorax pygmeus*), Dalmatian Pelican (*Pelecanus crispus*) and Glossy Ibis (*Plegadis falcinellus*). Finally, the White-tailed Sea Eagle is also an integrative driver for cross-border and transnational co-operation between protected areas, NGOs and other institutions and stakeholders working for nature conservation.

2. Background Information

2.1. Geographical Scope

This Action Plan addresses White-tailed Sea Eagles breeding during stopovers as well as wintering "along the Danube". We were unable to specify a certain distance from the main river to be called a breeding "Danube eagle"; pairs may fly five kilometres or more to reach their hunting grounds while, on the other hand, closer living pairs may hunt almost exclusively in nearby fish ponds. Therefore, we define "Danube eagles" to be "ecologically dependent" on the river system, i.e. specifically hunting in the Danube and its oxbows, often combined with breeding within the riparian forests. Foremost, this connection is thought to be during breeding time, as even in central Europe (and regularly in the north-eastern part of the continent) eagles may leave their breeding territories to head to large rivers such as the Danube for wintering.

This Action Plan deals solely with the Danube. However, tributaries like the Morava, Drava, Sava, and Tisza are ecologically similar; results and measures proposed in this Action Plan will work for these ecosystems as well. Furthermore, populations do overlap at tributaries like the Danube-Drava. As a whole, this Action Plan may be seen as addressed mainly to "Danube river basin eagles" of the south-eastern Europe, inhabiting the Danube, its alluvial floodplains and its tributaries.

2.2. Distribution and population

The White-tailed Sea Eagle as a breeding bird is distributed in the northern Palaearctic, to date from Scotland (reintroduced) and the Netherlands, Denmark and Germany in the West, to the Russian Far East and Japan. Furthermore, it reaches the Nearctic zone in Greenland (where the possibly valid subspecies *groenlandicus* occurs) and a reintroduction programme is running in Ireland (www.goldeneagle.ie). The world population of the White-tailed Sea Eagle was not summarised in detail, however according to B. Helander (pers. comm.), the current number of territorial pairs may be near 14,000, no less than at least half of it inhabiting Europe (BirdLife 2004). This European population is roughly divided into a north-eastern (foremost Norway, Sweden, Finland, Russia, Poland, and Germany) and a south-eastern subpopulation (Danube river basin countries).

Figure 2 shows a recent overview of the breeding distribution of the species in Danube countries. These data are based on intensive monitoring

activities; however, recently studies to predict current and future spatial distribution by ecological modelling are forced (e.g. Hengl et al. 2009 for Croatia, Krasznai 2011 for Austria). Table 1 gives the number of breeding White-tailed Sea Eagle pairs, subdivided into data for the whole country and pairs ecologically related to the Danube. Data are from 2009 and 2010. For some countries in South-East Europe the importance of the Danube as the backbone of their White-tailed Sea Eagle population and, subsequently, the high relevance of this Action Plan, is inevitable (e.g. Slovakia, Bulgaria, Romania). In other countries such as Austria, Croatia and Serbia, it is not exclusively the Danube but also the tributary rivers which form a habitat network for a high portion of the White-tailed Sea Eagle. As this Action Plan is addressed to "river eagles", it can also be seen as highly relevant for these countries. In Germany, the role of the Danube can be seen as a corridor connecting the large northern European population with the population in the Danube region.

Figure 3 again indicates the importance of the Danube as a breeding and hunting habitat for the respective countries, but also reveals substantial differences. Overall it can be stated that in the more south-eastern countries *relatively* more eagles breed close to the river Danube. While in Germany the mass of eagles breed in the north, with connection to the even larger Polish population, and there are to date no White-tailed Sea Eagles breeding close to the Danube. This value reaches 80% in Bulgaria and even almost 90% in Romania. In the later, the enormous Danube delta is of outstanding importance for the countries' population. In *absolute* numbers, most Danube eagles are to be found in Croatia (57 pairs) and Serbia, followed by Romania and Hungary.

Figure 4 shows the ratio of White-tailed Sea Eagle territory centres along the Danube, situated inside or outside of NATURA 2000 areas. It can be stated that in the more south-eastern countries relatively fewer eagle territories are strictly protected, keeping further in mind, that eagles here are more connected to the Danube (comp. Figure 3).

As a whole, and including six breeding pairs of the Ukrainian part of the Danube delta (M. Gavrilyuk in Probst 2009), to date there are 198 White-tailed Sea Eagle pairs to be viewed as ecologically related to the river Danube. In some regions, such as the Kopački rit wetland in Croatia, breeding densities are the highest that are known worldwide (up to 15 pairs per 10 x 10 km cell; Mikuska 2009). Furthermore, the Danube serves as a superior stop over site for dispersing and migrating eagles as well as an important wintering destination. Ham et al. (1990) show that every eagle wing-tagged in Croatia, regardless of its origin, was seen at least once in Kopački rit.

	Country	Danube	NATURA 2000
Bavaria	6	0	0
Austria	13-15	5	5
Slovakia	8	4	4
Hungary	226	37	31
Croatia	150	57	57
Serbia	90-92	43	32
Bulgaria	10-15	10	4
Romania	37-42	36	20-22
Sum	**540-554**	**192**	**153-155**

Table 1: Recent breeding distribution and numbers of White-tailed Sea Eagle in Danube countries. Data are divided for whole country, Danube, and NATURA 2000 areas along the Danube. Note that the large German population (630-660 Breeding pairs) does not belong to the South-East Europe population, therefore only Bavaria is taken into consideration. In Croatia there is a NATURA 2000 proposal (www.natura2000.hr), and in the non-EU member state of Serbia, Important Bird Areas (candidate status for Special Protected Areas) were taken instead of NATURA 2000 areas.

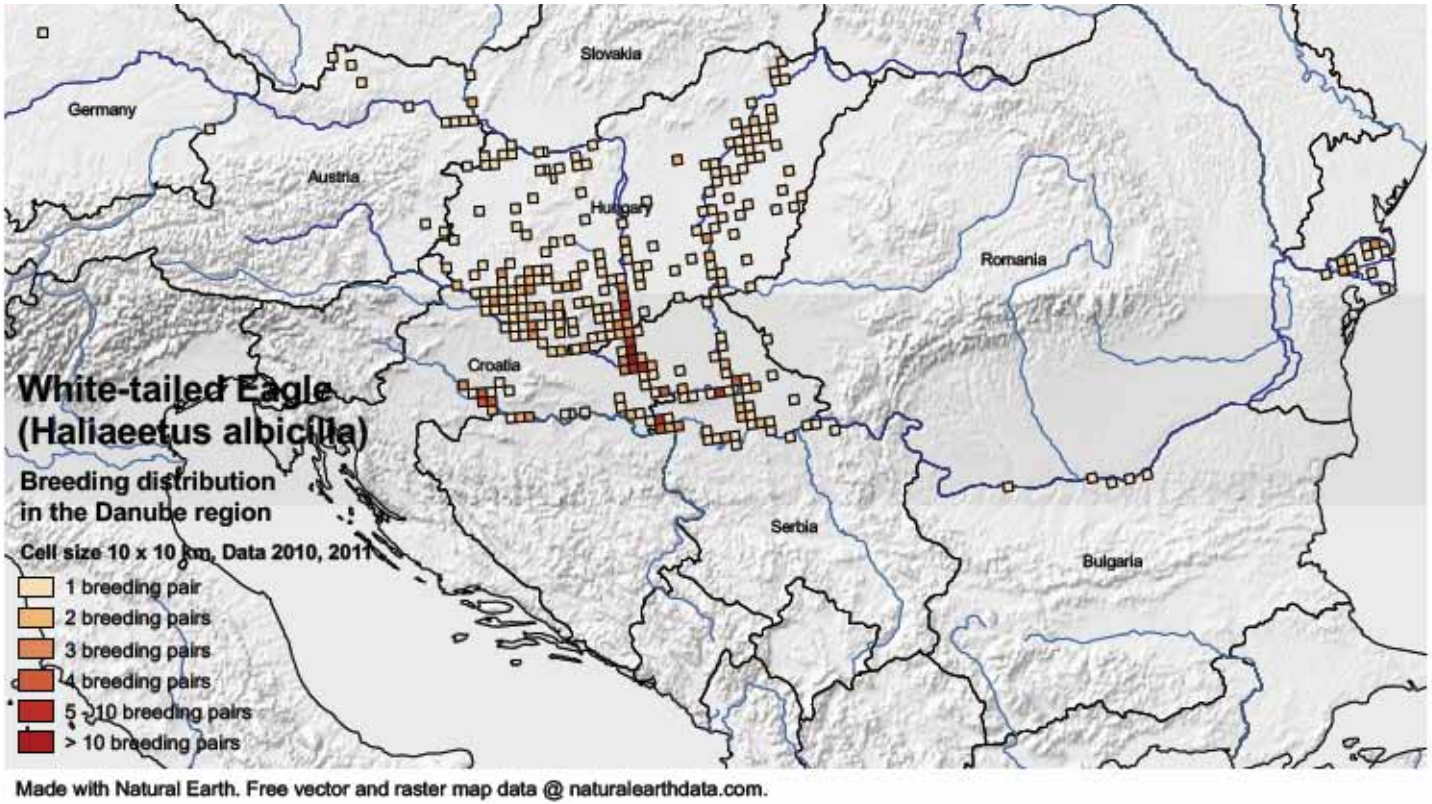

Figure 2: Breeding distribution of White-tailed Sea Eagle in countries along the Danube.
(Base: White-tailed Eagle database: www.danubeparks.org)

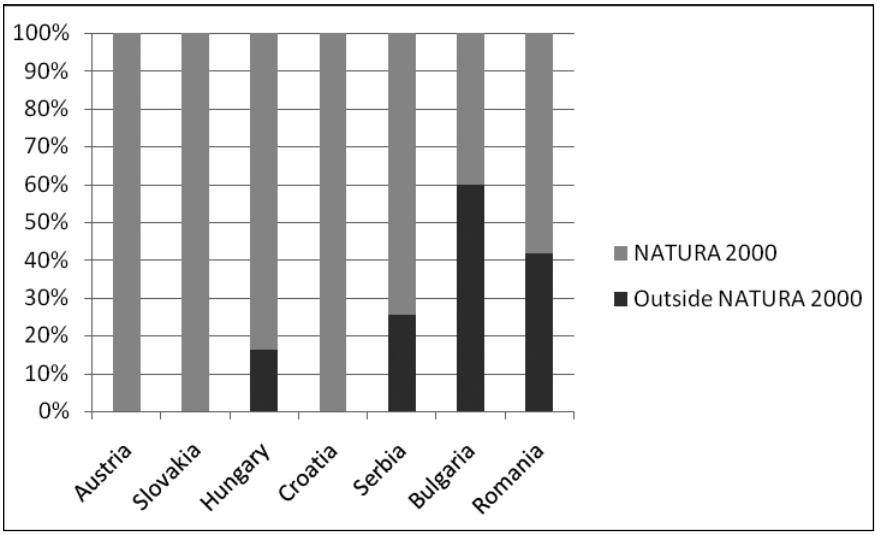

Figure 3: Ratio of White-tailed Sea Eagles breeding along the Danube and within Danube countries.

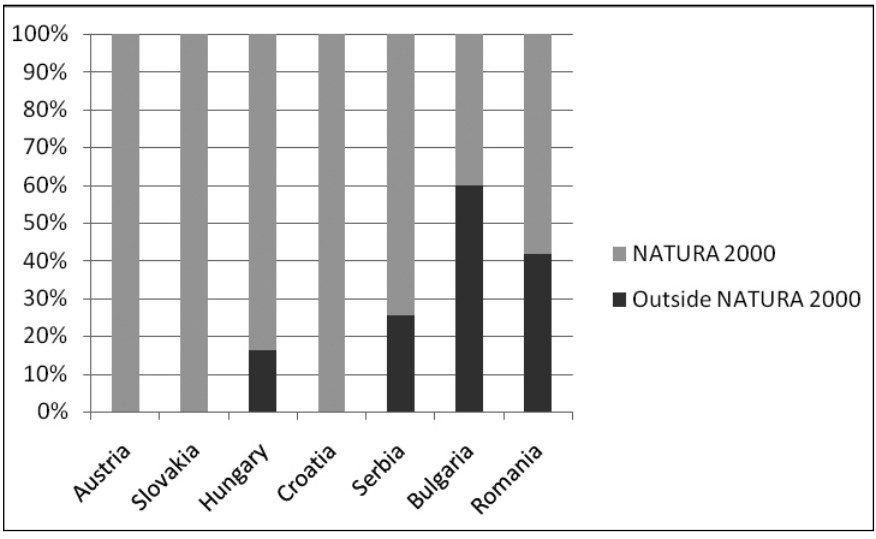

Figure 4: Ratio of White-tailed Sea Eagles breeding along the Danube inside and outside NATURA 2000 areas. In Croatia there is a NATURA 2000 proposal (www.natura2000.hr), and in the non-EU member state of Serbia, Important Bird Areas (candidate status for Special Protected Areas) were taken instead of NATURA 2000 areas. In Germany, no eagle pairs breed along the Danube.

The numbers stated above are up-to-date values; however, it should be noted that White-tailed Sea Eagles have recovered in these countries during the last few decades or even in last few years. In the second half of the 20th century

many species-specific monitoring activities were done and, therefore, we have a detailed impression of the comeback of the species. This intensified monitoring may have influenced the change of discovery of (new) pairs; however, the increase in the White-tailed Sea Eagle breeding population is a widely accepted fact. Figure 5 shows as an example the recovery of the species in the Danube countries of Austria, Bulgaria and Slovakia.

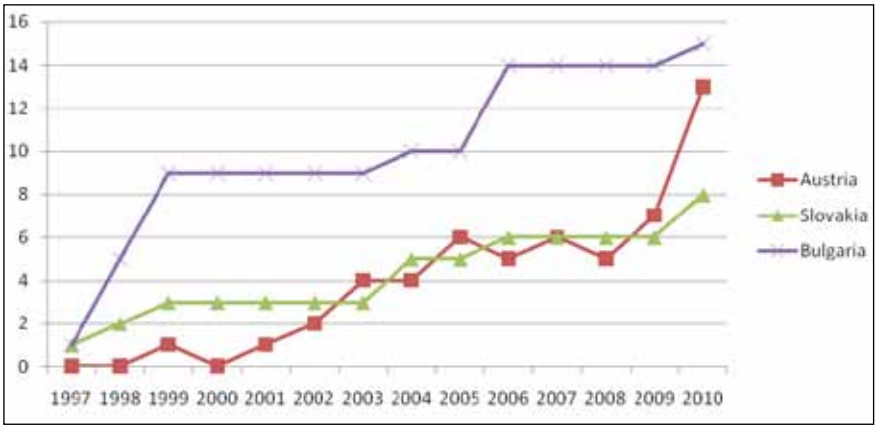

Figure 5: Recovery of White-tailed Sea Eagle as a breeding species in the second half of the 20th century, illustrated by population trends in Austria, Bulgaria and Slovakia.

In the times before this phase of intensive monitoring, information on population development is limited and may be summarised as follows:

Bavaria: In the federal state of Bavaria breeding in the 19th century is not fully proven (reviewed by N. Model, manuscript). The (re-)colonisation of Bavaria started in the mid 1990s at a military training area in the north-east of the state. Since then two more pairs have established territories and are breeding successful. A total of about four breeding pairs and two additional territorial pairs constitute the Bavarian White-tailed Sea Eagle population (H.-J. Fünfstück, via O. Krone). The perspective is promising since overwintering pairs have been seen in the area of the Lech-Danube region and elsewhere.

Austria: In Austria, the Danube was apparently of outstanding importance in the 19th century, where three to four pairs were known. After heavy persecution the White-tailed Sea Eagle disappeared almost completely from the country (within today's borders) and only single broods are known until the 1940s and 1950s, all along the Danube. The next breeding attempt was 1999 in the Morava river system. For a detailed description see Probst & Peter (2009).

Slovakia: In this country, breeding of the White-tailed Sea Eagle ceased during 1964. Formerly the species was, as once again, roughly divided into a western Danube and Morava population and breeding pairs in the easternmost part of the country (Bohuš et al. 2009).

Hungary: In Hungary the White-tailed Sea Eagle was never completely extinct. However, the population rapidly decreased from the 1950s and in the 1970s the absolute low was reached. Horváth (2009) reported that for the whole country only 10-12 pairs were thought to breed at that time.

Former Yugoslavia: In the former Yugoslavia no countrywide population development is known, although good data exist for Kopački rit. Mikuska (2009) reports that 20 pairs were known in 1878 as well as in 1885, and roughly the same number in 1943; however, by 1976 only 11 pairs could be found. Serbia and Croatia installed monitoring groups as early as 1985 and 1986, respectively. At the end of the first investigation period from 1985 to 1991, 23 active and 13 potential territories were known in Serbia, and 57 active and 17 potential pairs were known in Croatia (Hám et al. 2009).

Bulgaria: At the beginning of the 20th century the species was breeding along the Danube and other large rivers as well as on the Black Sea. After 1930 a sharp decline started and by 1985 only one breeding pair was left (Ivanov 1985). In the 1990s it began to increase gradually, with fluctuating rates to roughly one pair each year. Most of the new pairs appeared in the areas where the species used to breed. Currently the population of White-tailed Eagles is 10-15 breeding pairs and the trend of the population can be evaluated as increasing (Todorov 2007).

Romania: Historical data from 80-90 years ago show the regular breeding of the White-tailed Eagle as well as other different raptor species for the South-East of Romania. Similar to Bulgaria, starting in 1930 the total number all raptors decreased dramatically, most probably because of intensive shooting. Therefore, between 1964-1967 only 32 nests with twelve eggs in total were counted in Romania. Due to the ongoing decrease, between 1980-1982 only seven couples and occupied nests were found in the country, out of which 4 flying nestling resulted. Today we estimate a population of 25-30 pairs for Romania (D. Bandacu, pers. comment).

Finally, population recovery ran more or less in parallel for Danube countries as a whole and the respective Danube river section in particular. This is illustrated in Figure 6 for Austria and in Figure 7 for Slovakia. However, in countries like Hungary the eagle populations advanced more apart from the Danube due to habitat availability (Figure 8).

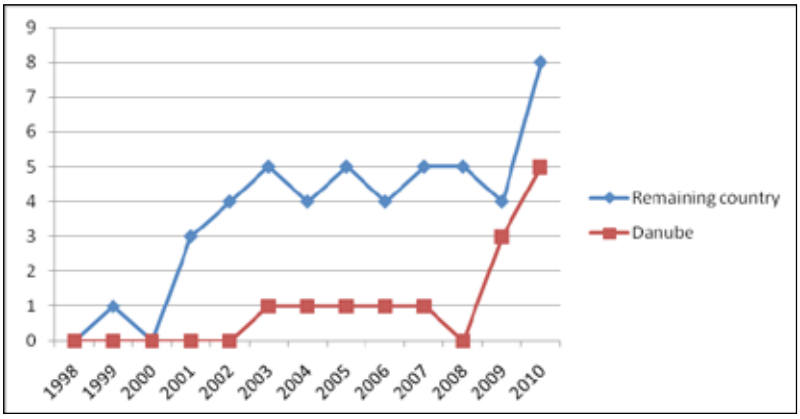

Figure 6: Recovery of White-tailed Sea Eagle breeding population in Austria, showing the whole country and the Danube section itself.

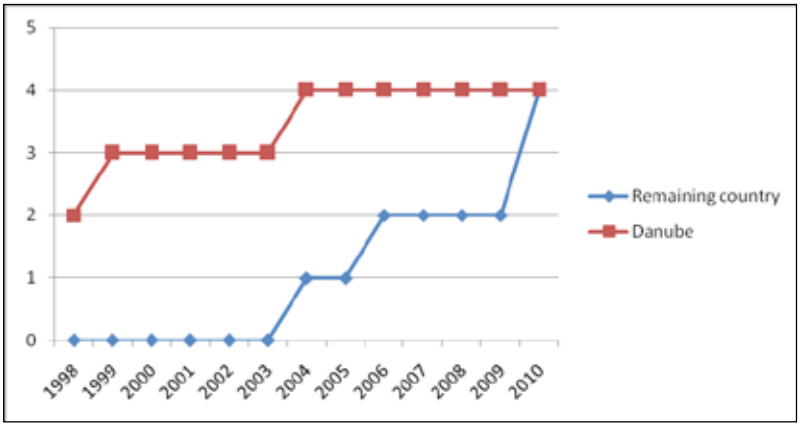

Figure 7: Recovery of White-tailed Sea Eagle breeding population in Slovakia, showing the whole country and the Danube section itself.

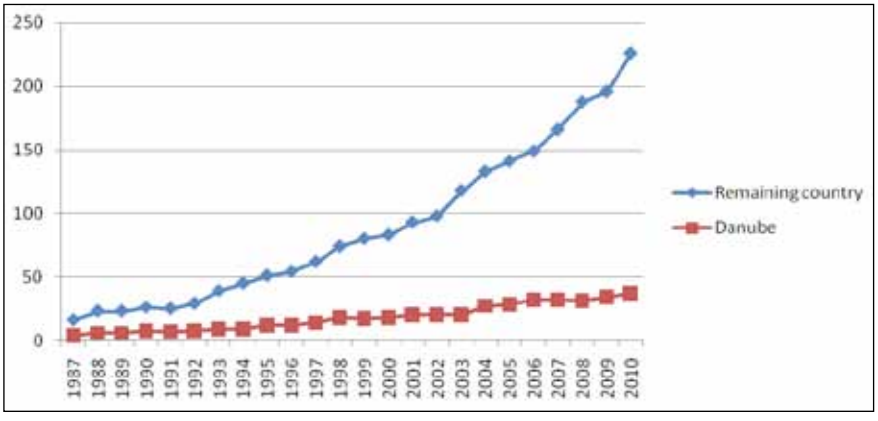

Figure 8: Recovery of White-tailed Sea Eagle breeding population in Hungary, showing the whole country and the Danube section itself.

2.3. Conservation Status

The White-tailed Sea Eagle enjoys high ranking protection statuses in most international conventions:

BirdLife International (2004): *SPEC I, Rare* – European species of global conservation concern.

Global IUCN Red List Category (IUCN 2010): *Least Concern*.

EU Wild Birds Directive (2009/147/EEC): *Annex I* – Species to be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution.

Washington Convention (CITES): *Appendix I* – Trade in specimens of this species is permitted only in exceptional circumstances.

Bonn Convention: *Appendix I* – Endangered migratory species and *Appendix II* – Migratory species to be the subject of agreements.

Bern Convention: *Appendix II* – Strictly protected species.

Table 2 gives an overview of the conservation status of the White-tailed Sea Eagle in Danube countries. In all countries but Germany the species is considered as endangered (VU, EN, CR) in the Red Data books; Serbia does not have such a status list.

In all countries there are often long-lasting programmes of monitoring and conservation for this species. Projects are run by different organisation (working groups, BirdLife, WWF, etc.) and are partly of transboundary character (e.g. Croatia and Hungary). Certain activities such as synchronised winter counts are already multi-lateral in part (e.g. Austria, Czech Republic, Slovakia, and Hungary).

Most countries have different versions of nest protection zones; however, as stated by the contributors, these are in practice often poorly enforced. Radiuses where forestry and human disturbance during breeding are not allowed are dissimilar (e.g. 300 m in Bulgaria and Germany, 400 m in Hungary, and 500 m in Croatia) which holds true for penalties for killing a White-tailed Sea Eagle or destroying a nest site (e.g. €5,530 in Croatia, €500 in Bulgaria).

Table 2: Conservation status of White-tailed Sea Eagle in Danube countries.

	Red Data Book	Highest National Authority	Nest Protection Zone	Penalties Killing / Nest Destruction	National Project / Working Group	Main Protection Measures
Germany	LC	Federal states ("Bundesländer")	300 metres	Fine and temporary confiscation of hunting licence	National monitoring of breeding pairs by Peter Hauff; diseases and mortality by Leibniz-Inst. for Zoo- and Wildlife Research, several working groups in different Federal States of Germany (e.g. Projektgruppe Seeadlerschutz Schleswig-Holstein)	Monitoring of breeding pairs by local eagle guides, research on lead poisoning by Leibniz-Inst. for Zoo- and Wildlife Research
Austria	CR	Provincial Government ("Bundesländer")	Temporary protection zones (e.g. Burgenland, Salzburg: 5 years; Lower Austria: 20 years) possible in some provinces, on voluntary basis, financed by forestry-environment funds	Fine and temporary confiscation of hunting licence	Run by WWF Austria since 1999	Monitoring (breeding and winter), Anti-Poison Campaign and Public Awareness
Slovakia	CR	Ministry of Environment	According to *ad hoc* order of competent District Office of Environment (after consultation with expert – zoologist from regional competent body of State Nature Conservancy of Slovak	According to valid law fine €4,315.2-*€17,260.8 (*in SPA more than 300%, according to amended law) for bird or egg. No cases. Other cases (e.g. clear-up of poisoning cases, till now without	Activities of NGOs (Raptor Protection of Slovakia), Regional Association for Nature Conservation and Sustainable Development (BROZ), specialised body "Danube" of Slovak Union	Breeding (since 1997) and wintering population (since January 2003, only the Danube river; and data obtained during winter waterfowl census) monitoring, construction of artificial nests, ringing,

	Red Data Book	Highest National Authority	Nest Protection Zone	Penalties Killing / Nest Destruction	National Project / Working Group	Main Protection Measures
			Republic or independent expert in zoology/ornithology/conservation biology) restriction of *ad hoc* defined human (mostly forest management) activities within 300-500 m radius of active nest (during locally defined breeding season)	White-tailed Sea Eagle victims) never completed. No/weak execution of existing laws.	of Nature and Landscape Protectors. National Species Action Plan (elaborated in 2005, but not actualised; Chavko, manuscript).	and securing breeding places against forest management activities; feeding in winter (1990s – Danube river and Orava reservoir)
Hungary	CR	National Inspectorate for Environment, Nature and Water	A 100 m radius all year round, 400 m radius in breeding period	Offence against nature, governed by criminal law. Courts are competent	Yes, since 1987, launched by BirdLife Hungary	Monitoring (breeding and winter population); Maintain contact with land owners; Information and publicity
Croatia	VU breeding population	Directorate for Nature Protection, Ministry of Culture	500 m around nest during breeding period (1 Jan – 15 July) prescribed and enforced in Kopacki rit Nature Park.	Fine of 40,000 kn (€5,530) per individual bird	Public Institution Kopacki rit Nature Park enforce monitoring of breeding population in Kopacki rit, and supervision of implementation of legislation of nature protection and protection of White-tailed Sea Eagle as well. Joint transboundary working group of Croatian Society for Bird and Nature	Monitoring (breeding and wintering) key areas, practical protection measures enforced by relevant protected areas or county nature protection management offices. Limited public awareness (e.g. Brodsko-posavska county nature protection management office published calendars for 2011 based on ringing project).

	Red Data Book	Highest National Authority	Nest Protection Zone	Penalties Killing / Nest Destruction	National Project / Working Group	Main Protection Measures
					Protection and Danube-Drava National Park, Hungary.	Kopacki rit Nature Park enforces Regulations on Internal Order which prohibits all activities within 500 metres of all nests during breeding period (1 Jan-15 July). Also enforce monitoring of White-tailed Sea Eagle breeding population
Serbia	Not existing	Government of Republic of Serbia	None	Fine	National monitoring 1985-1992 and starting from 2006 till today	Nest and nesting site conservation, prevention of disturbance, prevention of killing, save injured birds
Bulgaria	VU	Ministry of Environment and Water	Radius of 300 m for all human activities, March-July	Fine – €500	Yes, since 2004 run by the BSPB/BirdLife Bulgaria	Monitoring of breeding and wintering population; Feeding during winter; colour ringing, public awareness among local people and responsible institutions
Romania	CR	Ministry of Environment	Theoretically in (not well defined) "core areas" of Danube Delta Biosphere Reserve	Confiscation of weapon hunting licence; even prison possible: 3 months-1 year	No	Monitoring (breeding and winter) and Public Awareness; theoretically (nest) guarding in Danube Delta Biosphere Reserve

Protected areas play a key role in the conservation of the White-tailed Sea Eagle. Considering the conservation status of this bird and its inclusion in Annex I of the EU Wild Birds Directive, high numbers of breeding sites on the Danube are covered by NATURA 2000 areas (Table 1), but the coverage by NATURA 2000 is not adequate in all countries (Figure 4).

However, even in NATURA 2000 areas the protection of this species, its nesting places, hunting areas, etc. is sometimes poorly enforced. Thus, protected areas like National Parks, Biosphere Reserves, Nature Parks and Reserves often are key drivers for the protection of the White-tailed Sea Eagle by providing suitable habitats for first re-colonisation (e.g. in Austria in 2001), inhabiting core populations (e.g. the Danube Delta in Romania or Kopački rit in Croatia), acting as best practice for management and implementing specific conservation and monitoring programmes. Considering this leading role, DANUBEPARKS (The Danube River Network of Protected Areas) has started the initiative for this Action Plan.

Box 2: DANUBEPARKS – The Danube River Network of Protected Areas. In 2009, DANUBEPARKS was established as a platform for continuous transnational cooperation of Danube Protected Areas. DANUBEPARKS develops and implements joint transnational strategies in the field of habitat management, river restoration, conservation of flagship species and nature tourism. URL: www.danubeparks.org

Yet, birds with such wide home-ranges as the White-tailed Sea Eagle cannot be protected exclusively by protected areas. Therefore, this Action Plan refers especially to all stakeholders responsible for nature conservation outside of protected areas.

2.4. Life History

a. Breeding biology

The White-tailed Sea Eagle is a slow-reproducing bird of prey, compensating for a low per year chick production by longevity. Nests are typically built in trees or on cliff ledges but locally also on the ground, as in Greenland, Iceland and Norway. Rarely, pylons are used for nesting. Typically, two or more alternate nests can be found within one home range. Adult eagles are highly faithful to the same territory throughout life. The clutch size usually varies from 1-3 eggs, which are incubated for 35-38 days. The nestling period is 70-86 days, after which fledged juveniles are dependent on their parents for about a further 1-2 months. A recent detailed study of a White-tailed Sea Eagle pair over several years in Bavaria by Müller (2011) revealed an incubation of 37-38 days and a nestling period of 74-89 days. Furthermore

it published for the first time the fact that females also hunted for the nestlings immediately after hatching (comp. Altenkamp et al. 2007). In healthy populations the annual rate of pairs rearing chicks is usually about 60-80% and the nestling brood size reaches 1.2-1.8 juveniles per successful pair; however, this largely depends on food supply (B. Helander, pers. comm.).

These values are reached in most European countries, including all states along the Danube (e.g. Mikuska 2009, Hám et al. 2009b, Probst 2009). Low nestling brood size is especially seen in Swedish Lapland (1.26; Helander 2003a), Greenland (1.3; Wille 2003), and Iceland (1.34 juveniles per successful pair), with only 33% nest success in the latter population (Skarphédinsson 2003). This is thought to be connected to harsh spring temperatures and human interference in Iceland. Breeding may start in the south-eastern part of the Danube as early as January, however, most typically in February in the Danube river system (e.g. Hám et al. 2009).

b. Hunting and prey

White-tailed Sea Eagles are well adapted to catching fish, which is in many regions the predominant prey during breeding. However, from late breeding season until early spring, water birds such as ducks and coots often form a substantial part of the prey base. Especially in winter, eagles often feed on carrion. Furthermore, White-tailed Sea Eagles steal prey from other birds such as Cormorant (*Phalacrocorax carbo*), Osprey (*Pandion haliaetus*), and herons (e.g. O Krone, E. Todorov, pers. comm.).

Deme et al. (2009) analysed 371 prey animals, collected in the Croatian floodplains of the Danube and Sava during late April and early May. About 61% were fish, 21% birds, 16% mammals, and 2% reptiles (exclusively European Pond Turtle (*Emys orbicularis*)). Fish species most often taken were Prussian Carp (*Carassius gibelio*) and Pike (*Esox lucius*); with birds the main prey was Coot (*Fulica atra*) and Pheasant (*Phasianus colchicus*); and in mammals it was Hare (*Lepus europaeus*) and Wild boar piglets (*Sus scrofa*). In some cases, breeding pairs specialised on turtles and animal corpse sites.

c. Habitat

This species inhabits a wide range of habitats, from marine coastal areas in the north, lake and river systems in the forest zone, to floodplains in southern Europe. In some areas, such as parts of Hungary, Serbia and Austria, fish ponds support a substantial part of the breeding population. As with all birds of prey, a sufficient prey base and safe breeding sites are most important (e.g. Newton 1979). For the White-tailed Sea Eagle this often includes highly productive shallow waters, forests or single trees for nesting, and low human disturbance and persecution.

The Danube rises in Germany and, after almost 3,000 kilometres, reaches its delta in Romania and the Ukraine. Up to the Austrian-Slovakian border it is a fast flowing river of alpine character; in the lowlands that follow it broadens and slows down substantially. Subsequently, White-tailed Sea Eagle habitats, such as extended riparian forests and shallow, slow running water bodies, are more frequent to the south-east. Radović & Mikuska (2009) analysed the habitat selection in Croatia and revealed that White-tailed Sea Eagles avoided human settlements (but not as a result of the absence of forests closer to these settlements) whenever possible, and selected water-rich biotopes; 95% of the population breed less than four kilometres from a large water body. Some tree species were preferred for nesting, such as Pedunculate Oak (*Quercus robur*), Narrow-leafed Ash (*Fraxinus angustifolia*), Black Poplar (*Populus nigra*) and White Poplar (*P. alba*) as well as large, mature trees.

d. Migration, dispersion, and homing

In central Europe, adult White-tailed Sea Eagles are usually sedentary and juveniles disperse after becoming independent of parents' care in autumn. However, due to serve winter conditions and the lack of prey, birds from north-eastern Europe are forced to undertake partly long migrations, which may cover more than 2,000 kilometres to central-southern Europe and partly the Danube itself (e.g. Probst 2009). Helander (2003b) showed from data of the international colour-ringing programme that White-tailed Sea Eagles in Sweden had a strong tendency for homing, i.e. breeding close to their birth place.

For further general information see e.g. Glutz von Blotzheim et al. (1989), Mizera (1999), Ferguson-Lees & Christie (2001), and Helander & Stjernberg (2002).

3. Main threats to White-tailed Sea Eagle along the Danube

a. General statement

The Danube and its floodplain is one interrelated ecosystem. As it is the most international river in the world, cross-border co-operation in the field of nature conservation is inevitable. Due to its political, economic and cultural diversity, transnational exchange of know-how and experience has suffered for a long time. Considering the behaviour of the White-tailed Sea Eagle (large home-range, migration to wintering areas, etc.), a joint approach for the monitoring of threats and, subsequently, its conservation are important.

b. Threats worldwide – a comparison to the Danube

The threats worldwide (mainly European countries) were published by Helander & Stjernberg (2002). A general comparison to the threats along the Danube can be seen in Table 3.

The result for the Danube was gathered by scoring the expert-based ratings in Table 4 with "Low" = 1, "Medium" = 2, "High" = 3, "Critical" = 4, "Unknown" = 2, "None" = 0, and "*" = 2, and evaluating average overall threat scores of 0-0.49 as "None existent", 0.5-1.49 as "Low", 1.5-2.49 as "Medium", 2.5-3.49 as "High", and 3.5-4 as "Critical". Results change only insignificantly ("reduction of prey base" would score "Medium") if scoring is analysed using a weight factor according to the population size of a certain country. This weight factor would be 0.001 for Germany (for mathematical reasons, although no breeding currently along the Danube), 0.026 for Austria, 0.021 for Slovakia, 0.193 for Hungary, 0.297 for Croatia, 0.224 for Serbia, 0.052 for Bulgaria, and 0.186 for Romania.

We are aware of statistical uncertainties; however, this procedure served as a simple vehicle to get standardised and repeatable scoring. Further explanations are given in the text.

In summary, it reveals that threat potentials are roughly the same worldwide and along the Danube. White-tailed Sea Eagles are disturbed by human activities and habitats are destroyed as well as fragmented almost throughout its range. Reduction of prey base seems to be a regional phenomenon and nest robbing of no importance in terms of influencing population. However,

it was evident that there is a bigger lack of data/research concerning threats like lead, pesticides and pollutants along the Danube.

	Danube	Worldwide
Forestry	High	High
Land exploitation	Medium	High
River regulation / drainage	Medium	High
Disturbance	Medium	Medium
Reduction of prey base	Low	Low
Shooting and trapping	Medium	Medium
Nest robbing	Low	Low
Poisoning	Medium	Medium
Lead poisoning	Medium	Medium
Pesticides and pollutants	Medium	Medium
Collision and electrocution	Medium	Medium

Table 3: Comparison of threats worldwide and along the Danube.

c. Threats along the Danube

Foremost, the total area of historical floodplain wetlands along the Danube and its major tributaries (Morava, Drava, Tisza, Sava and Prut) was reduced from the 19th century by 80%, from 41,605 km^2 to 7,845 km^2 (UNDP/WWF 1999). This is a very substantial habitat loss for the White-tailed Sea Eagle! The evaluation of other historical threats (up to 1980) is limited because of a lack of data. According to the numbers, Gamauf (1991) showed for Austria that many raptors killed in the second half of the 19th century were not determined at a species level, so the number of White-tailed Sea Eagles killed remains unknown. Direct persecution and the use of biocides were of particular importance, however, the ratio of significance of these threats is not fully understood. Hauff (2009) argued for Germany that the negative effects of biocides like DDT were underestimated. In summary, we know about habitat destruction and strong intentional persecution which, from the mid 20th century, was accompanied by the effects of biocides.

Table 4 gives an expert overview of the recent threats along the Danube, which are discussed in detail below. If there are differences between the Danube section within one country and the whole country, these will be stated.

	DE	AT	SK	HU	HR	RS	BG	RO
Forestry	L	**	C	M	H	M	H	C
Land exploitation	L	M	H	L	L	L	H	L
River regulation / drainage	N	L	M	L	H	L	M	H
Disturbance	L	**	H	M	M	M	H	C

Reduction of prey base	N	N	U	L	L	C	L	M
Shooting and trapping	N	U	C	L	L	L	M	H
Nest robbing	N	N	L	L	L	U	L	L
Poisoning	L	H	C	H	U	L	U	H
Lead poisoning	*	*	U	M	H	U	U	M
Pesticides and pollutants	N	U	U	M	U	M	U	L
Collision and electrocution	L	M	H	M	L	L	U	U

Table 4: Threats to the White-tailed Sea Eagle along the Danube.

Abbreviations:

DE = Germany, AT = Austria, SK = Slovakia, HU = Hungary, HR = Croatia, RS = Serbia, BG = Bulgaria, RO = Romania.

Criteria:

C = *Critical*: could lead to extinction in 20 years or less
H = *High*: could lead to a decline of more than 20% in 20 years or less
M = *Medium*: could lead to a decline of less than 20% in 20 years or less
L = *Low*: effects only at local level
U = *Unknown*: is likely to affect but unknown to what extent
N = *None*: no effects likely
DD = *Data deficient*: potential affects cannot be evaluated due to lack of knowledge

* Comment by Oliver Krone, Germany: "The judgement of lead poisoning on population scale does not fit with IUCN criteria. In Germany every fourth dead White-tailed Sea Eagle found has been killed by lead poisoning from hunting ammunition (see Krone et al. 2009). In some areas, such as Müritz National Park or Nossentiner/Schwinzer Heide Nature Park, lead poisoning amounts to more than 50% of the causes of death in White-tailed Sea Eagle. Modelling the impact of lead poisoning on the German Sea Eagle population suggested a delay of 10 years in reaching the carrying capacity for Germany (see Sulawa et al. 2009)." The same argument holds true (very probably) for Austria.

** Comment by R. Probst, Austria: "To date, most White-tailed Sea Eagles breed in protected areas. However, now they are spreading and, therefore, the impact of forestry and disturbance may increase sharply".

3.1. Forestry

Forestry influences the distribution and reproductive success of the White-tailed Sea Eagle because (a) clearing of mature tree-stands may cause reduced availability of suitable tree stands for nesting and (b) logging, plantation and forest roads (including subsequent use by the public) cause disturbance.

Internationally, the influence of forestry on the habitat quality of the White-tailed Sea Eagle is seen as "Medium to High" (Helander & Stjernberg 2002), and "High" along the Danube. Generally, in forests at lower elevations

and with easy access, the density of forestry roads is higher than at higher elevations. Therefore, the Danube floodplains mostly suffer from a very dense network of forestry roads causing habitat fragmentation and, indirectly, disturbance by human activities. Furthermore, existing laws to minimise negative effects of forestry are often poorly enforced.

On a site-specific level (eagle territories), this threat factor is divided along the Danube between fully protected areas and those which are not. Within highly protected areas, such as national parks, there is no or limited logging and the public can be forced out from sensitive areas like nesting places, which is one of the main advantages of such protection zones for large raptor species like the White-tailed Sea Eagle. In Austria, for example, no case of nest disturbance and subsequent nesting failure is known from high ranked protection zones such as national parks ($n = 53$ breeding attempts; R. Probst, unpubl. data). However, within the areas with lower protection status (nature and regional parks, protected landscapes) forestry is allowed (including intensive management with plantations), causing frequent nesting failures.

Outside protected areas disturbance may be equally high and law execution weak. This is especially important for the White-tailed Sea Eagle as it already starts nesting in February and, therefore, a substantial overlap with the main logging period is given; in addition, eagles often select mature tree-stands such as harvest-intensive (hybrid) poplars (Hauff 2009b, Radović & Mikuska 2009). However, in Croatia (and probably other areas too), logging extends well into the vegetation period and the eagle chick-rearing period (May).

On the landscape level, the minimisation of riparian forests along the Danube will lower the overall carrying capacity for the south-eastern European population. The often carried out parallel river regulations will increase disturbance and lower the prey base for breeding eagles.

3.2. Land exploitation

Land exploitation includes effects such as the building of roads and wind-farms, the establishment of industrial zones, enlargement of settlements, etc.

On the worldwide and European level this threat factor ranks as "Medium to High" in importance (Helander & Stjernberg 2002) and about the same scoring holds true along the Danube.

In the past, especially at the end of the 19th and beginning of the 20th centuries, large scale impacts took place in the Danube floodplains, including loss of floodplain forests, water bodies and inundation areas. At the moment this is generally thought to be of "Medium" importance (with exceptions such as

Slovakia and Bulgaria), especially as contributors see most up-to-date breeding places secured in protection areas. However, having in mind an expanding Danube White-tailed Sea Eagle population, land-use planning seems to be very important for saving and increasing *potential* breeding sites and establishing buffer-zones. Considering the dynamic economic development in South-East Europe, numerous infrastructure projects can be expected in the near future, some of them with a strong influence on habitat quality.

Problems are generated with the loss of wetlands and forested areas used for breeding and hunting. The latter is particularly the case when windfarms are built. This may lead to collisions (Krone 2003, Krone et al. 2009, Bevanger et al. 2010) or, as shown by Walker et al. (2005) in the Golden eagle (*Aquila chrysaetos*), to avoidance of the area and hence to a minimisation of foraging grounds. 3% of White-tailed Sea Eagles found dead in Germany are killed by windfarms (Krone et al. 2009).

In general, much of south-eastern Europe is no longer suitable for the White-tailed Sea Eagle and, therefore, the saving and restoration of potential habitats is of outstanding importance. According to the modelling of Radović & Mikuska (2009), no more than 3% of the area of Croatia is potentially suitable for the breeding of the White-tailed Sea Eagle. This is because of *a priori* inappropriate (mountain) areas, but in the flat, water-rich lowlands largely because of destroyed and fragmented landscapes, and because of disturbance.

3.3. River regulation and drainage

Although in general seen to be of outstanding importance, in both the international (Helander & Stjernberg 2002) and Danube countries ranking, river regulation is evaluated very differently. Table 3 shows a gradient in the ranking of the expected impact of river regulation. In the Upper Danube, which is suffering most from the alterations of the past, the process of river restoration is seen as a positive perspective for the future. In comparison to that, in the Lower Danube (still in much better morphological condition) more negative influence from river regulation is expected in the next few years. Taking into consideration the alterations of the past, river regulation has to be seen as one of the main negative factors on floodplain habitats – the total area of historical floodplain wetlands of the Danube and its larger tributaries was reduced by 80% (!) (UNDP/WWF 1999). For example, in Austria the potential riparian forest of the Danube would be 833 km^2; however, only 34% of it is left (Haidvogl et al. 2009). Nowadays, following the EU Water Framework, Habitat and Bird Directives, the focus on the Danube is more and more on the ecological perspective of river engineering, showing a wide range of planned and implemented river restoration projects. However, actual navigation projects (TEN-T) in different phases of the planning process,

could have dramatic impacts on river morphology and habitat quality in the long-term (Schneider-Jacoby 2005, Egger et al. 2010). The implementation of these activities may cause not only disturbance to White-tailed Sea Eagle breeding sites, but more importantly, they are causing river bed incision, lowering of surface and groundwater levels, hydrological disruptions between the river and its floodplain, loss of spawning areas and finally succession of wet depressions and marshes, i.e. the loss of appropriate feeding habitats and therefore the loss of necessary habitats requisite for successful breeding. Destroying floodplains may further force White-tailed Sea Eagles into fish farm areas where the potential conflict between human economic activities and nature conservation is much higher.

Therefore, a joint participation process is crucial to avoid negative consequences for the habitats of White-tailed Sea Eagle, as expressed by the International Commission for the Protection of the Danube River (ICPDR) in the Joint Statement on Guiding Principles for the Development of Inland Navigation and Environmental Protection in the Danube River Basin (ICPDR, Danube Commission & ISRBC 2007) , Danube River Basin District Management Plan (ICPDR 2009) or "Platina Manual" (ICPDR, VIA DONAU, BOKU & INE 2010).

Finally, plans to build new hydropower dams on the Danube river have to be judged very critically, having mostly direct negative influence on the habitat capacity for the White-tailed Sea Eagle.

3.4.. Disturbance

Apart from forestry (as discussed above), disturbance factors can be manifold such as canoeing, hiking, fishing, hunting, photographers, bird-watchers, camping, etc. Contributions from Helander & Stjernberg (2002) as well as experts of this Action Plan ranked this threat factor as "Medium"; however, it was agreed that disturbance is especially disastrous at nesting sites. In accordance with forestry and hunting, experts argue that although in many countries nest protection zones exist, they are often not enforced. In Croatia for example, hunting of Wild Boar is allowed throughout the year. Supplemental feeding of game animals and collecting Red Deer antlers in February and March are the main culprits for nesting failures due to egg cooling (T. Mikuska, pers. comm.).

In addition, studies of the White-tailed Sea Eagle on the river Elbe in Germany revealed a conflict between perching trees and human disturbance. Conflicts exist between bicycle trails and walking path on both sides of the river Elbe and perching trees used by eagles for hunting. Because the trails

have been built direct under those trees the eagles are always scared away by approaching humans (O. Krone, pers. comm.).

3.5. Reduction of prey base

In most countries experts do not see the lack of prey as a threat to White-tailed Sea Eagle populations. The species is a versatile hunter, taking fish, birds, mammals and carrion as well. On an international level (Helander & Stjernberg 2002), in particular the northernmost populations (such as in Greenland) seem to be affected by the over-exploitation of fish resources and bird colonies. Changes in the prey base have also become a matter of concern in recent years in the Baltic Sea (B. Helander, pers. comm.). In south-eastern Europe, the closing of commercial fish ponds is thought to regionally have a high ranked influence (Schneider-Jakoby 2003, Mikuska 2009; comp. Table 4), however, this is mostly for eagles not ecologically dependent on the Danube.

Data are largely missing for the assessment of prey base development; however, results from the long-term International Waterbird Census (Delany et al. 1999) suggest that among main avian prey taxa, Mallard (*Anas platyrhynchos*) have decreased in Central Europe and the Black Sea/East Mediterranean, Tufted Duck *(Aythya fuligula*) increased in those regions, and Common Coot (*Fulica atra*) showed a stable trend. The Great Cormorant (*Phalacrocorax carbo*) increased at least in the Black Sea/East Mediterranean region.

T. Mikuska (pers. comm.) argues that during the last two decades, Bean Geese (*Anser fabalis*) shifted their wintering grounds further north into Poland (numbers in Kopacki rit decreased from 10-50,000 individuals down to a couple of hundred), but this decrease was partly supplemented by the increase of the Greylag Goose (*Anser anser*) population and remaining wintering White-fronted Geese (*Anser albifrons*). These statements are in general confirmed for Bulgaria by E. Todorov (pers. comm.). However, apart from the numbers of wintering geese, from the White-tailed Sea Eagle point of view it is more important that goose hunting is substantially reduced, thus lower numbers of crippled and sick animals are available. However, possible reduction of the prey base during winter is highly outweighed by the emergence of White-tailed Sea Eagle winter feeding programmes across the Pannonian plain. These programmes would particularly benefit the survival rate of immature and inexperienced birds and aid to the general breeding population increase. Of course, in feeding programmes prey without contamination of e.g. lead can be provided.

Concerning fish prey, for certain regions like the Danube stretch in Slovakia, a negative influence on prey base is strongly suspected because of massive,

industrial fish poaching in combination with the reduction of the absence of natural water regime for the Gabčikovo dam system (M. Bohuš, pers. comm.).

This threat factor is strongly interlinked with other threats like 3.1 land exploitation, which could limit the availability and accessibility of food especially in the surrounding of the Danube floodplain, 3.4 disturbance, which could reduce the accessibility to food and, finally, 3.3 river regulation, which could reduce the productivity of fish in the long-term (e.g. Zweimüller 2000). Also the unclear influence of the planned increase of inland water navigation has to be stressed, considering disturbance to waterfowl and higher mortality of juvenile fish caused by waves as possible negative impacts.

3.6. Shooting and trapping

The (intentional) killing of White-tailed Sea Eagles by shooting and trapping is thought to still be a serious problem, at least in some of the Danube countries. This species reproduces slowly and are, therefore, dependent on longevity. Moreover, experts argue that the scientific community is likely to be informed only of the tip of the iceberg, having in mind that hunting activities are particularly poorly managed in some countries (Schneider-Jacoby & Spangenberg 2010).

There are no indications that White-tailed Sea Eagles are more heavily pursued along the Danube itself than in other parts of the Danube countries; more likely fully protected zones such as national parks are of outstanding importance for conservation. Probst (2009) argued that none of the eagles known to have been shot or trapped in Austria (about $n = 40$) was killed in a protected area.

3.7. Nest robbing

Nest robbing is given no significant threat potential by experts today. Apparently, illegal egg collecting is of no more widespread interest and illegal harvesting for raptor exhibitions, falconry, etc. is limited. The official trade in White-tailed Sea Eagles or "products" from the wild has been constantly low during the last 25 years (UNEP-WCMC trade data; A. Ranner, pers. comm.).

3.8. Poisoning

The killing of White-tailed Sea Eagles by poison is still widespread and thought to be a major problem in many of the Danube countries. Probst (2009) showed that after 1980 the killing by Carbofuran was the major cause of death in Austria and most likely the same is true in neighbouring Hungary (Horváth 2009). Although Carbofuran has been banned within the EU

since December 2008 (2007/416/EU; B. Kohler in Probst et al. 2009), large residual amounts and alternative poisonous substances are available.

Poisoning is not a problem of the immediate Danube area itself, but is more common in the open landscapes, rich in game like Brown Hare (*Lepus europaeus*). Probst (2009) reveals that none of the approximately 20 known White-tailed Sea Eagles killed in Austria by Carbofuran was found directly on the river Danube. However, eagles are nevertheless under threat as they have very large home ranges, regularly heading to agricultural areas to feed on mammals and carrion. Furthermore, the recent increase and expansion of the Jackal (*Canis aureus*) population in the Pannonian plain has triggered hunters to place poisonous baits (T. Mikuska, pers. comm.).

3.9. Secondary poisoning from lead ammunition

Generally, lead ammunition is banned in wetlands in Germany (ten federal states), Slovakia, Hungary, Bulgaria, and will be banned in Austria in 2012 for hunting waterfowl. The assessment of the importance of the factor of lead poisoning is divided in countries which lack scientific data and the statement of O. Krone (Germany), who pointed out that modelling the impact of lead poisoning on the German Sea Eagle population suggested a delay of ten years in reaching the carrying capacity for this country (Sulawa et al. 2009). Subsequently, the use of IUCN criteria is somewhat misleading in this case, as lead poisoning is obviously an important potential death threat but will on the other hand not cause a decline of the White-tailed Sea Eagle in the next 20 years.

In general, investigations are missing in many countries. Furthermore, the current policy in some states was not considered to have solved the situation, such as Germany and Austria, who aim to ban lead ammunition for waterfowl hunting in water-rich areas like the Danube but not in the open landscape when hunting other game like the often taken prey Brown Hare.

3.10. Secondary poisoning from pesticides and pollutants

Impaired reproduction because of secondary poisoning from substances like DDT and PCBs was the main threat to European White-tailed Sea Eagle populations from the 1950s to the 1980s (Helander & Stjernberg 2002). Today, the productivity of eagles in most areas, including the whole Danube, is well above necessary levels for maintaining stable populations. Kenntner et al. (2003) showed for Germany no critical levels for DDT, DDE, HCH, HCB and PCBs; however, many "new" pollutants like surfactants and new generation pesticides are yet to be investigated (O. Krone, pers. comm.).

Therefore, although these "old" substances are thought to be a minor threat recently, it is necessary to remember that the potential danger is still high and data are lacking for many regions, including almost all countries of South-Eastern Europe.

3.11. Accidental killing by collision and electrocution

The evaluation of this factor for the Danube countries revealed a mix of answers, from "Low" to "Medium" importance and many unknown effects. This may be seen partly because data are missing and, on the other hand, specific local problems like dangerous railway sections, windfarms, and (medium voltage) power lines. Krone et al. (2009) reported for Germany a high total number of eagles killed by collision with trains, cables and cars as well as killed by electrocution (24% of all deaths). Helander & Stjernberg (2002) argued that this "Low" to "Medium" importance threat will potentially increase to a high ranked mortality factor as landscape fragmentation augments in parallel. However, in Sweden, killing by trains has increased and was the most common death-cause in 2000-2007 (Helander et al 2009b). No specific investigations, e.g. concerning the crossing of power lines over the Danube, are available so far. The increasing number of wind farms across Pannonian plain should be viewed with caution (see Bevanger et al. 2010).

3.12. Climate

In addition to the eleven threat factors evaluated so far, climate change (of growing interest in ornithology) should be addressed here too. Huntley et al. (2008) simulated in a "good" fit model the future distribution of the White-tailed Sea Eagle to be much reduced in extent and shifted eastwards and, to a lesser extent, northwards. Most of the present range of the White-tailed Sea Eagle is simulated as no longer suitable. However, mechanisms such as impaired reproduction caused by a rainier climate in Greenland (Helander & Stjernberg 2002) are unknown for the Danube region.

However, changes in the water regime of the Danube are expected due to climate change, showing long-lasting low water conditions and shorter periods of stronger floods. Subsequently, this could lead to changes in food conditions or increased disturbance due to higher accessibility of landscape.

3.13. Lack of knowledge

Finally, one serious threat factor is the lack of knowledge itself as it will hinder specific conservation activities. Most often, direct (shooting, poisoning, etc.) and indirect (lead, pesticides, etc.) mortality factors are important for understanding population ecology in Danube countries; in part, other

aspects in certain areas are insufficiently known, such as the prey base for the White-tailed Sea Eagle. Moreover, future infrastructure (river regulation, navigation projects, hydropower plants, windfarms, fragmentation, etc.) and executive activities (nest protection zones, banning lead, etc.) are in part speculative and changeable.

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The White-tailed Eagle is one of the most fascinating and impressive bird species. Thus, and its role as top predator qualifies the White-tailed Eagle as flagship species for habitat conservation on a transnational scale.

Facing the key role of Protected Areas for the conservation of the White-tailed Eagle in the Danube region, DANUBEPARKS – The Danube River Network of Protected Areas initiated the transnational process for the elaboration of this Action Plan.

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Natural river dynamics is the key factor for the Danube river ecosystem. The deep impact of hydro morphological alterations in the present and past has caused a strong decline of floodplain areas in the last century and induces a direct as well as a long-term reduction of the habitat quality.

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The Danube river is the backbone for the White-tailed Eagle population in South-East Europe. The habitat of the White-tailed Eagle is a diverse mosaic, including water bodies, old growth forest stands and open areas.

© Duna-Drava National Park

Older trees in large complexes of old growth forests provide suitable nesting sites for the White-tailed Eagle

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Intensive forestry has been identified as serious threat in all Danube countries. Beside long-term negative influence on the forest structure and age composition, also direct disturbance at the nesting sites can have negative influence on the breeding success

© Danube Delta Biosphere Reserve/Bandacu

In areas with lack of suitable nesting trees, artificial nests can aid population increase and can "guide" White-tailed Eagles to secure breeding areas

A minimum of one nestling per territorial pair is to ensure the long-term viability of White-tailed Sea Eagle populations along the Danube and its role as source populations.

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The food composition in territories in the Danube region is dominated by fish and waterfowl. At present, the reduction of prey base is not seen as main threat, however, suitable feeding conditions has direct influence on the breeding success.

© Oliver Krone/Leibniz Institute for Zoo- and Wildlife Research

Lead intoxicated White-tailed sea eagle with fragments of a conventional lead-based rifle-projectile. For Germany, lead intoxication is identified as the most frequent cause of death, while the know-how on the impact of lead ammunition is still poor in the Danube region.

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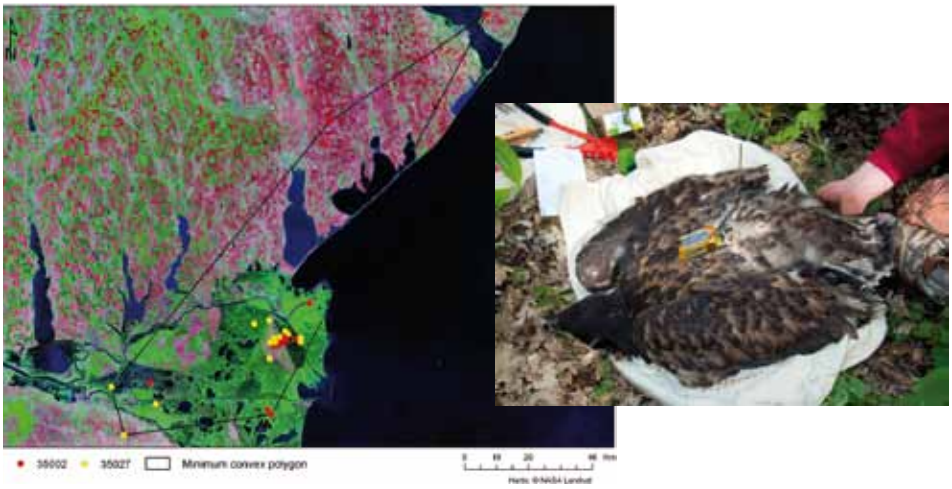
In the Upper Danube countries illegal poisoning is identified as relevant negative impact on the White-tailed Eagle.



© Danube Delta Biosphere Reserve/Dan Bandacu

Innovative tools for research and monitoring like satellite telemetry delivers important basic data on habitat use, inevitable for concrete conservation actions. This map shows for the Danube Delta the dispersal and habitat use of fledged White-tailed Eagles.

The transnational White-tailed Eagle embedded in www.danubeparks.org, is a milestone for data and know-how exchange between the Danube countries.

4. Action Plan Goal and Objectives

4.1. Goal

The goal of this Action Plan is to secure a viable population of the White-tailed Sea Eagle along the Danube. Through national action and international co-operation, White-tailed Sea Eagle habitats are to be secured and major man-made threats are to be eliminated.

The Danube is to be protected as the backbone for White-tailed Sea Eagles in South-Eastern Europe, acting as a source breeding subpopulation as well as an important wintering place for eagles coming from the north-east of the continent.

The saving of the flagship and umbrella species White-tailed Sea Eagle along the Danube should be a best practice example for transnational conservation of species and habitats. Based on the recovery of this species, transnational co-operation of stakeholders should be built up.

4.2. Objectives

This Action Plan includes 37 objectives which are grouped under eight general headings, namely organisation, legislation, monitoring, habitat conservation, protection, research, rehabilitation, and evaluation:

Organisation

In the past, co-operation between Danube countries was limited and even individual countries have to date no specific White-tailed Sea Eagle projects and Action Plans. Therefore, on the organisational level the following objectives are to be ensured:

Objective 1: To establish national White-tailed Sea Eagle projects which elaborate national Action Plans, carry out monitoring and research activities, and serve nationally as well as internationally as the institution in charge.

Objective 2: To establish a White-tailed Sea Eagle working group for the Danube, ensuring a transnational conservation approach.

Objective 3: To install a Danube-wide database for data concerning the monitoring and conservation of the White-tailed Sea Eagle.

Objective 4: To ensure information exchange between governments, stakeholders, and the public concerning research results, especially including population development and threat potentials, as well as exchange of scientists.

Legislation

One of the major problems for the development of the White-tailed Sea Eagle population in Danube countries are non-existing, diverging, and poorly enforced laws. The following objectives are addressed to the Danube countries in general, not specifically to the Danube section itself.

Objective 5: To force governments to implement existing laws, especially to standardise and implement nest protection zones within the Danube countries.

Objective 6: To standardise legislation, especially to change the White-tailed Sea Eagle from hunting law (solely) to nature conservation law were necessary.

Objective 7: To help to ban any legal killing of any raptor species within the Danube countries (to date the killing of a certain number of Common Buzzards, *Buteo buteo*, and Northern Goshawks, *Accipiter gentilis*, is allowed in Austria).

Objective 8: To totally ban the use of lead ammunition (not only in waterfowl hunting as already implemented in some countries).

Objective 9: To totally ban the use of and traffic in poison, in particular Carbofuran and rodenticides.

Objective 10: To standardise action against electrocution and collision with power lines.

Objective 11: To standardise evaluation protocols of windfarm projects and to evaluate buffer/tabu zones.

Monitoring

Monitoring is the major basis for obtaining data on population development and health. Specifically addressing the Danube itself, the following objectives can be stated.

Objective 12: To conduct joint Danube-wide synchronised winter counts of White-tailed Sea Eagles.

Objective 13: To monitor the breeding population along the Danube.

Objective 14: To monitor threats and death causes within Danube countries.

Objective 15: To continue or join the international colour-ringing programme.

Habitat conservation

The above mentioned objectives are more useful for saving White-tailed Sea Eagle individuals *per se*; in this sub-point the conservation and the enlargement of the habitats along the Danube is the main focus.

Objective 16: To save the Danube river dynamic by preventing river regulation and incision projects and implementing river restoration on a large scale.

Objective 17: To enlarge the network of suitable habitats and protection zones for the conservation of the White-tailed Sea Eagle.

Objective 18: To enlarge existing protection zones.

Objective 19: To enlarge strictly protected zones within already existing protected areas along the Danube, especially dedicated for the protection of the White-tailed Sea Eagle.

Protection

Under this heading we want to summarise concrete activities as well as threshold values to be conducted and reached.

Objective 20: To ensure mean annual breeding success necessary for source populations.

Objective 21: To ensure successful annual breeding rate of a minimum of 60%.

Objective 22: To ensure strict obedience to nest and habitat protection zones of 100 m radius.

Objective 23: To ensure strict obedience to disturbance-free protection zones of 300 m radius during the breeding season.

Objective 24: To ensure strict obedience to 3,000-m "no-go" zone from nests to harmful infrastructure projects.

Objective 25: To technically improve existing power lines within 3,000 m of nests.

Objective 26: To decrease the density and use of forest roads in White-tailed Sea Eagle habitats.

Objective 27: To establish winter feeding sites where appropriate.

Objective 28: To establish artificial nests in areas with a lack of nesting possibilities.

Research

The above mentioned research activities are a minimum necessity to get information on the development of the White-tailed Sea Eagle populations. Herein, we focus on projects suitable to give deeper insights in this and related topics.

Objective 29: To study the home range size and dispersal of the White-tailed Sea Eagle.

Objective 30: To study age structure and philopatry of White-tailed Sea Eagle subpopulations.

Objective 31: To model White-tailed Sea Eagle population developments and habitats.

Objective 32: To conduct studies on lead, pesticides and pollutants.

Objective 33: To conduct further studies on life history aspects.

Objective 34: To evaluate effects of conservation activities for White-tailed Sea Eagle on other characteristic floodplain species to learn more of its role as flagship species.

Objective 35: To study diseases in the White-tailed Sea Eagle.

Rehabilitation

Injured White-tailed Sea Eagles are found on a regular basis. It is important to treat the birds in a professional (veterinary) way.

Objective 36: To ensure rehabilitation of wounded and poisoned White-tailed Sea Eagles through professional (veterinary) treatment.

Evaluation

Measurements to save and improve the White-tailed Sea Eagle population along the Danube have to be evaluated on a regular basis.

Objective 37: To ensure evaluation of measurements taken for the White-tailed Sea Eagle on a regular basis.

5. Actions required for achieving the Goal and Objectives

To fulfil the goal and the objectives of this White-tailed Sea Eagle Action Plan, specific activities have to be undertaken. These activities are stated in Table 5 to Table 12; the Tables are structured as follows (from left to right):

- Objective: The objectives are formulated; these are identical to 4.2.
- Rationale: This sub-point evaluates why the implementation of a certain objective would make sense in conservation work for the White-tailed Sea Eagle.
- Geographical scope: This addresses to which geographical area the objective is of foremost importance. In particular it is divided into "Danube-wide" and "Each individual Danube country".
- Priority and timeframe: This points out in what timeframe an objective has to be reached and if the objective is of "High" (within three years/ permanent), "Medium" (ten years) or "Low" priority.
- Indicator of success: This sub-point clarifies when implementation of a certain objective can be called successful.
- Mainly addressed to: Here organisations are listed which are most likely responsible for the implementation of a certain objective (EU, governments, NGOs, protected areas, etc.)

Table 5: Organisation actions for White-tailed Sea Eagle conservation work in Danube countries.

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
Objective 1: To establish national White-tailed Sea Eagle projects which elaborate national Action Plans, carry out monitoring and research activities, and serve nationally as well as internationally as the institution in charge.	National projects are the core unity to ensure specific, decentralised, and up-to-date conservation activities.	Each individual Danube country.	High priority, short-term action, i.e. within three years.	Each Danube country establishes national White-tailed Sea Eagle project for monitoring and conservation, and produces and implements a national White-tailed Sea Eagle Action Plan. Funding is ensured.	NGOs (BirdLife, WWF, etc.) protected areas and governments to ensure sustained base for financing
Objective 2: To establish a White-tailed Sea Eagle working group for the Danube, ensuring a trans-national conservation approach.	Danube-wide White-tailed Sea Eagle working group is the necessary basis for international co-operation and conservation activities.	Danube-wide.	High priority, short-term action, i.e. within three years.	Establishment and financing of Danube-wide, trans-boundary White-tailed Sea Eagle working group. Each country delegates at least one member to working group. Regular (biannual) meetings.	Protected areas, DANUBEPARKS, NGOs (BirdLife, WWF, etc.); plus governments as well as the EU to ensure sustained financing.
Objective 3: To install a Danube-wide database for data	Only archiving and exchange of data in a common database	Danube-wide.	High priority, short-term action, i.e. within three years.	Common, computer based data collection, especially including monitoring data	Danube White-tailed Sea Eagle working group, and

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
monitoring and conservation of the White-tailed Sea Eagle.	will guarantee international monitoring, research, and conservation activities.		Establishment of database is in progress, see www.danube-parks.org; financial resources for sustained maintenance are necessary.	and indicators of threats. No necessity for storage of coordinates of individual nest sites and/or restricted data access. Data delivery on regular basis is ensured.	governments as well as EU (financing).
Objective 4: To ensure information exchange between governments, stakeholders and public concerning research results, especially including population development and threat potentials, as well as exchange of scientists.	Information needs to be spread not only within experts but also to governments, stakeholders and the public. High relevance for cross-border and transnational know-how transfer and experience exchange.	Danube-wide.	High priority, short-term action, i.e. within three years.	Information system on regular basis, best realised by national person in charge and Danube-wide newsletter (at least once per year). White-tailed Sea Eagle conferences at least on a five year basis. Establishment of a Danube-wide White-tailed Sea Eagle web page for dissemination, etc., ensure regular (once per year) delivery of information to governments, officials and stakeholders. Careful information about actual nesting sites.	National White-tailed Sea Eagle projects and Danube White-tailed Sea Eagle working group, and governments as well as EU (financing).

Table 6: Legislation actions for White-tailed Sea Eagle in the Danube

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
Objective 5: To force governments to implement existing laws, especially to standardise and implement nest protection zones within Danube countries.	Although all Danube countries have existing laws, especially concerning nest protection, these are poorly enforced.	Each individual Danube country.	High priority, short-term action, i.e. within three years.	Implementation of nest protection zones, but also execution of existing laws concerning illegal hunting, illegal trade, etc.	NGOs (BirdLife, WWF, etc.), national White-tailed Sea Eagle projects and Danube White-tailed Sea Eagle working group, and governments (execution).
Objective 6: To standardise legislation, especially to change the White-tailed Sea Eagle from hunting law (solely) to nature conservation law were necessary.	In many countries or regions the White-tailed Sea Eagle is still situated within hunting law which is illogical as well as hinders financing by nature conservation authorities.	Each individual Danube country.	Medium priority, medium term action, i.e. within ten years.	Convey the White-tailed Sea Eagle from hunting to nature conservation law.	NGOs (BirdLife, WWF, etc.), national White-tailed Sea Eagle projects and Danube White-tailed Sea Eagle working group, and governments (execution).
Objective 7: To help to ban any legal killing of any raptor species within the Danube counties (to date the killing of a certain number of Common	There are no serious reasons to kill birds of prey; raptors do not harm public maintenance. If killing of more common species is allowed, rare species	Austria	High priority, short-term action, i.e. immediately.	Stop legal killing of raptors.	NGOs (BirdLife, WWF, etc.), Danube White-tailed Sea Eagle working group, and government of Lower Austria (execution).

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
Buzzards, *Buteo buteo*, and Northern Goshawks, *Accipiter gentilis*, is allowed in Austria).	like White-tailed Sea Eagle might be misidentified and killed as well.				
Objective 8: To totally ban the use of lead ammunition (not only in waterfowl hunting as already realised in some countries).	Lead is harmful to White-tailed Eagles as shown in many studies (e.g. Krone et al. 2009). Lead poisoning may kill eagles and delay population development.	Each individual Danube country and EU.	High priority, short-term action, i.e. within three years.	Ban of use of lead ammunition. As a minimum, Danube itself serves as pilot area.	NGOs (BirdLife, WWF, etc.), national White-tailed Sea Eagle projects and Danube White-tailed Sea Eagle working group, and governments (execution).
Objective 9: To totally ban the use of and traffic in poison, in particular Carbofuran and rodenticides.	Deliberate and accidental poisoning is a significant source of mortality of White-tailed Sea Eagle and other raptors in the Danube basin.	Each individual Danube country and EU.	High priority, short-term action, i.e. within three years.	Ban Carbofuran and related substances in all Danube countries within three years.	EU, governments, and NGOs.
Objective 10: To standardise action against electrocution and collision with power lines.	White-tailed Sea Eagles, being large birds, are especially prone to electrocution and collision with power lines.	Each individual Danube country.	High priority, short-term action, i.e. within three years.	Governments implement standardised action against electrocution and collision with power lines. Implementation based on	NGOs (BirdLife, WWF, etc.), national White-tailed Sea Eagle projects and Danube White-tailed Sea

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
				proposal of national White-tailed Sea Eagle Action Plan, itself based on international recommendations (e.g. Haas & Schürenberg 2008). As a minimum, Danube itself serves as pilot area.	Eagle projects and Danube White-tailed Sea Eagle working group, and governments (execution).
Objective 11: To standardise evaluation protocols of windfarm projects and evaluate buffer/tabu zones.	Windfarms have the potential to kill White-tailed Sea Eagles as shown in various studies. Although birds are in general protected by diverse laws, no obligatory standard evaluation protocol exists (including e.g. methods of investigation, safety distances, etc.).	Each individual Danube country.	High priority, short-term action, i.e. within three years.	Governments implement standardised action against collision with windfarms. Implementation based on proposal of national White-tailed Sea Eagle Action Plan, itself based on proposal of Danube White-tailed Eagle working group. As a minimum, buffer/tabu zones for the Danube itself are standardised.	NGOs (BirdLife, WWF, etc.), national White-tailed Sea Eagle projects and Danube White-tailed Sea Eagle working group, and governments (execution).

Table 7: Monitoring actions for White-tailed Sea Eagle in Danube countries.

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
Objective 12: To conduct joint Danube-wide synchronised winter counts of White-tailed Sea Eagles.	White-tailed Sea Eagles are wide-ranging and partly fly daily between countries. Therefore, only synchronised censuses can find true number of wintering individuals.	Danube-wide.	High priority, short-term action, i.e. within three years.	Implementation of synchronised winter count, using standardised methods and raising know-how by information exchange/training/workshops run by Danube White-tailed Sea Eagle working group.	National White-tailed Sea Eagle projects and Danube White-tailed Sea Eagle working group. Furthermore, organisers of International Waterfowl Count, to which co-operation should be given. EU (financing of organisation and transport costs).
Objective 13: To monitor the breeding population along the Danube.	Monitoring breeding success and distribution is essential for understanding population dynamics.	Each individual Danube country.	High priority, short-term action, i.e. within three years.	Implementation, expansion, and continuation of breeding monitoring, covering the whole Danube.	National White-tailed Sea Eagle projects and Danube White-tailed Sea Eagle working group (database). Governments and EU (financing).
Objective 14: To monitor threats and death causes within Danube countries.	Monitoring threats and death causes is very important for	Danube-wide.	High priority, short-term action, i.e. within three years.	Gathering data in common database for conservation activities. Uncover potential differences between the	National White-tailed Sea Eagle projects and Danube White-tailed Sea Eagle working

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
	deciding on conservation activities.			country and its stretch of Danube.	group (database). Governments and EU (financing).
Objective 15: To continue or join the international colour-ringing programme.	Colour-ringing is an important tool for data on survival, recruitment, dispersion, migration, etc.	Each individual Danube country.	High priority, short-term action, i.e. within three years.	Start or continue colour-ringing White-tailed Sea Eagle chicks within framework of international programme run by B. Helander, Sweden. For the Danube region, training by experts of Danube White-tailed Sea Eagle working group.	National White-tailed Sea Eagle projects. Governments and EU (financing).

Table 8: Habitat Conservation actions for White-tailed Sea Eagle in Danube countries.

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
Objective 16: To save the Danube river dynamic by preventing river regulation and incision projects and implementing river restoration on a large scale.	Due to floods, a dynamic river provides feeding grounds and safe breeding sites.	Each individual country and Danube-wide.	High priority action, i.e. permanently	Danube flood dynamic not (additionally) reduced.	National White-tailed Sea Eagle projects, Danube White-tailed Sea Eagle working group, NGOs (e.g. Important Bird Areas of BirdLife) and governments and EU.

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
Objective 17: To enlarge the network of suitable habitats and protection zones for the conservation of the top predator White-tailed Sea Eagle.	As evaluated in this Action Plan, White-tailed Sea Eagles are best conserved in protected areas.	Each individual country and Danube-wide.	High priority, long term action i.e. within twenty years.	Save most important White-tailed Sea Eagle habitats along the Danube. Improve habitats by restoration of floodplain forests and wetlands/polder areas; development of buffer/tabu zones three kilometres from windfarms; co-operation due to cross-border protection zones.	National White-tailed Sea Eagle projects, Danube White-tailed Sea Eagle working group, NGOs (e.g. Important Bird Areas of BirdLife) and governments and EU.
Objective 18: To enlarge existing protection zones.	White-tailed Sea Eagles are best conserved in protected areas.	Each individual country and Danube-wide.	Medium priority, medium term action, i.e. within ten years.	Enlarge at least one existing protected area per Danube country.	Partners of the Danube River Network of Protected Areas. Governments and the EU (financing).
Objective 19: To enlarge strictly protected zones within already existing protected areas along the Danube, especially dedicated for the protection of the White-tailed Sea Eagle.	White-tailed Sea Eagles are best conserved in specific protected areas.	Each individual country and Danube-wide.	Medium priority, medium term action, i.e. within ten years.	Implement or improve activities for conservation of White-tailed Sea Eagle, e.g. set up artificial nests, enlarged nest protection zones (process conservation), mark or disassemble power lines, river restoration, etc.	Partners of the Danube River Network of Protected Areas.

Table 9: Protection actions for White-tailed Sea Eagle in Danube countries.

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
Objective 20: To ensure mean annual breeding success necessary for source populations.	Long-term viability of White-tailed Sea Eagle populations along the Danube can only be secured if they act as source populations.	Danube-wide.	High priority, continuous.	A minimum of 1.0 nestlings per checked territorial pair.	Governments, protected area managers and landowners.
Objective 21: To ensure successful annual breeding rate of a minimum of 60%.	Annual nesting failures below 40% would ensure long-term viability of the population.	Danube-wide.	High priority, continuous.	Annual nesting failure rates are below 40%.	Governments, protected area managers and landowners.
Objective 22: To ensure strict obedience to nest and habitat protection zone of 100-m-radius.	Nest protection zone prevents disturbance and habitat destruction.	Danube-wide.	High priority, continuous.	Implement protection zones, no trespass and changing of habitat within 100 m; increase in number of nests with successful nest protection.	Governments, protected area managers and landowners.
Objective 23: To ensure strict obedience to a disturbance-free protection zone of 300-m-radius during the breeding season.	Disturbance free zone would prevent nesting failures induced by humans (foresters, hunters, visitors, mushroom or antler collectors, etc.)	Danube-wide.	High priority, continuous.	Implement protection zones, trespass scheduled (e.g. no trespass 1 Jan-15 July), no significant habitat changes (clear-cuts, new forest roads, etc.), local/regional adjustments (e.g. diameter) in	Governments, protected area managers and landowners.

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
				agreement with White-tailed Sea Eagle experts possible; increase in number of nests with breeding success.	
Objective 24: To ensure strict obedience to a 3,000-m-"no-go"-zone around nests to harmful infrastructural projects.	A distance of 3,000 m between nest and infrastructure objects (windfarms, power lines, highways, etc.) would prevent mortality of White-tailed Sea Eagle due to collision, electrocution, etc.	Danube-wide.	High priority, continuous.	No infrastructure projects developed within 3,000 m.	Governments, EU, protected area managers and NGOs.
Objective 25: To technically improve already existing power lines within 3,000 m of nests.	Electrocution and collision are one of the main human induced mortality sources, but can be prevented by technical improvement of power lines.	Danube-wide.	Medium priority, continuous.	Increased number of technically improved power lines and poles.	Governments, EU, protected area managers, companies, and NGOs.
Objective 26: To ensure the decrease of density and use of forest roads in White-tailed Sea Eagle habitats.	A dense network of forest roads causes disturbance at nesting and hunting sites and habitat fragmentation.	Danube-wide.	Medium priority, ten years.	Decrease in number and use of forest roads.	Governments, EU, protected area managers, companies, and NGOs.

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
Objective 27: To establish winter feeding sites where appropriate.	Lack of food during winter increases mortality of immature birds; supplemental winter feeding reduces risk of poisoning and starvation.	Each individual country	Medium priority, continuous.	Feeding places installed where appropriate.	Protected area managers and NGOs.
Objective 28: To establish artificial nests in the areas with a lack of nesting possibilities.	In areas with lack of suitable trees for nesting, artificial nests can aid population increase and breeding pair establishment; probably, White-tailed Sea Eagles can be attracted to secure breeding areas.	Each individual country	Low, continuous.	Artificial nests installed where appropriate.	Protected area managers and NGOs.

Table 10: Research actions for White-tailed Sea Eagle in Danube countries.

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
Objective 29: To study the home range size and dispersal of the White-tailed Sea Eagle.	Understanding home range sizes and dispersal will improve possibility for habitat protection and understanding of mortality factors.	Each individual country and Danube-wide.	Medium priority, medium term action, i.e. within ten years.	Setting up at least one (satellite) telemetry study along the Danube. Special interest for human induced mortality factors, e.g. windfarms close to main breeding and wintering places or migration bottlenecks.	National White-tailed Sea Eagle projects, Danube White-tailed Sea Eagle working group, governments and EU.
Objective 30: To study age structure and philopatry of White-tailed Sea Eagle subpopulations.	Genetic studies can provide data on genetic variation, turn-over at nest sites, philopatry, etc.	Each individual country and Danube-wide.	Medium priority, medium term action, i.e. within ten years.	Setting up at least one genetic study along the Danube and continue/ expand international colour-ringing programme.	National White-tailed Sea Eagle projects, Danube White-tailed Sea Eagle working group, governments and EU.
Objective 31: To model White-tailed Sea Eagle population developments and habitats.	Models might be of great help in discussion of population developments and habitat changes (comp. Sulawa et al. 2009).	Danube-wide.	Medium priority, medium term action, i.e. within ten years.	Setting up at least one modelling project along the Danube (comp. Radovic & Mikuska 2009b, Kraznai 2011). Modelling may include effects of climate change, lead poisoning, windfarms (see e.g. May 2010), etc.	National White-tailed Sea Eagle projects, Danube White-tailed Sea Eagle working group, governments and EU.

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
Objective 32: To conduct studies on lead, pesticides and pollutants.	Many substances like lead, DDT, etc. were shown to be harmful to White-tailed Sea Eagle; data partly lacking.	Each individual country.	Medium priority, medium term action, i.e. within ten years.	Setting up study for evaluation of contamination of White-tailed Sea Eagles along the Danube. Danube White-tailed Sea Eagle working group provides a feasible checklist for toxicological screening routine. Such studies should include investigations concerning sources.	National White-tailed Sea Eagle projects and Danube White-tailed Sea Eagle working group.
Objective 33: To conduct further studies on life history aspects.	Although White-tailed Sea Eagle is a relatively well known species, even basic knowledge is missing in part (comp. e.g. Müller 2011)	Each individual country and Danube-wide.	Medium priority, medium term action, i.e. within ten years.	Countries set activities to answer questions concerning regional aspects such as prey taken, habitat variables, etc.; "conventional" telemetry could be of substantial help for such investigations.	National White-tailed Sea Eagle projects, Danube White-tailed Sea Eagle working group, governments and EU.
Objective 34: To evaluate effects of conservation activities for White-tailed Sea Eagle on other characteristic floodplain species to learn more of its role as flagship species.	As a top predator of aquatic ecosystems, White-tailed Eagle can serve as an important biological indicator species.	Each individual country.	Medium priority, medium term action, i.e. within ten years.	Setting up at least one study evaluating effects of conservation measures dedicated to the White-tailed Sea Eagle on other taxa.	National White-tailed Sea Eagle projects, Danube White-tailed Sea Eagle working group, and governments.

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
Objective 35: To study diseases in the White-tailed Sea Eagle.	Study of diseases will improve understanding of factors being contra productive to positive population development.	Each individual country.	Medium priority, medium term action, i.e. within ten years.	Setting up at least one study concerning White-tailed Sea Eagle diseases. "Pinching off" syndrome would be a candidate.	National White-tailed Sea Eagle projects and Danube White-tailed Sea Eagle working group.

Table 11: Rehabilitation actions for sick, wounded and poisoned White-tailed Sea Eagles in Danube countries.

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
Objective 36: To ensure rehabilitation of wounded and poisoned White-tailed Sea Eagles through professional (veterinary) treatment.	Wounded or poisoned White-tailed Sea Eagles are found on a regular basis. Professional treatment is important.	Each individual country.	High priority, short-term action, i.e. within three years.	The continuation or implementation of rehabilitation centres.	National White-tailed Sea Eagle projects and governments.

Table 12: Evaluation actions for measurements taken for the conservation of the White-tailed Sea Eagle in Danube countries.

Objective	Rationale	Geographical scope	Priority and timeframe	Indicator of success	Mainly addressed to
Objective 37: To ensure evaluation of measurements taken for the White-tailed Sea Eagle on a regular basis.	Only regular evaluation of measurements will show benefits and possible discrepancies for conservation of White-tailed Sea Eagle	Each individual country and Danube-wide.	On the regular basis of five years.	Evaluation report every five years.	National White-tailed Eagle projects, Danube White-tailed Eagle working group, governments and EU.

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Letter of commitment from the directors of the Danube River Network of Protected Areas

DANUBEPARKS
network of protected areas

2nd Steering Committee, 3rd September 2011, Orth an der Donau (Austria)

Letter of Commitment by the Directors of the Danube River Network of Protected Areas concerning the White-tailed Eagle Action Plan

The Danube River Protected Areas play a key role for the conservation of biodiversity, especially for flagship species of large scale habitat complexes in Danube River Floodplains. The International White-tailed Eagle Conference at Illmitz 2007 – the first with focus on Central and South-East Europe - has stressed the leading role of Protected Areas, especially for transnational coordination of the conservation approach along the Danube River.

The Danube River Network of Protected Areas (DANUBEPARKS) has been established as platform for the cooperation of the Danube River Protected Areas, for the development and implementation of transnational nature conservation activities as well as to promote exchange of experience and know-how on the field of nature conservation.

In 2009, DANUBEPARKS started an initiative for the elaboration of the White-tailed Eagle Action Plan for the Danube River, based on the joint approach of numerous Protected Areas and a discussion process including international White-tailed Eagle experts. Therefore, this document has to be seen as a result of the joint work of the Danube Protected Areas in a leading role in cooperation with the Advisory Board of experts of Danube countries.

The White-tailed Eagle Action Plan for the Danube River calls to implement concrete actions for the conservation of this species. As flagship species, conservation actions for the White-tailed Eagle should contribute furthermore to the protection of our joint natural heritage at the Danube as well as to promote transnational cooperation on this sector.

The finalization of the Action Plan has been done within the DANUBEPARKS Task Force Meeting Birds in Persina Nature Park (March 2011). This memorandum is a result of the discussion process under the lead of the Persina Nature Park and it calls to take further steps towards its implementation.

This letter of commitment, signed by the Directors of Danube River Protected Areas represented in the DANUBEPARKS network, is to stress the willingness of these Protected Areas to take over consequently a leading role in the implementation of this Action Plan.

A consistent implementation of the actions proposed by this Action Plan will serve as best practice for the whole ecosystem along the Danube and secure the Danube River and its tributaries as the backbone for the White-tailed Eagle population in the Danube River basin.

[1] PE „Vojvodinašume" signed the willingness statement for the implementation of White-tailed Eagle Action Plan with a remark that certain limitations (technical and economic) that can occur during implementation process has to be considered.

Letter of endorsement from BirdLife International

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Brussels, 7th May 2010
Ref: AC 010 151

Object: Letter of Support for the **DANUBEPARKS White-tailed Eagle Action Plan**

BirdLife International is a global Partnership of conservation organisations that strives to conserve birds, their habitats and global biodiversity, working with people towards sustainability in the use of natural resources. Based on a partnership in more than one hundred countries BirdLife International is a key stakeholder for transnational bird conservation issues.

The White-tailed Eagle is an excellent European flagship species for biodiversity conservation that highlights the need cross-border conservation efforts. Protected Areas play pivotal role as breeding sites for the White-tailed Eagle in the Danube region. The coordination of conservation activities as initiated by DANUBEPARKS – The Danube River Network of Protected Areas is a welcome step towards the establishment of the Danube region as a backbone for further restoration of the White-tailed Eagle population in South-East Europe.

BirdLife International gives full support to this initiative and in particular to the elaboration of the White-tailed Eagle Action Plan for the Danube river, an initiative by DANBUBEPARKS – The Danube River Network of Protected Areas.

This cooperation does not include any financial contribution. BirdLife International is to be listed as official supporter in all publications on the White-tailed Eagle Action Plan by DANUBEPARKS with its logo.

We wish you success in this important initiative,

Angelo Caserta
Regional Director
BirdLife International, European Division

Letter of endorsement from WWF International

WWF International
Danube-Carpathian
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7 March 2011

Re: Letter of Support for the **DANUBEPARKS White-tailed Eagle Action Plan**

On behalf of the WWF International Danube-Carpathian Programme, I would like to express my full support to this initiative and in particular to the elaboration of the White-tailed Eagle Action Plan for the Danube River initiated by DANBUBEPARKS – The Danube River Network of Protected Areas.

The WWF-International Danube-Carpathian is responsible for leading and coordinating WWF's conservation activities across the Danube and Carpathian ecoregions of Central and Southeastern Europe. WWF has been a strong supporter of protected area management in the region, particularly in a trans-boundary context, and is currently providing support to Serbian protected area authorities to participate in the DANUBEPARKS network.

The White-tailed Eagle is an excellent European flagship species for biodiversity conservation that highlights the need for cross-border conservation efforts. Protected Areas play pivotal role as breeding sites for the White-tailed Eagle in the Danube region. At the same time, development of the Action Plan provides a valuable and very practical focus for networking and exchange of know how and experience between the Danube parks, with longer-term benefits in many other areas as well.

This cooperation does not include any financial contribution. WWF is to be listed as official supporter in all publications on the White-tailed Eagle Action Plan by DANUBEPARKS with its logo.

On behalf of WWF, I wish you success in this valuable initiative.

Andreas Beckmann, Managing Director
WWF-International Danube-Carpathian Programme

Remo Probst & Ákos Gaborik

SOUTH EAST EUROPE
Jointly for our common future

DANUBEPARKS
network of protected areas

Programme co-funded by the
EUROPEAN UNION

The White-tailed Sea Eagle is a magnificent bird of prey and, as a top predator of aquatic ecosystems, it is of special conservation concern. Threats to this slow-reproducing raptor are manifold, including habitat destruction, persecution, accidental killing and disturbance.

With about 650 nesting pairs, the Danube river serves as backbone for this South-East European White-tailed Sea Eagle population. This Action Plan seeks to eliminate major man-made threats in this region and to secure a sustainable viable population of the White-tailed Sea Eagle along the Danube. Through transnational co-operation and national action this river should be presevered and developed as source for the breeding subpopulation as well as a wintering place of European wide relevance.

The *Action Plan for the conservation of the White-tailed Sea along the Danube* presents best practice for macro-regional preservation of species and habitats. Based on the recovery of this species, transnational co-operation of stakeholders should be developed.

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