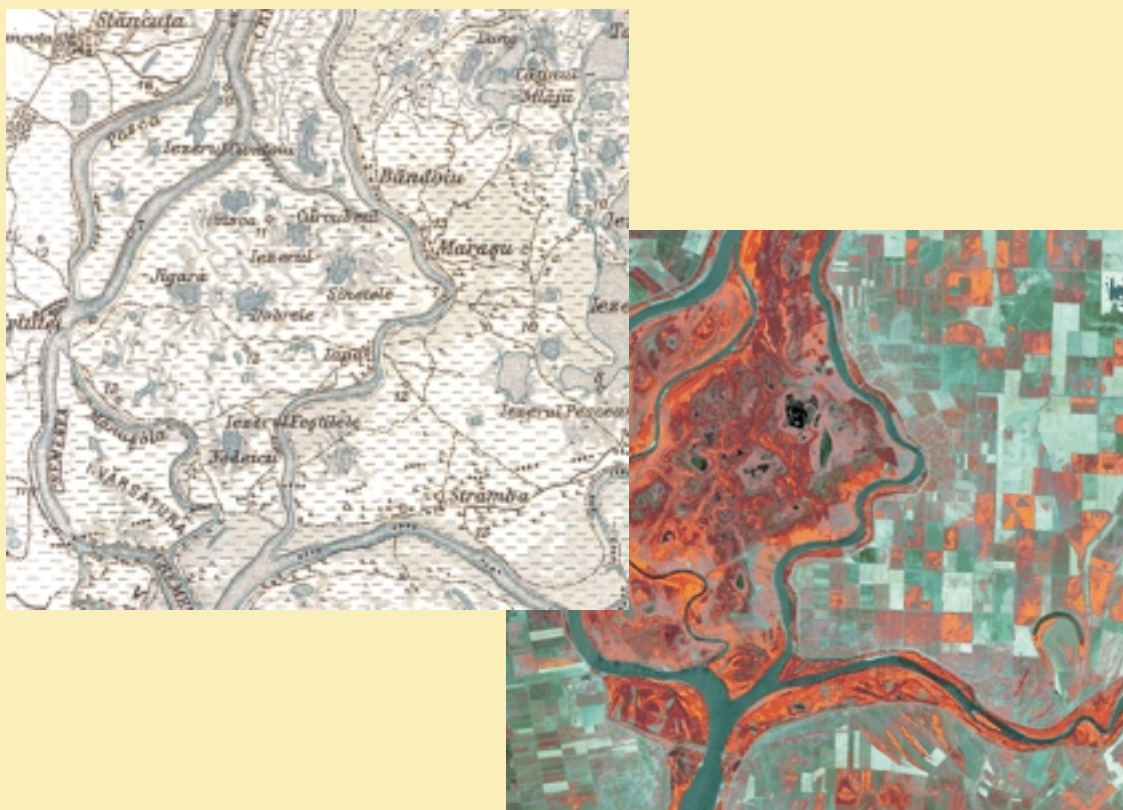


DANUBE POLLUTION REDUCTION PROGRAMME

EVALUATION OF WETLANDS AND FLOODPLAIN AREAS IN THE DANUBE RIVER BASIN

ANNEX
MAY 1999



**Programme Coordination Unit
UNDP/GEF Assistance**

prepared by

**WWF Danube-Carpathian-Programme
and WWF-Auen-Institut (Germany)**



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Site 1.

- **Name of the site:** Floodplain near Ingolstadt
- **Country:** Germany/Bavaria
- **Region/town/community:** Neuburg and Ingolstadt
- **Size of the area:** 1500 ha
- **Site Description:**

The floodplain area upstream of Ingolstadt, between Bergheim and Ingolstadt, represents the largest floodplain forest complex on the Upper Danube with alpine characteristics, indicated by the abundance of grey alder (*Alnus incana*) in a typical oak-elm-hardwood forest. White and black poplar (*Populus alba*, *Populus nigra*) are also represented. The oxbow lakes (big meanders) in the area are rich in water macrophytes. Characteristic of the area are also dry higher elevations, the so-called "Brennen"-sites, with typical life communities.
- **Hydrological Characteristics:**

Changed water and groundwater dynamics due to river regulation and hydropower dams; floodplain severed from the river dynamics.
- **Water Quality:**

Grade II, moderate pollution (see B. WACHS 1997: Zustand und Qualität der Donau)
- **Land Use:**

Small agriculture plots, water supply, energy production, silviculture (including near natural silviculture), nature protection areas (1260 ha)
- **Land Ownership:**

Private, collective and state
- **Responsibility for the area:**

Administration - local and regional Nature Protection authority, town of Ingolstadt; Government of Lower Bavaria; Bayer. Landesanstalt für Umweltschutz; Bayr, Amt für Wasserwirtschaft; Wittelsbacher Ausgleichfonds
- **Additional Contacts:**

Local NGOs
- **Studies concerning the area:**

Impact study "Machbarkeitsstudie Donau-Auen bei Ingolstadt. Auenrenaturierung an der Donau zwischen den Staustufen Bergheim und Ingolstadt" realised by WWF-Auen-Institut Rastatt/Germany; Bayerisches Landesamt für Umweltschutz: Ökologische Zustandserfassung der Flußauen an Iller, Lech, Isar, Inn Salzach und Donau Heft 124 (1992)
- **Restoration Proposals:**

Reconnection of meanders with the river and reestablishment of ecological conditions typical for floodplains; Revitalisation of meanders and run-off channels ("Schluten"); the project may be realised in 3 phases; Improvement of water purity and secure conservation of the floodplain forests

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
1.500	0	1.500	> 75 %	1.125	1.500	113	150	11	15	281.250	375.000

Site 2.

- **Name of the site:** Mouth of Isar/Lower Isar
- **Country:** Germany/Bavaria
- **Region/town/community:** Plattling/Landkreis Deggendorf
- **Size of the area:** 1700 ha
- **Site Description:**

Floodplain with large seasonally flooded forest areas, typical for pre-alpine lowlands with mountain species like grey alder (*Alnus incana*), grey willow (*Salix elaeagnos*), oak (*Quercus robur*), elm (*Ulmus carpiniifolia*), ash (*Fraxinus excelsior*) and others, forest areas partly transformed into poplar plantations; oxbow lakes with rich macrophyte vegetation, meadows with typical floodplain meadow species.
- **Hydrological Situation:**

Natural water dynamics, groundwater dynamics; the floodplain is partly separated from the river dynamics and influenced only by groundwater level changes.
- **Water Quality:**

Moderate pollution (after B. Wachs 1997)
- **Land Use:**

Forestry (including near natural forestry), agriculture (arable lands), extensively used meadows, 855 ha of nature reserve areas
- **Land Ownership:**

Private (WWF Germany owns a small floodplain forest area in the region), communities and state propriety
- **Responsibility for the area:**

Nature protection authority Landkreis Deggendorf, Regierung von Niederbayern, Bayerisches Landesamt für Umweltschutz München, Bayerisches Amt für Wasserwirtschaft
- **Additional Contacts:**

Local NGOs, Bund Naturschutz Bayern
- **Studies concerning the area:**

Bayerisches Landesamt für Umweltschutz: Ökologische Zustandserfassung der Flußauen an Iller, Lech, Isar, Inn Salzach und Donau Heft 124 (1992)
- **Restoration Proposals:**

Exemplary small scale forest restoration areas on WWF-owned areas, establishment of near-natural flood regime in the damaged part of floodplain; reconstruction of dykes

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
1.700	400	1.300	50–75 %	650	975	65	98	7	10	162.500	243.750

Site 3.

- **Name of the site:** Drösinger Wald
- **Country:** Austria
- **Region/town/ community:** Drösing, Sierndorf, Waltersdorf
- **Size of the region:** 3000 ha
- **Site Description:**

Floodplain situated south of the mouth of Dyje into the Morava with large floodplain forest areas, especially hardwood forests with oak (*Quercus robur*) and ash (*Fraxinus angustifolia ssp. danibialis*), partly separated from the river dynamics, part of the Ramsar Site 'Donau-March-Thaya-Auen'
- **Hydrological Situation:**

Only a part of the floodplain is under the regulated flooding regime, the other part of the floodplain is separated from the river dynamics and is only under the influence of changing groundwater levels
- **Water Quality:**

Moderate pollution
- **Land Use:**

Forestry, small arable lands, meadows
- **Land Ownership:**

Private, community
- **Responsibility:**

Local and regional authorities for forestry and agriculture, local forestry co-operatives, state water authority
- **Additional Contacts:**

Distelverein, Wasserstrassen-Direktion, local and regional stakeholder panels, local NGO's
- **Studies concerning the area:**

Wasserwelt March-Thaya-Auen, Martha Report on River Restoration, Trilaterales March-Thaya Konzept, Ramsar Concept Morava-Dyje
- **Restoration Proposals:**

Proposal to lower the banks of the river along some sections to facilitate the flow of the river
- **Additional Remarks:**

Overall restoration plan for the Austrian portion of the Morava-Dyje floodplain has been prepared in the framework of the LIFE Project 'Wasserwelt March-Thaya-Auen', and a second LIFE project with actual restoration measures has recently been commenced.

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
3.000	800	2.200	50 – 75 %	1.100	1.650	110	165	11	17	275.000	412.500

Site 4.

- **Name of the site:** Floodplain near Strážnice
- **Country:** Czech Republik
- **Region/town/community:** Strážnice
- **Size of the area:** 2.200 ha
- **Site Description:**

Floodplain area with fields, meadows and floodplain forest area in the southern part of the region near Straznice. The width of the eastern part is up to 3km and the western part is not more than 0.5km wide.
- **Hydrological Situation:**

Large areas of the floodplain are separated from the river dynamics. A high water dam exists on the eastern portion. A stretch of the river approximately 10km long is not controlled by dams but the most important tributary (Becva) has a dam in the upper reaches.
- **Water Quality:**
- Moderate pollution
- **Land Use:**

Arable land, small structured agriculture, including small remnants at the natural floodplain. Settlements exist on the higher land. There are hardwood forests. The former floodplain at Straznice was converted in 1968 to agricultural fields.
- **Land Ownership:**
- State, with some private.
- **Responsibility:**

Povodi Moravé Brno, Regional Nature Protection Authorities
- **Additional Contacts:**

Local NGOs
- **Studies concerning the area:**

There exists a number of studies including a restoration proposal from the University of Olumove.
- **Restoration Proposals:**

Measures for flood protection in strong relation with ecological restoration of the area have been developed.
- **Additional Remarks:**

Needs clarification with the local and regional authorities.

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
2.200	200	2.000	50 - 75 %	1.000	1.500	100	150	10	15	250.000	375.000

Site 5.

- **Name of the site:** Gemenc-Kopacki Rit
- **Country:** Hungary, Croatia, Serbia
- **Region/town/community:** Gemenc/Mohács area (Hungary); Batina, Osije (Croatia), Apatin (Serbia);
- **Size of the area:** 250,000 ha
- **Site Description:**

Large, regularly flooded areas with typical floodplain forests (soft and hardwood), and dynamic habitats depending on the water dynamics, seasonally large temporarily dry areas with typical floodplain pioneer habitats and possibilities for natural regeneration of softwood forests (white willow); old river branches with water macrophytes and typical floodplain meadows, large areas with reeds.
- **Hydrological Situation:**

Large areas under near natural water dynamics, smaller parts separated from the river dynamics; in the Gemenc area problems with bed deepening (bed erosion)
- **Water Quality:**

Moderate pollution, reed belts have a high filtering capacity and are very important for the improvement of the water quality
- **Land Use:**

Forestry, agriculture with arable lands, meadows, grazing areas, hunting, large protected areas in the recent floodplain
- **Land Ownership:**

State, local and regional communities, small private
- **Responsibility:**

Authorities of nature protection, authorities for agriculture and forestry
- **Additional Contacts:**

Kopacki Rit Nature Park, Gemenc-Beda National Park, local communities, local NGOs
- **Studies concerning the area:**

Floodplain Rehabilitation Gemenc Main Report and sub-reports, Program Obnove I Sanacije Općine Blue
- **Restoration Proposals:**

Reconnection of old river branches in the Gemenc area and south of Mohács in Hungary; in the Serbian part the dams are near the river and in the former floodplain there are few small settlements; possibilities for restoration exists in this area, but depends on the situation and the structure of the settlements in the former floodplain
- **Additional Remarks:**

This territory has a very high ecological value and forms an important part of the network of green corridors along the Danube.

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
250.000	70.000	180.000	25 - 50 %	45.000	90.000	4.500	9.000	450	900	11.250.000	22.500.000

Site 6.

- **Name of the site:** Mouth of Drina/Sava
- **Country:** Yugoslavia and Bosnia-Herzegovina
- **Region/town/ community:** Raca (Yugoslavia)
- **Size of the area:** 10,000 ha
- **Site Description:**
Large floodplain areas with 70-80% of floodplain forests in the Northern part of the Sava river; in the Southern part a mosaic of forests, meadows and arable lands
- **Hydrological Situation:**
Near natural river dynamics in the recent floodplain; in the Southern part of the area the dams are near the river, in the Northern part of the Sava river the floodplains are larger.
- **Water Quality:**
Moderate pollution
- **Land Use:**
Agriculture (arable lands, meadows), forestry.
- **Land Ownership:**
State, private
- **Responsibility:**
Authorities for water, agriculture, forestry and nature protection at local, regional and national levels
- **Additional Contacts:**
Local NGOs
- **Studies concerning the area:**
- **Restoration Proposals:**
Reconstruction of dykes, restoration of former floodplain areas with improvement of the ecological situation for the parts of floodplain forests separated from the river dynamics, restoration of the filtering capacity in the floodplain and improvement of the water quality
- **Additional Remarks:**

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
60.000	10.000	50.000	25 - 50 %	12.500	25.000	1.250	2.500	125	250	3.125.000	6.250.000

Site 7.

- **Name of the site:** Mokro Polje
- **Country:** Croatia
- **Region/town/community:** Bosgradiska
- **Size of the area:** 12,400 ha
- **Site Description:**

Large floodplain area with more than 50% of floodplain forests, white willow forests and hardwood forests with oak and ash, open land such as fields and floodplain meadows; oxbow lakes with water macrophytes;
- **Hydrological Situation:**

Parts of the floodplain are separated from the river dynamics and influenced only by groundwater changes
- **Water Quality:**

Moderate pollution
- **Land Use:**
- Agriculture, forestry
- **Land Ownership:**

State, private
- **Responsibility:**

Local, regional and national authorities for forestry, agriculture, water management and nature protection
- **Additional Contacts:**
- **Studies concerning the area:**
- **Restoration Proposals:**

Improvement of the ecological situation in the former floodplain by reconstruction of the dykes and development of a network with the other "Polje" areas; improvement of the water quality in a larger floodplain with higher river dynamics
- **Additional Remarks:**

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
12.400	1.000	11.400	50–75 %	5.700	8.550	570	855	57	86	1.425.000	2.137.500

Site 8.

- **Name of the site:** Upper Tisza/Mouth of Bodrog River
- **Country:** Hungary
- **Region, town/ community:** Tiszavasvári/Polgári
- **Size of the area:** 10,000 ha
- **Site Description:**

The floodplain in this part of the Upper Tisza is characterised by open landscape with a mosaic of floodplain meadows, large arable lands, small areas of traditional agriculture and also small parts of floodplain forests. The meandering river is bordered with gallery-like floodplain forests. In the former floodplain are small settlements. In the remaining floodplain the river presents a number of meanders, numerous old branches, oxbow lakes, rich in water macrophytes. Upstream and downstream of the mouth of the Bodrog there are large meandering systems with a very high ecological value.
- **Hydrological Situation:**

Large areas of the floodplain are disconnected from the river dynamics and are only under the influence of groundwater dynamics; the areas in the recent floodplain are very dynamic with active meanders and active sediment dynamics.
- **Water Quality:**

Moderate to critically polluted (large scale intensive agriculture has affected the water quality)
- **Land Use:**

Agriculture on large scale (arable lands, meadows), traditional small-scale agriculture and forestry
- **Land Ownership:**

State, private
- **Responsibility:**

Regional and central authorities for agriculture, water management and nature protection authorities
- **Additional Contacts:**

University of Debrecen, nature protection authorities, local NGOs
- **Studies concerning the area:**
- **Restoration Proposals:**

Revitalisation of wetlands in the Bodrog river area, reconnection of oxbow lakes to the river dynamics

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
10.000	7.000	3.000	> 75 %	2.250	3.000	225	300	23	30	562.500	750.000

Site 9.

- **Name of the site:** Lower Tisza
- **Country:** FR Yugoslavia
- **Region/town/community:** Novi Becej
- **Size of the area:** 36,000 ha
- **Site Description:**

The floodplain area in the Northern part of Novi Becej is dominated especially by open land, meadows and fields and small gallery-like floodplain forests with white and black poplar and wild wine (*Vitis sylvestris*) in the living floodplain as well as reed beds and oxbow lakes rich in water macrophytes.
- **Hydrological Situation:**

The living floodplain is very small, and the dams are near the river so the largest part of the floodplain is influenced only by groundwater dynamics.
- **Water Quality:**

Moderate to critical pollution caused by agricultural land in the area
- **Land Use:**

Agriculture: arable land (predominant), meadows, small areas for forestry
- **Land Ownership:**

State, private
- **Responsibility:**

Local, regional and national authorities for agriculture, forestry and water management
- **Additional Contacts:**

Local NGOs
- **Studies concerning the area:**
- **Restoration Proposals:**

Relocation of dykes for the improvement of water dynamics, the self-purification capacity and reconnection of former branches to the river dynamics

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site (100 kg/y/ha)	t/y/site (100 kg/y/ha)	t/y/site (10 kg/y/ha)	t/y/site (10 kg/y/ha)	US \$ (250 US\$/ha/y)	US \$ (250 US\$/ha/y)
36.000	3.000	33.000	25-50 %	8.250	16.500	825	1.650	83	165	2.062.500	4.125.000

Site 10.

- **Name of the site:** Balta Potelu and floodplain near Oriahovo
- **Countries:** Romania, Bulgaria
- **Region/town/community:** Stretch of river between Bechet and Corabia (downstream the mouth of the Jiu) and Oriahovo, Bulgarian side
- **Size of the area:** 27,000 ha
- **Site Description:**
- Large former floodplain area on the Romanian side separated from the river dynamics, with small parts of reed bed vegetation and large areas drained for agricultural use; in the small living floodplain gallery forests along the Danube and islands with natural succession of vegetation; habitats for water fowl.
- **Hydrological Situation:**
Regularly flooded until 1963 - after this time the area was separated from the river by dams in the 1960's and only influenced by groundwater dynamics.
- **Water Quality:**
At the mouth of Jiu into the Danube, very high pollution (grade III-IV after B. Wachs 1997), and later a high to moderate pollution;
- **Land Use:**
Arable land (predominant), meadows, grazing areas, traditional agriculture on small spots
- **Land Ownership:**
State propriety
- **Responsibility:**
Agency for environmental protection of Judet Dolj and Judet Olt (RO); regional administration of Oriahovo (Bulgaria); Ministry for Water, Forest and Environmental Protection Bucarest; Ministry for Environment in Bulgaria
- **Additional Contacts:**
Local NGOs
- **Studies concerning the area:**
Publications in different scientific papers in Romania for example: "Influence des endiguements de la région inondable du Danube sur l'ornithofaune dans le secteur Calafat-Corabia" Travaux du muséum d'histoire naturelle Grigore Antipa Bucarest"; Geografia vail Dunarii in sectorul romanesc" Edit. Acad, 1967
- **Restoration Proposals:**
Reconnection of the former floodplain to the river dynamics with the benefit of restoration of wetlands as spawning grounds for fish, breeding, feeding places for birds, improvement of the water quality through reed filtration and self-purification
- **Additional Remarks:**
Area with high restoration potential

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site (100 kg/y/ha)	t/y/site (100 kg/y/ha)	t/y/site (10 kg/y/ha)	t/y/site (10 kg/y/ha)	US \$ (250 US\$/ha/y)	US \$ (250 US\$/ha/y)
27.000	7.500	19.500	> 75 %	14.625	19.500	1.463	1.950	146	195	3.656.250	4.875.000

Site 11.

- **Name of the site:** Bulgarian/Romanian Danube Islands and Floodplain Area of Balta Suhaia, Romania
- **Countries:** Bulgaria and Romania
- **Region/ town/community:** Towns of Nikopol, Belene and Svistov, Bulgaria; Turnu Magurele and Zimnicea, Judetul Teleorman Romania
- **Size of the area:** 27,000 ha
- **Site Description:**

Large former floodplain on the Romanian side with small remaining reed bed areas and meadows, former floodplain areas and islands on the Bulgarian side (a part of them dyked for agricultural use (Persin); oxbow lakes with macrophytes; hardwood forest with balcan oak (*Quercus pedunculiflora*), ash (*Fraxinus angustifolia*), elm (*Ulmus carpiniifolia*) of very high value on Vardim island
- **Water Quality:**

The mouth of the Olt in the Danube is over-polluted - immediately upstream from the Olt the pollution is very high and high to critical, grade (IV, III, II) (according to B. Wachs 1997)
- **Hydrological Situation:**

Large areas are separated from the river dynamics and only influenced by groundwater dynamics
- **Land Use:**

Agriculture (arable lands, meadows), abandoned fields, small areas of reed beds, forestry (poplar plantations), fishery, hunting
- **Land Ownership:**

State, commercial societies as users
- **Responsibility:**

Regional agency for Environmental Protection, jud. Teleroman; MWFEP Bucarest; local, regional and national authorities in Bulgaria: Ministry of Environment, Forest Authority
- **Additional Contacts:**

Local NGOs
- **Studies concerning the area:**

Very good information on the situation existing before dyking; Geografia vaii Dunarii in sectorul romanesc" Edit. Acad, 1967
- **Restoration Proposals:**

Restoration of the former floodplain areas as spawning areas for fish, natural water filters for improvement of the water quality; removal of existing levees (Vardim, persin), reconnection of former river branches to the river dynamics, restoration of a former floodplain lake (Persin island)
- **Additional Remarks:**

A series of natural islands (Bulgarian and Romanian side) without human activities give the river stretch a very high ecological value and have an high genetic potential also for the areas to be restored

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
27.000	7.000	20.000	> 75 %	15.000	20.000	1.500	2.000	150	200	3.750.000	5.000.000

Site 12.

- **Name of the site:** Balta Greaca (RO), floodplain between Brushlen and Tutracan, Kalimok Marshes
- **Countries:** Romania, Bulgaria
- **Region/town/community:** Giurgiu and Oltenita (RO), Jud. Ilfov; Brushlen, Tutracan (Bulgaria)
- **Size of the area:** 54,000 ha
- **Site Description:**

Large former floodplain area on the Romanian side with small remaining reed bed areas and meadows, former floodplain areas, very small parts of hardwood floodplain forest near the dyke (partly in the former floodplain and partly in the recent floodplain) with balcan oak (*Quercus pedunculiflora*), ash (*Fraxinus angustifolia*) and locally with the liana *Periploca graeca*; former floodplain areas with large wetland remnants, also islands on the Bulgarian side, oxbow lakes with macrophytes
- **Hydrological Situation:**

Floodplain separated from the river dynamics, influenced only by groundwater dynamics; separated from the river in the late sixties, problems with salinity
- **Water Quality:**

Critical pollution to high and very high pollution (B. Wachs 1997) caused by industry in the town of Giurgiu
- **Land Use:**

Agriculture (fields, meadows), forestry
- **Land Ownership:**

State, private territories, local communities
- **Responsibility:**

APM Agency for Environmental Protection, MWFEF Bucarest, regional and national Bulgarian Authorities;
- **Additional Contacts:**

Local NGOs, local stakeholder panels, local fishing sector, municipalities
- **Studies concerning the area:**

Characterisation of the biodiversity of the current vegetation in the south of Muntenia field (including the Greaca area); Kalimok marshes; Combining Natural Resource Protection with Economic benefit (WWF and Green Balkan study 1998)
- **Restoration Proposals:**

Reconnection of the former floodplain to the river dynamics, where possible, for restoration of wetlands and reed beds as water filters, improving the water quality, for spawning areas for fish, restoration of floodplain lakes, old small floodplain rivers (Garlas); conservation and restoration of the floodplain forests with a very high ecological and biodiversity value; land use changes, performed concurrently with marketing strategies.

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
54.000	9.000	45.000	> 75 %	33.750	45.000	3.375	4.500	338	450	8.437.500	11.250.000

Site 13.

- **Name of the site:** Balta Calarasi
- **Country:** Romania
- **Region/town/ community:** Calarasi
- **Size of the area:** 10,000 ha
- **Site Description:**

Large former floodplain area with preserved structures of the former floodplain (partly), wetland vegetation, floodplain lake Iezeru Calarasi (about 400 ha of open water surface), small areas of floodplain forests and large areas of cultivated land; important corridor for bird migration, resting places for about 70,000 geese; in the Southern part of the area the island of Pacuiu liui soare also has floodplain structures and the wetland habitat is partly preserved
- **Hydrological Situation:**

Floodplain areas were disconnected from the river in the late sixties and are influenced only by groundwater dynamics, there are dykes near the Danube, and problems with salinity
- **Water Quality:**

Moderate to critical pollution
- **Land Use:**

Agriculture (large areas), forestry
- **Land Ownership:**

State property
- **Responsibility:**

APM- Regional Agency for Nature Protection judet Ialomita, regional agricultural authorities; forest authorities of the judet Ialomita, MFWEP Bucurest
- **Additional Contacts:**

Local NGOs, Commission of Natural Monuments of the Academy of Science;
- **Studies concerning the area:**

Data by the APM Ialomita (Agency of Environmental Protection); Characterisation of the biodiversity of the current vegetation in the South of Muntenia field (including the Greaca area)
- **Restoration Proposals:**

Reconnection of river branches to the Danube, opening of dams where possible, restoration of the wetland reed beds (for improvement of filtering and water self-purification)

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
10.000	0	10.000	> 75 %	7.500	10.000	750	1.000	75	100	1.875.000	2.500.000

Site 14.

- **Name of site:** Lower Prut floodplain
- **Countries:** Romania/ Moldavia
- **Region/town/ community:** Town of Galati, jud. Galati, Kahul (Moldavia)
- **Size of the area:** 51,000 ha
- **Site description:**

Floodplain with water dynamics, floodplain gallery forest (softwood forest with white willow), floodplain lakes with macrophytes, meadows and reed beds are habitats for a large number of bird species
- **Hydrological Situation:**

The dykes are near the river and part of the floodplain is disconnected from the river dynamics; problems with salinity and stepisation
- **Water Quality:**

High pollution (Wachs 1997), very high pollution (according to information from local NGOs)
- **Land Use:**

Agriculture (arable land, meadows), fish ponds (artificial)
- **Land Ownership:**

State propriety
- **Responsibility:**

AEP Galati, regional authorities for agriculture, water management; MWFEP Bucarest, local and regional authorities in Moldavia
- **Additional Contacts:**

Local NGOs, Complex of museums for natural sciences in Galati, University of Galati (water management), Fishery
- **Studies concerning the area:**
- **Restoration Proposals:**

Restoration of the floodplain by reconnecting areas to the river dynamics, improvement of the water quality by restoration of wetland vegetation

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
51.000	20.000	31.000	50–75 %	15.500	23.250	1.550	2.325	155	233	3.875.000	5.812.500

Site 15.

- **Name of the site:** Lower Danube Limans/Lakes
- **Countries:** Moldavia/Ukraine
- **Region/town/community:** Reni, Ismail, Kilia (Ukraine), Moldova: Kahul
- **Size of the area:** 38,000 ha
- **Site description:**

The lakes of the lower Danube (Kartal, Kugurlui, Kagul, Yalpug) are situated partly in the floodplain and partly in the tableland area, and are typical floodplain lakes in their Southern parts. All tributaries arrive from the Ukrainian and Moldavian tableland, and the floodplain areas are disconnected from the river dynamics. There are regulated in- and outlets on the connecting natural channels, all these lakes act more like fish ponds than as natural floodplain lakes. The territories of the former floodplain are on large areas covered by reed, but also on large areas transformed into agricultural land. On the lakes there are also small parts of softwood forests and forests with white poplar (*Populus alba*), wild vine (*Vitis sylvestris*).
- **Hydrological Situation:**

The lakes are connected to the Danube River by regulated in- and outlets. The dams are near the river and the greatest influence are changing groundwater levels and very high flood levels.
- **Water Quality:**

Very high pollution, partially over-polluted
- **Land Use:**

Agriculture, fish collective farms, water supply, irrigation, traditional agriculture on small plots, cattle grazing recreation zone
- **Land Ownership:**

State, collective, private
- **Responsibility:**

Regional councils of Reni, Ismail, Kiliya; Ministry of Environment Protection and Nuclear Safety (Ukraine); Ministry of Environment Moldova
- **Additional contacts:**

Academy of Science (Ukraine); National Institute of Ecology (Moldova); local NGOs
- **Studies concerning the area:**
- **Restoration Proposals:**

Reconnecting the areas to the river dynamics, where possible, to ensure a more natural regime for the lakes, to restore the floodplain reed bed areas between the Danube river and the southern part of the lakes (area of Kartal-Kugurlui), for improving the filtration capacity and with this the water quality; to restore the habitats for typical species and ensure the sustainability of resource use.

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
38.000	12.000	26.000	> 75 %	19.500	26.000	1.950	2.600	195	260	4.875.000	6.500.000

Site 16.

- **Name of the site:** Polder Pardina
- **Country:** Romania
- **Region/town:** Tulcea region/Danube Delta, village Pardina
- **Size of the Area:** 27,000 ha
- **Site Description:**

The large former wetland area of Pardina is completely transformed with the dense drainage canal-system. In the past the area was covered by large reed beds, also floating reeds ("Plaur"), deltaic lakes with typical water macrophytes and natural water courses, and so called "garlas". Near the canals is remaining reed vegetation and in the southern abandoned part, the reed vegetation is again in development.
- **Water Quality:**
- **Hydrological Situation:**

Transformed in 1970 to a reed harvesting polder and in 1989 completely transformed into an agriculture polder, with a network of drainage and irrigation canals, in- and outlet construction. Damaged and completely disconnected from the river dynamics, without flooding; the drainage and irrigation system, is not functioning and there are problems with salinity and stepisation.
- **Land Use:**

Agriculture in the northern part of the polder (arable lands and meadows), hunting; the southern part is abandoned.
- **Land Ownership:**

Must be clarified. It is state propriety, but in the regional administration of the Tulcea district. Users are commercial societies. The area is part of the Danube Delta Biosphere Reserve as a proposed area for ecological restoration.
- **Responsibility:**

Regional territorial administration of district Tulcea; ADDBR (Administartion of the Danube Delta Biosphere Reserve), but this is an unclear situation.
- **Additional Contacts:**

Danube Delta Research and Design Institute Tulcea, Ecodelta (user of resources); Local NGOs as Pro Delta and Romanian Ornithological Society
- **Studies concerning the area:**

GOMOIU, M. & G. BABOIANU (1992): Some aspects concerning the ecological restoration in the Danube Delta Biosphere Reserve; in the Annual Journal of the DDI are results of research in the area of Pardina.
- **Restoration Proposals:**

Ecosystem rehabilitation, restoration of the wetlands for improving the filtration capacity, self purification with a view to improvement of the water quality
- **Additional Remarks:**

The clarifying of the ownership and the responsibilities is the first condition for all further activities to the restoration of the area

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
27.000	0	27.000	> 75 %	20.250	27.000	2.025	2.700	203	270	5.062.500	6.750.000

Site 17.

- **Name of the site:** Wetlands in the Danube Delta Ukraine (SZP, Ermakov)
- **Country:** Ukraine
- **Region/ town/community:** Vilkovo, Leski, Primorskoe, administrative territory of Chilia Rayon, Odessa oblast;
- **Size of the Area:** 27,000 ha
- **Site Description:**

The area includes the two large wetland complexes of Stentsovsko Zebrianskie Plavni and Ermakov Island; the first (SZP) is a large wetland complex situated North of the Kilia branch and in the Eastern part with a connection to the Black Sea. The area was freely connected in the past to the Danube River and also with the Black Sea. The Stenstovkie Plavny in the Western part was influenced more by the dynamics of the Danube River and the Eastern part was more under the influence of the Black Sea. The entrance of water is regulated by hydro-technical constructions, in- and outlets, and act more as fish pounds. The area is covered by reed vegetation in mosaic with open water bodies. The island of Ermakov is situated in the Kilia branch of the Danube Delta, covered by reed, and in the Northern and North-Wwestern part with meadows and grazing areas in continuous salinisation due to the disconnection from the river dynamics.
- **Hydrological Situation:**

The SZP is divided in two parts by the Danube-Sasyk canal with small outlets between the two parts; water circulation between the two parts is very bad, the Western parts communicate with the Black sea only by a pipe; in the past the hydrology of the island Ermakov was completely dependent on the hydrological regime of the Danube. In the years with high water level, about 90% of the island was covered with water. After the embankment the hydrological regime of the island was radically changed. At present the water regime of Ermakov is regulated by two pipes, one in the Western part (inlet) and one in the Eastern part (outlet).
- **Water Quality:**

Critical to high pollution
- **Land Use:**
- **Land Ownership:**

State, SZP and Ermakov are part of the Ukrainian Danube Delta Biosphere Reserve; user of Ermakov is the state Farm Pogranichnaia
- **Responsibility:**

DP authority, farm Pogranichnaia, regional authorities for water management, agriculture, nature protection (DP), Ministry for Environmental Protection and Nuclear Safety
- **Additional Contacts:**

Ukrainian Academy of Science, local NGOs as Ecocenter Delta Vilково
- **Studies concerning the area:**

RIZA study for SZP; WWF Proiect ‘Partners for Wetlands’

➤ **Restoration Proposals:**

Ecosystem rehabilitation, wetland, including reed bed restoration (filtration capacity) for improving the drinking water quality; reconnecting the island of Ermakov with the dynamics of the Danube river to be reflooded; the reconnection will improve the quality of the grazing land, the salinisation and stepisation, restoration of the reed beds and improvement of the filtering capacity as a basis for better water quality also in the Black Sea area.

➤ **Additional Remarks:**

Restoration activities concerning SZP are difficult due to the issue concerning the use of fire for nature protection and for different user interests.

➤ **Overview of potential nutrient reduction and its value:**

Proposed study area for future restoration	Area of recent floodplains included in proposed study area	Proposed study area, only former floodplains	Estimated portion of restorable area in the former floodplains	Potential Rest. Area (min.)	Potential Rest. area (max.)	N-reduction (min)	N-reduction (max)	P-reduction (min)	P-reduction (max)	Value of potential nutrient reduction (min)	Value of potential nutrient reduction (max)
ha	ha	ha	%	ha	ha	t/y/site	t/y/site	t/y/site	t/y/site	US \$	US \$
						(100 kg/y/ha)	(100 kg/y/ha)	(10 kg/y/ha)	(10 kg/y/ha)	(250 US\$/ha/y)	(250 US\$/ha/y)
27.000	7.000	20.000	25 – 50 %	5.000	10.000	500	1.000	50	100	1.250.000	2.500.000

List of areas proposed in the „Inventory of Potential Small Scale Wetland Restoration Sites in the Danube River Basin“

This report was commissioned by the Programme Coordination Unit of the Environment Programme for the Danube River Basin

Germany

G1: Flusslandschaft Donauwiesen

G2: Mouth of the Isar River

Austria

A1: Lower Lobau

A2: Danube East of Vienna

Czech Republic

CZ1: Lower Dyje Floodplain

CZ2: Pod Suezonym (Napajedla)

Slovakia

SLK1: Klastorske luky (Klastorske meadows)

SLK2: Zitavsky luh (Zitava river floodplain)

Hungary

H1: Báli Tó

H2: Boronka Region (Somogyfajsz)

Slovenia

SLO1: Draga valley Nature Reserve

SLO2: Golnik - Restoration of a Golnik wetland

Croatia

CR1 Lake Èambina (Drava river)

CR2: Kraplje Dol

Bosnia Herzegovina

B-H1: Bosna River Estuary

B-H2: Spreca River Estuary

Romania

R1: Small Braila Island

R2: Large Braila Island

Bulgaria

B1: Belene (Persina) Nature Reserve

B2: Kalimok Fishponds Complex

Moldova

M1: Lower Prut River (Lower Prut Lakes)

M2: Central Prut River Valley (Codri)

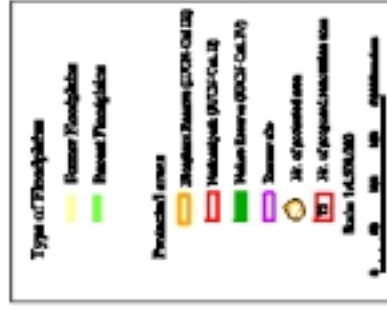
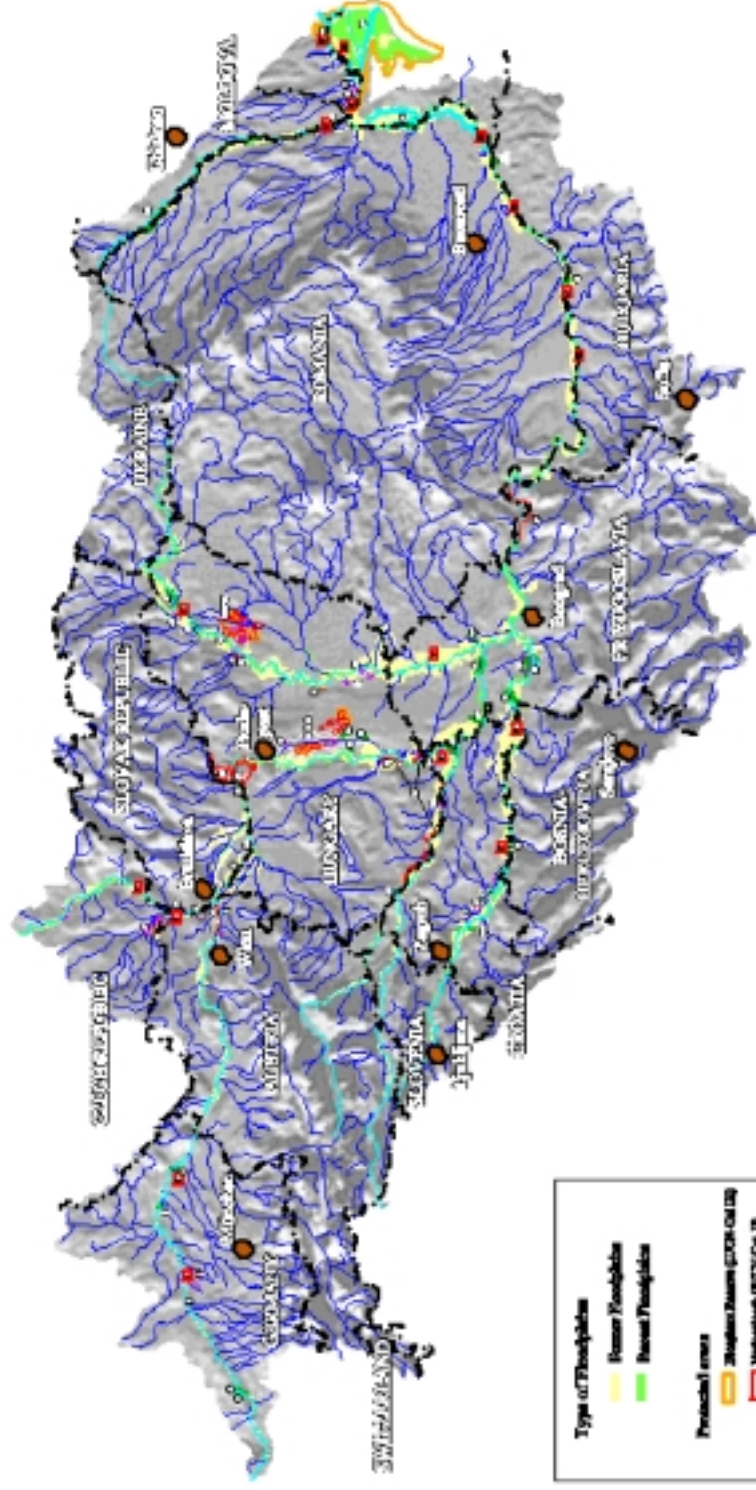
Ukraine

U1: Restoration of Staronekrasovskije Plavny

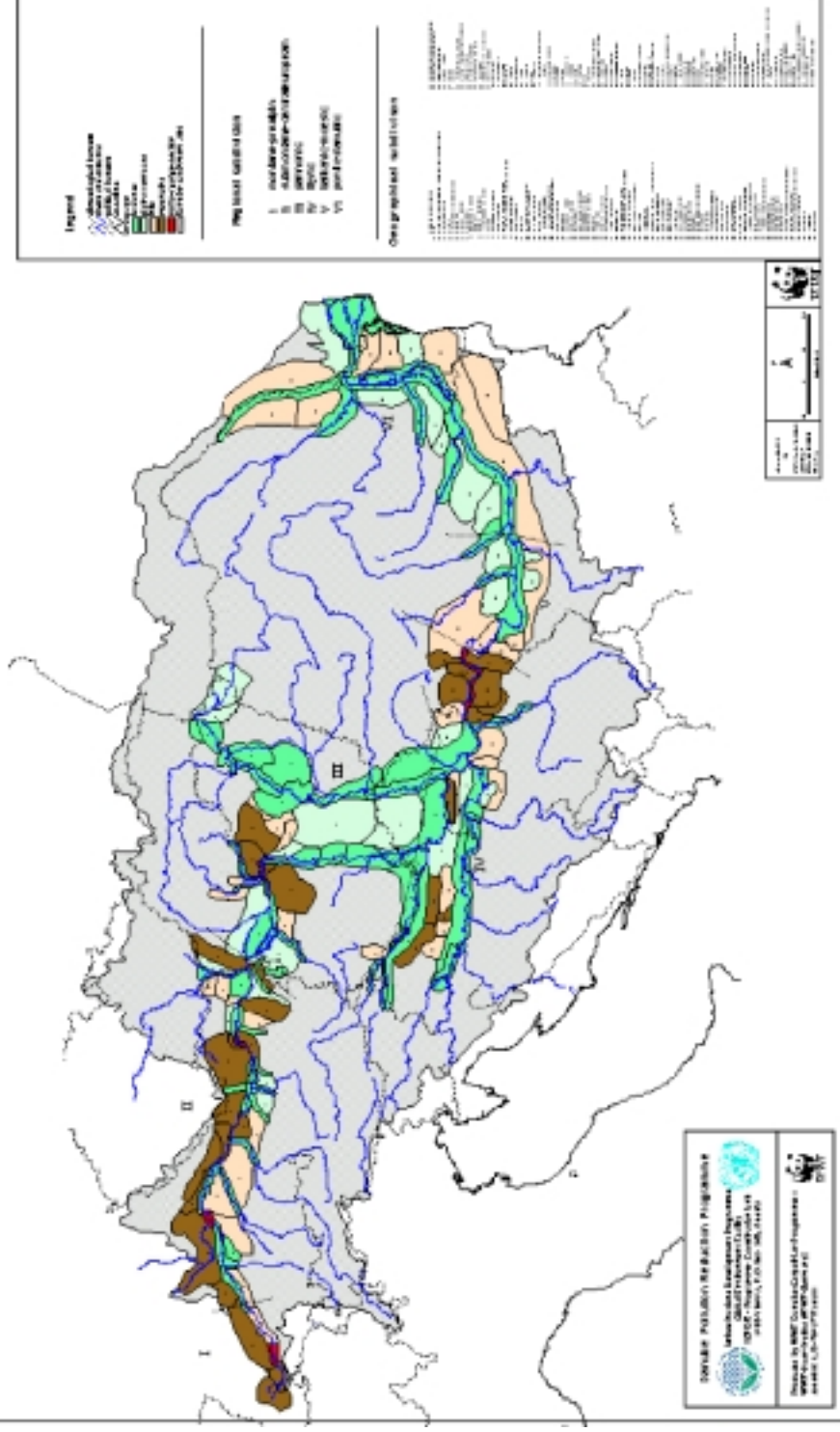
U2: Restoration of the Orlovsky Plavny

Floodplain areas in the Danube River Basin

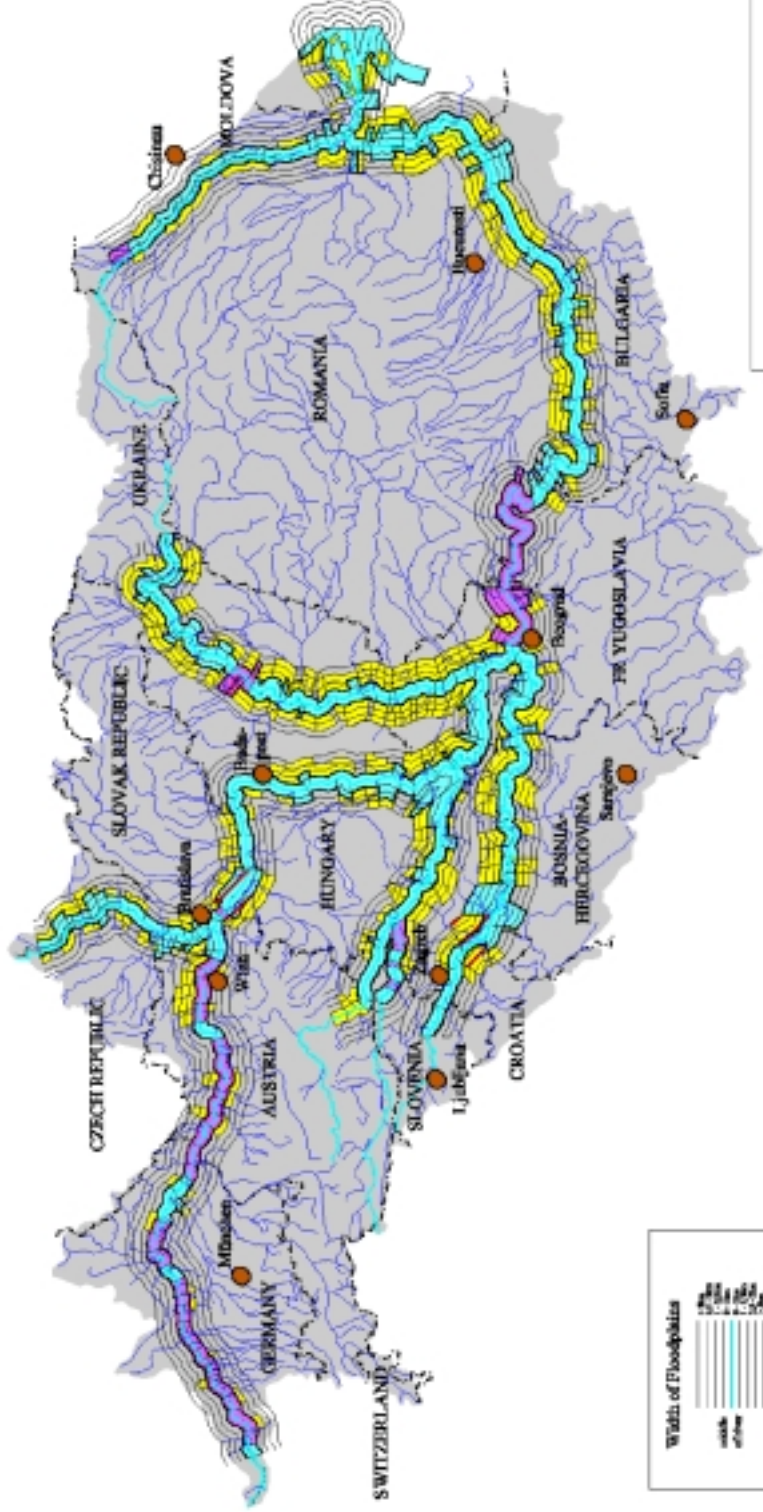
with protected areas along the studied rivers (Danube, Morava, Drava, Sava, Tisza and Prut)



Geographical subdivision of the Danube river basin



Symbolized view of floodplains in the Danube River Basin



Width of Floodplains

10 km
15 km
20 km
25 km
30 km
35 km
40 km
45 km
50 km

Type of Floodplains

- Former Floodplains (Yellow)
- Recent Floodplains (Cyan)
- Back water area of dams (Purple)

Scale: 1:4,500,000
0 50 100 150 kilometers

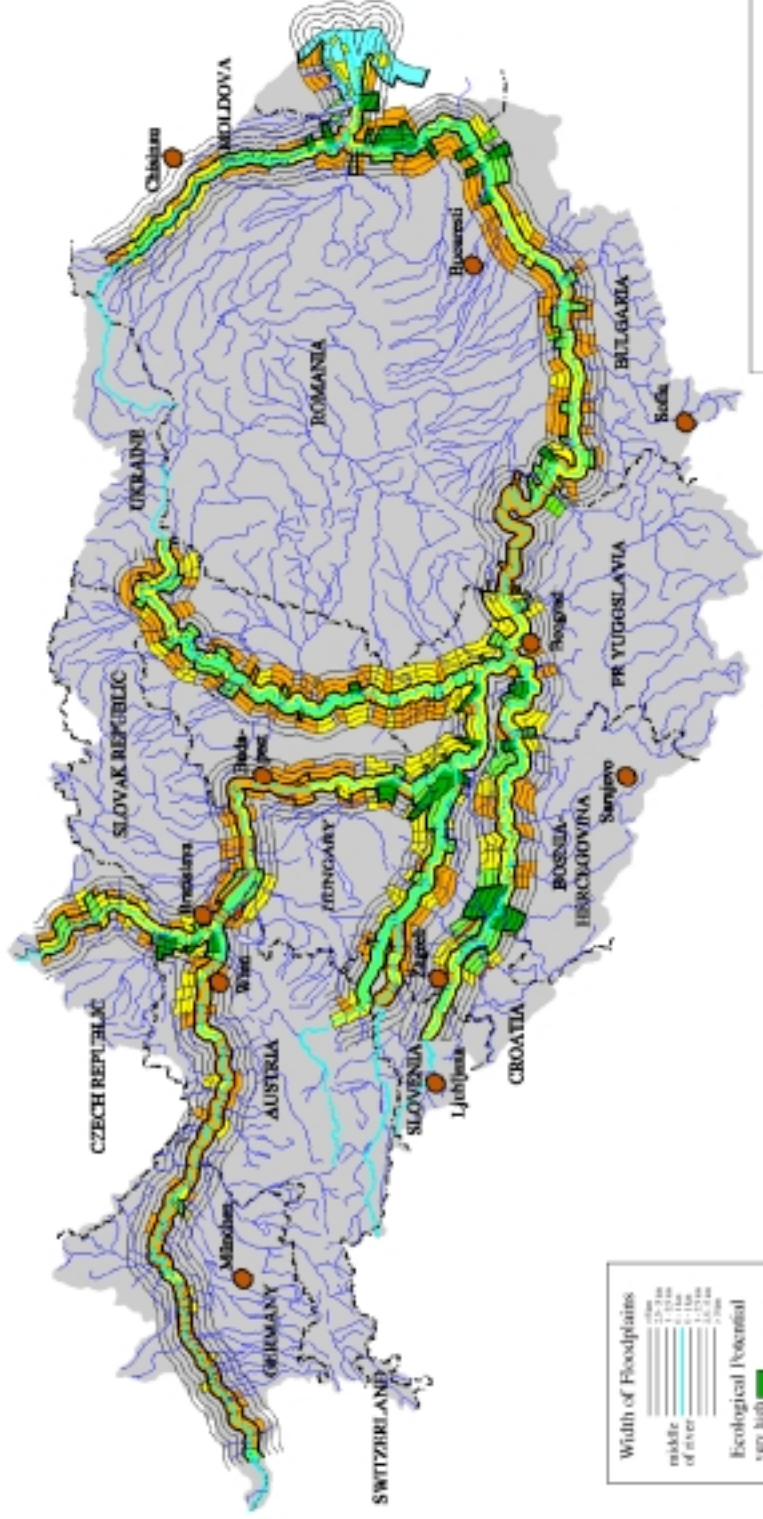
Area of historical floodplains in the study area: 41600 km
 Area of remaining floodplains in the study area: 8000 km
 A floodplain loss of more than 80%

Danube Pollution Reduction Programme

United Nations Development Programme
 Global Development Facility
 KCPDR - Programme Contribution Lock
 1180 Vienna, P. O. Box 500, Austria

Produced by WFP - Vienna Corporation Programme
 1970-August-Institut (CP 107, Germany)
 Austria, 1, D-76207 Jasselt 1999

Ecological potential of floodplains in the Danube River Basin



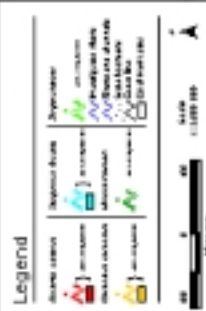
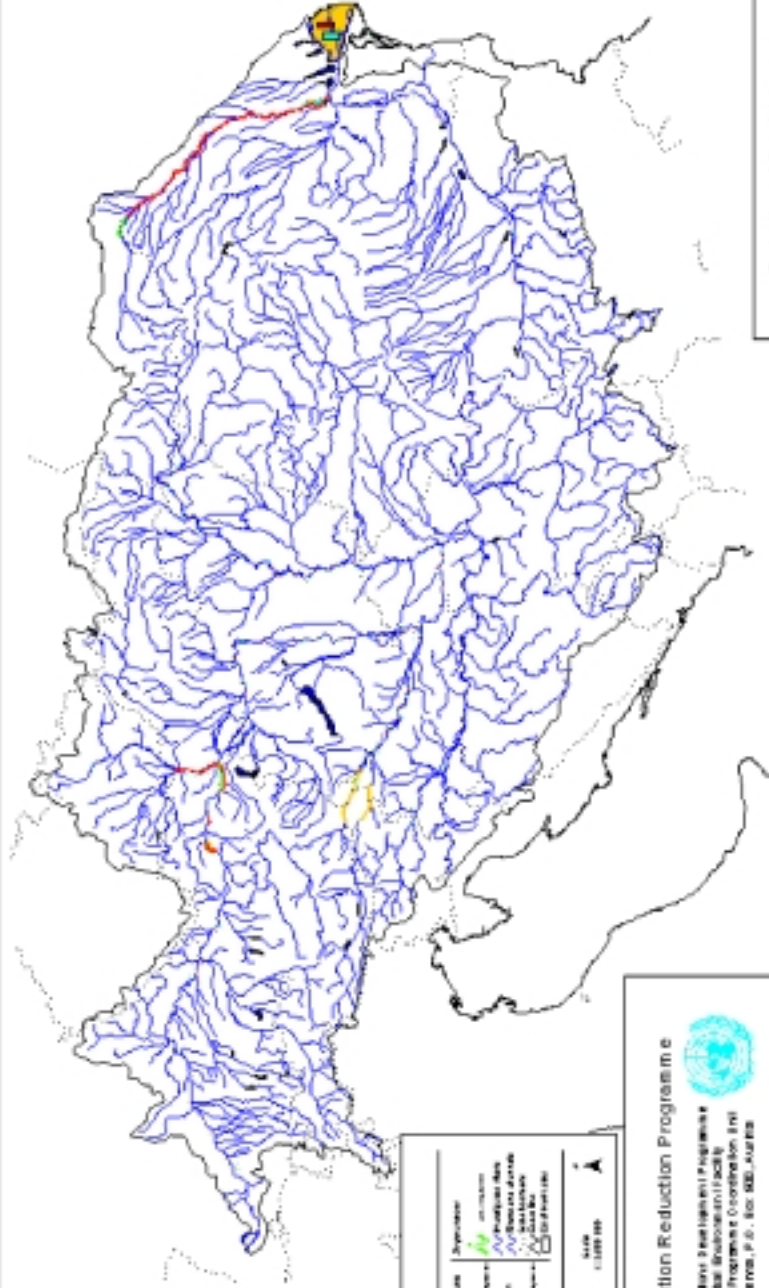
Danube Pollution Reduction Programme

United Nations Development Programme
 Global Environment Facility
 UNEP - Programme Coordination Unit
 1400 Vienna, P. O. Box 500, Austria

Produced by WWF Danube-Corridor-Programme
 WWF-Austria Institut (WWF-Osterreich)
 Jordanstr. 1, D-76407 Rastatt 1999
 WWF

Selected Bioindicator Species (Fish)

(*Alburnus baloneus*, *Carassius auratus*, *Misgurnus fossilis*, *Umbra limbaei*, *Zingel steindachneri*)



Danube Pollution Reduction Programme



1480 Vienna, P.O. Box 100, Austria



Produced by WWF Danube Catchment Programme /
World Wildlife Fund (WWF) /
100018, 1, 3-18427, 836 93

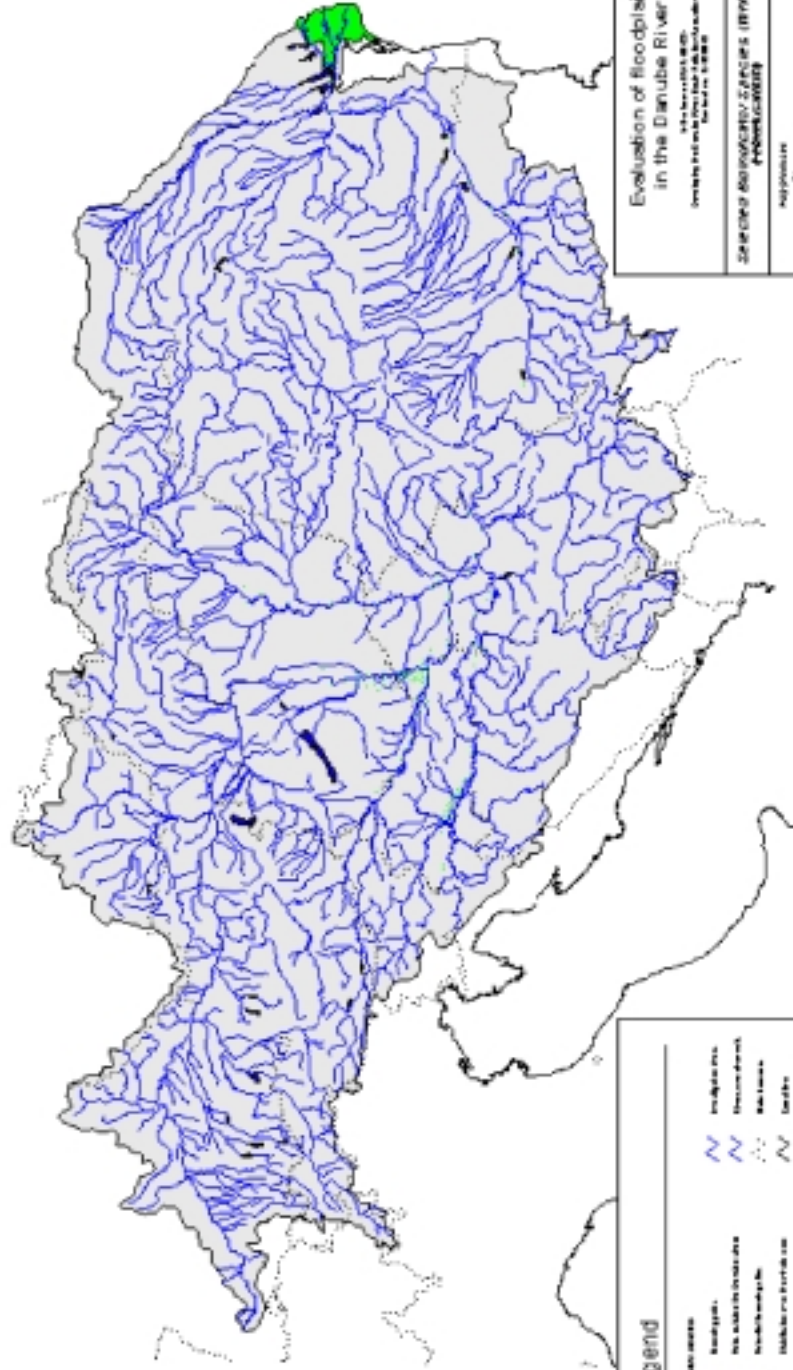
Evaluation of floodplain areas in the Danube River Basin

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Danube River Basin Programme
1480 Vienna, Austria

Selected Bioindicator Species (Fish)
© WWF International, 1999-2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025

Selected Bioindicator Species (White-tailed eagle)

(*Haliaeetus albicilla*)



Legend

Floodplain areas	Floodplain areas
No suitable habitats	River channels
Suitable habitats	Main roads
Suitable floodplain	Canals
	Urban areas

0 50 100
Kilometers

0 100
Kilometers

▲

Evaluation of floodplain areas
in the Danube River Basin

www.biodiversity.europa.eu
www.danube.eu

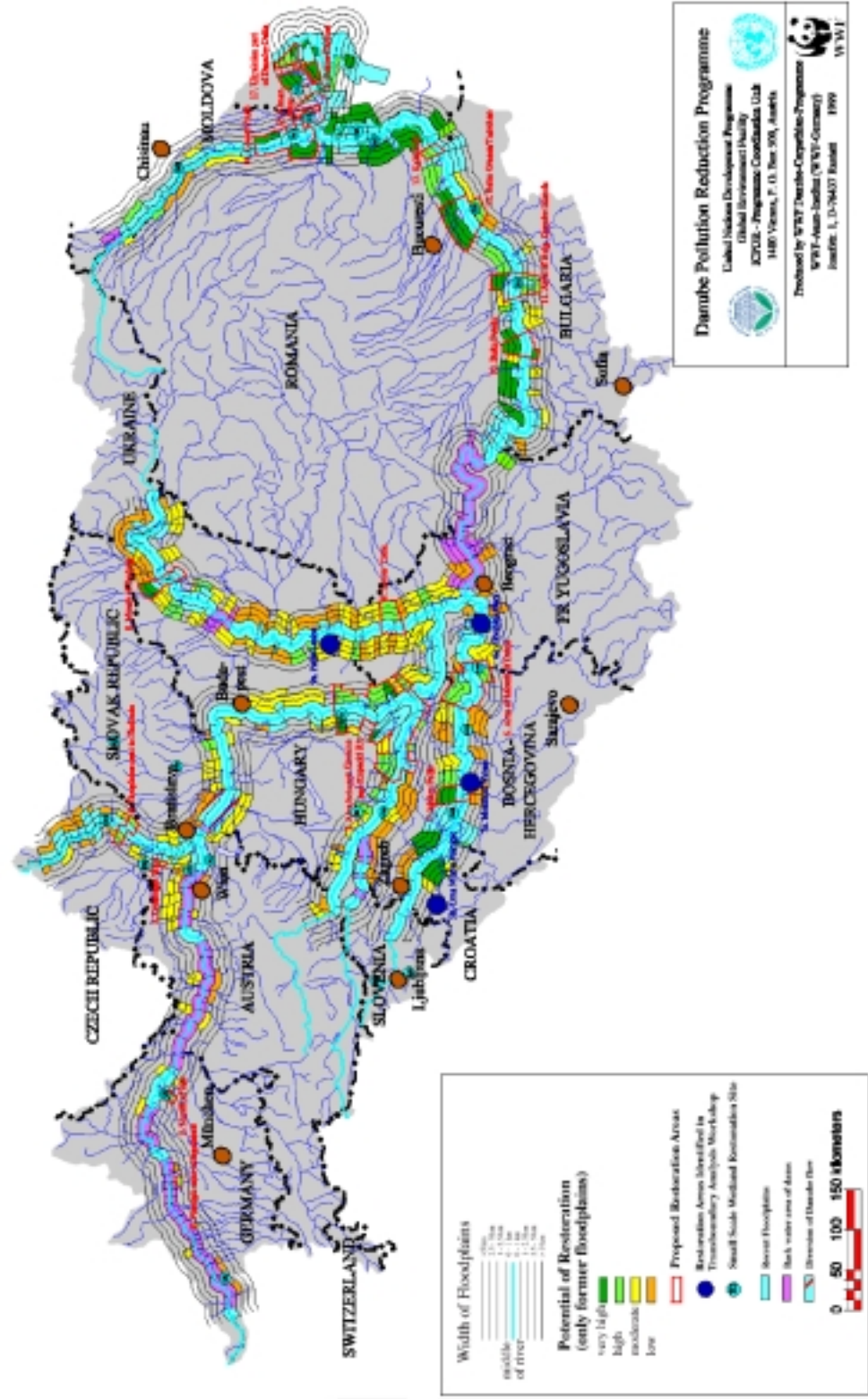
SEARCHED BIODIVERSITY SPECIES (BIOINDICATOR SPECIES)

White-tailed eagle

Project leader:
WWF Central Europe
Sándor Balogh
Béatrice

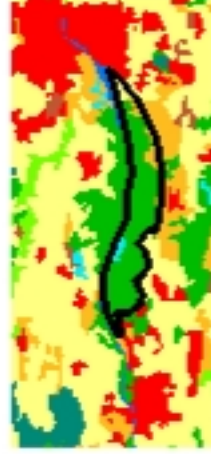
WWF

Restoration potential of former floodplains in the Danube River Basin



Comparison of historical and recent view

Proposed Restoration Area Nr. 1: Floodplains next to Ingolstadt

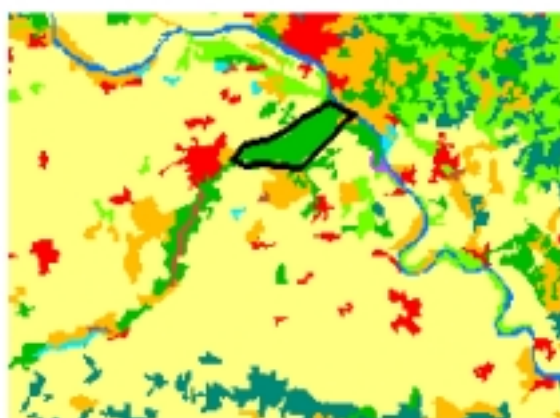


0 2,5 5 7,5 10 kilometers


 Danube Pollution Reduction Programme United Nations Environment Programme Global Environment Facility EUNAS - Programme Coordination Unit 1400 Vienna, P. O. Box 300, Austria	 Established by 1997 Danube-Commission Programme WVW - James Sautner (WVW - Germany) E-mail: J. D. 94877@post. 1999 WWW
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Comparison of historical and recent view

Proposed Restoration Area Nr. 2: Mouth of Isar



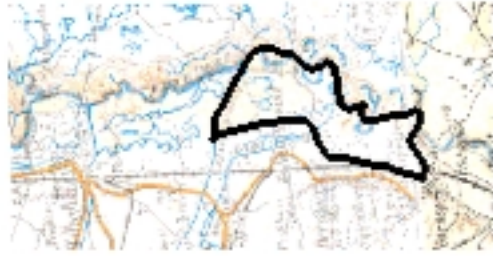
0 2.5 5 7.5 10 kilometers



Danube Pollution Reduction Programme		
	United Nations Development Programme Global Environment Facility ECE - Programme Coordination Unit 1400 Vienna, P. O. Box 500, Austria	
Co-funded by WWF Danube-Capitania Programme		
DPO: J. von Soden (WWF-Germany) E-mail: J. D. 7627 Berlin 1999		

Comparison of historical and recent view

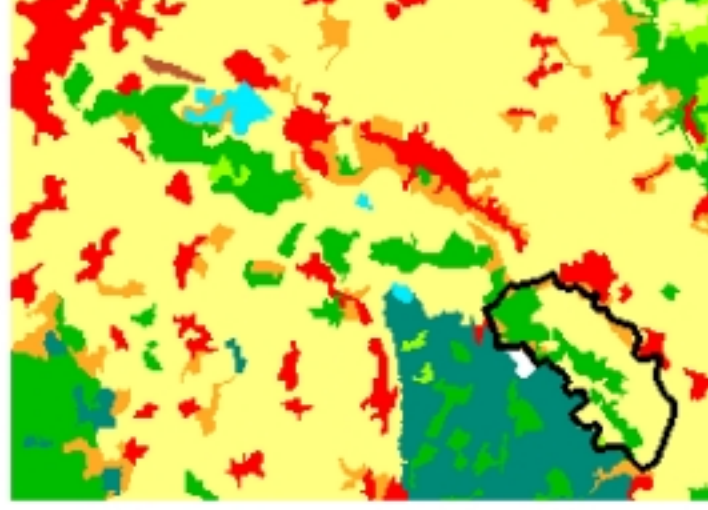
Proposed Restoration Area Nr. 3: Drösinger Wald



 United Nations Development Programme Global Environment Facility GEF/ODP - Programme Operations Unit 1480 Vienna, P. O. Box 500, Austria	 Damube Pollution Reduction Programme
Produced by WWF Danube-Catchment-Programme WWF-Austria-Institut (WWF-Germany) Josefstr. 1, D-76457 Rastatt 1999	

Comparison of historical and recent view

Proposed Restoration Area Nr. 4: Floodplains next to Straznice



0 2.5 5 7.5 10 kilometers



Danube Pollution Reduction Programme



United Nations Development Programme
Global Environment Facility
ICPDR - Programme Coordination Desk
1400 Vienna, P. O. Box 308, Austria

Produced by WWF Danube-Carpathian Programme

WWF-Austria-Institut (WWF-Graz)

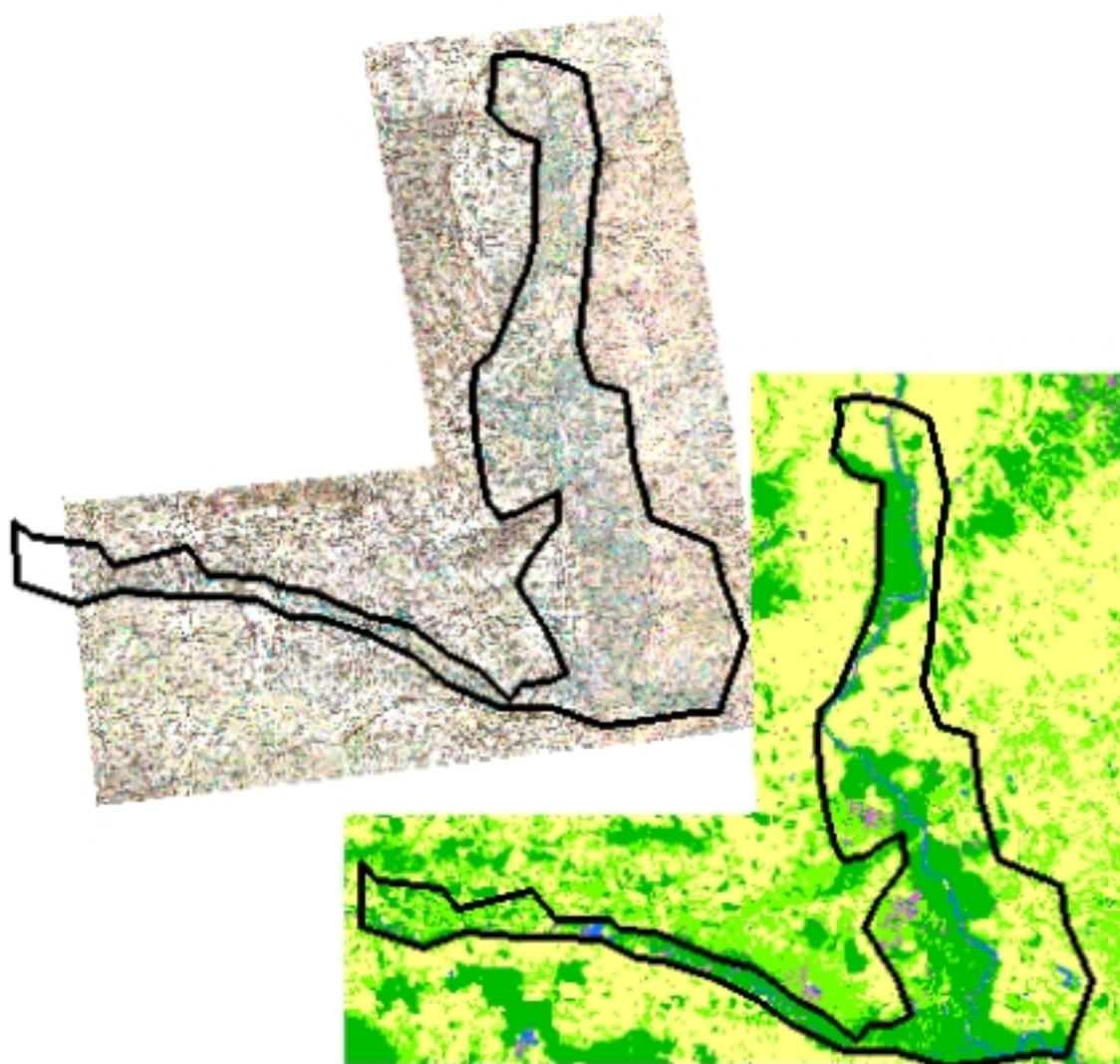
Joséfu. L. D-76437 Rastatt 1999






WWF

Comparison of historical and recent view

Proposed Restoration Area Nr. 5: Gemenc-Kopacki Rft (Att.: reduced scale!)

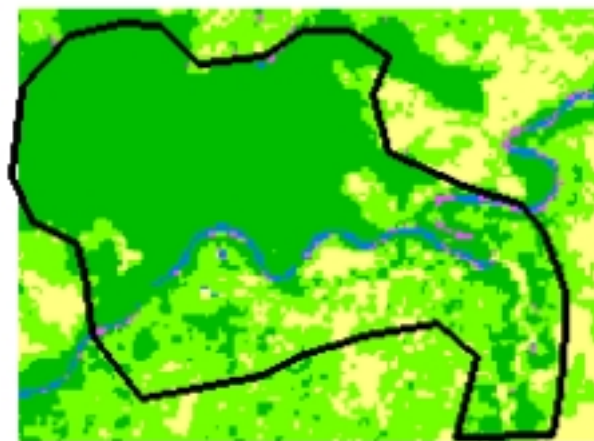


0 5 10 15 20 25 30 kilometers




Danube Pollution Reduction Programme		
	United Nations Environment Programme Global Environment Facility EPRP - Programme Coordination Unit 1400 Vienna, P. O. Box 20, Austria	
Financed by WWF Danube-Capital Programme		
WWF - Anna Lindh (WWF-Germany) Kunzele 1, D-74077 Pforzheim 1999		

Comparison of historical and recent view

Proposed Restoration Area Nr. 6: Mouth of Drina

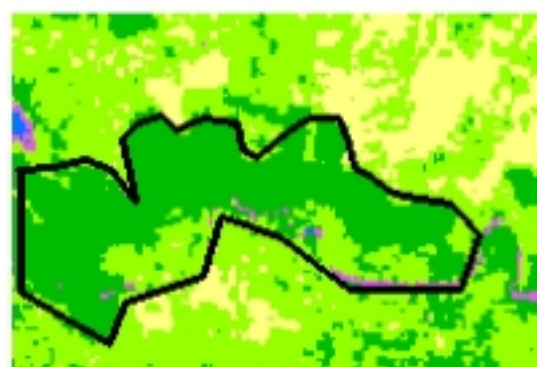


0 2.5 5 7.5 10 kilometers

Drube Pollution Reduction Programme		
	United Nations Development Programme Global Environment Facility GEF - Programme Coordination Unit 1400 Vienna, P. O. Box 90, Austria	
Financed by WWF Europe - Cooperation Programme		
WWF - Local Institute (WWF-Germany) Frankfurt, D-60477 Frankfurt 1999		
		

Comparison of historical and recent view

Proposed Restoration Area Nr. 7: Mokro Polje



0 2.5 5 7.5 10 kilometers



Danube Pollution Reduction Programme		
	United Nations Development Programme Global Environment Facility EUSE - Programme Coordination Unit 1400 Vienna, P. O. Box 200, Austria	
Financed by WWF Danube-Chapline Programme		
WWF Swiss Institute (WWF-Geneva) Sankt. L. D-74177 Postfil. 1999		

Comparison of historical and recent view

Proposed Restoration Area Nr. 8: Mouth of Bodrog



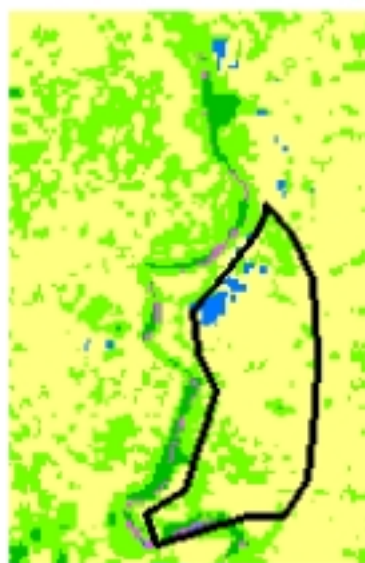
0 2.5 5 7.5 10 kilometers



Danube Pollution Reduction Programme		
	United Nations Development Programme Global Environment Facility EPPR - Programme Coordination Unit 1400 Vienna, P. O. Box 200, Austria	
Financed by WWF Danube-Capitania Programme		
WWF - Jean-Sebastien (WWF-Geneva)		
Sankta. L. D-74177 Frankfurt 1999		
		

Comparison of historical and recent view

Proposed Restoration Area Nr. 9: Lower Tisza



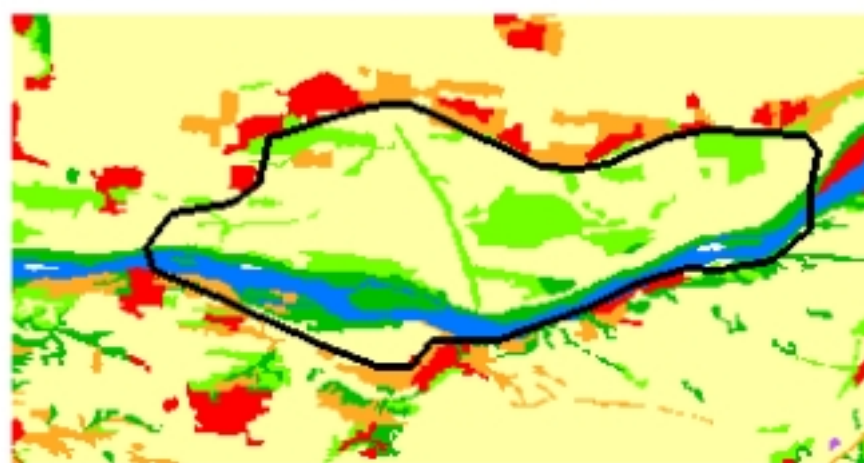
0 2.5 5 7.5 10 kilometers



Danube Pollution Reduction Programme		
	United Nations Development Programme Global Environment Facility EUSE - Programme Coordination Unit 1400 Plaza, P. O. Box 200, London	
Financed by WWF Danube-Chapline Programme		
WWF Swiss Institute (WWF Germany) Sankt Leonhard, D-74177 Stuttgart 1999		

Comparison of historical and recent view

Proposed Restoration Area Nr. 10: Balta Poteln



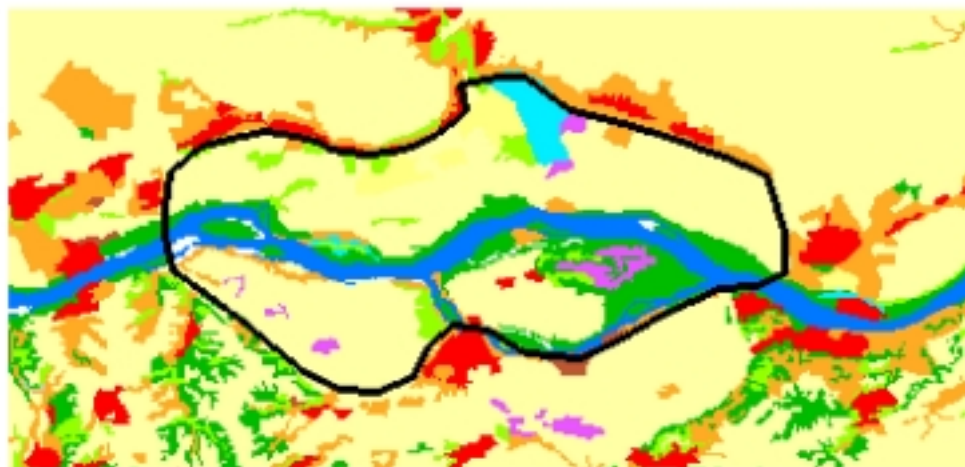
0 2.5 5 7.5 10 kilometers



Danube Pollution Reduction Programme		
	United Nations Development Programme Global Environment Facility EPPR - Programme Coordination Unit 1400 Vienna, P. O. Box 200, Austria	
Financed by WWF Danube-Capital Programme		
WWF - Jean-Sebastien (WWF-Geneva)		
Funding: S.D-2417 Zurich: 1999		

Comparison of historical and recent view

Proposed Restoration Area Nr. 11: Bulg. Islands and Rom. Balta Subala



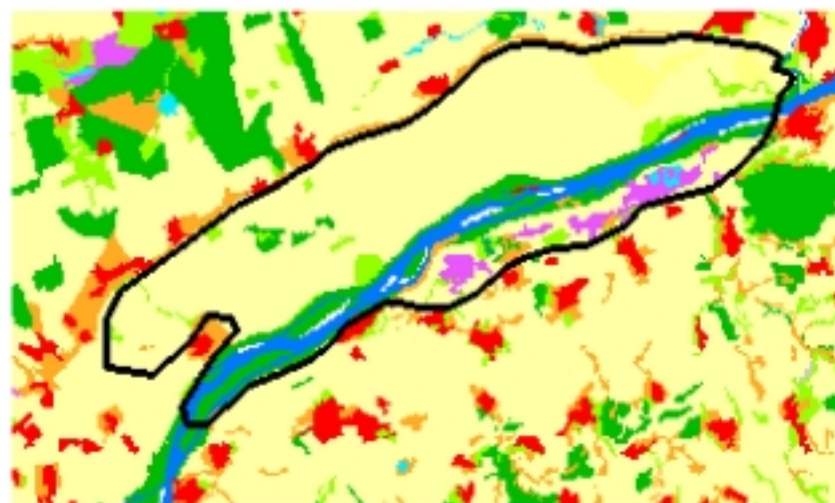
0 2.5 5 7.5 10 kilometers



Danube Pollution Reduction Programme		
	United Nations Development Programme Global Environment Facility GEF - Programme Coordination Unit 1400 Thomas, P. O. Box 200, Zurich	
Financed by WWF Danube-Capitania Programme		
WWF - Jean-Luc Rothig (WWF-Chemnitz)		
Frankfurt, D-76177 Frankfurt 1999		
		




Comparison of historical and recent view

Proposed Restoration Area Nr. 12: Balta Geaca/Tutrican



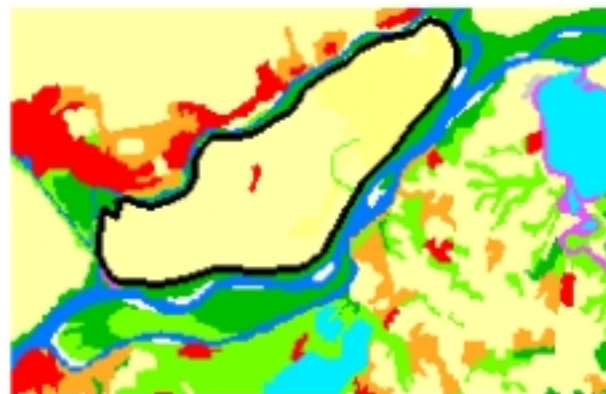
0 2.5 5 7.5 10 kilometers



Disaster Prevention Reduction Programme		
	United Nations Environment Programme Global Environment Facility UNEP - Programme Co-ordinator Unit 1401 White, F.O. Box 963, Zurich	
Financed by UNEP/Global Environment Programme		
WWF International (WWF-Swiss)		
Zurich, 1, CH-8030 Zurich 1999		
		

Comparison of historical and recent view

Proposed Restoration Area Nr. 13: Island next to Calarasc



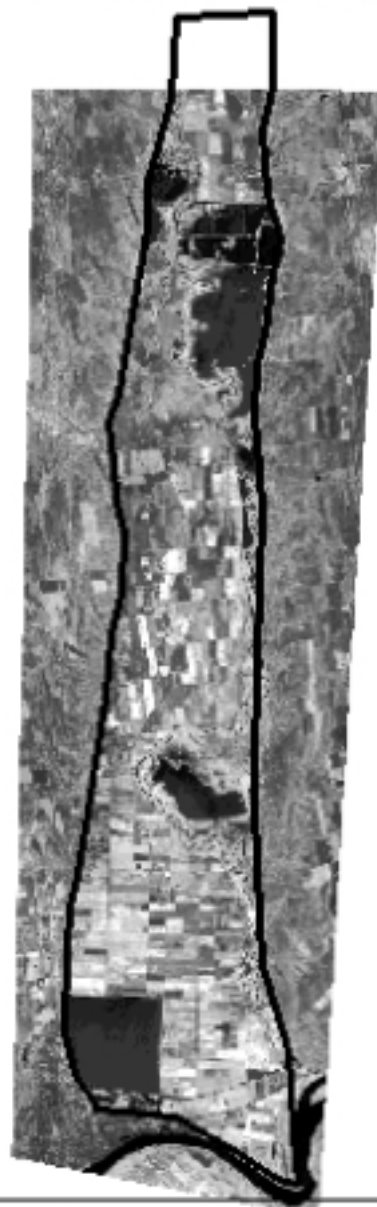
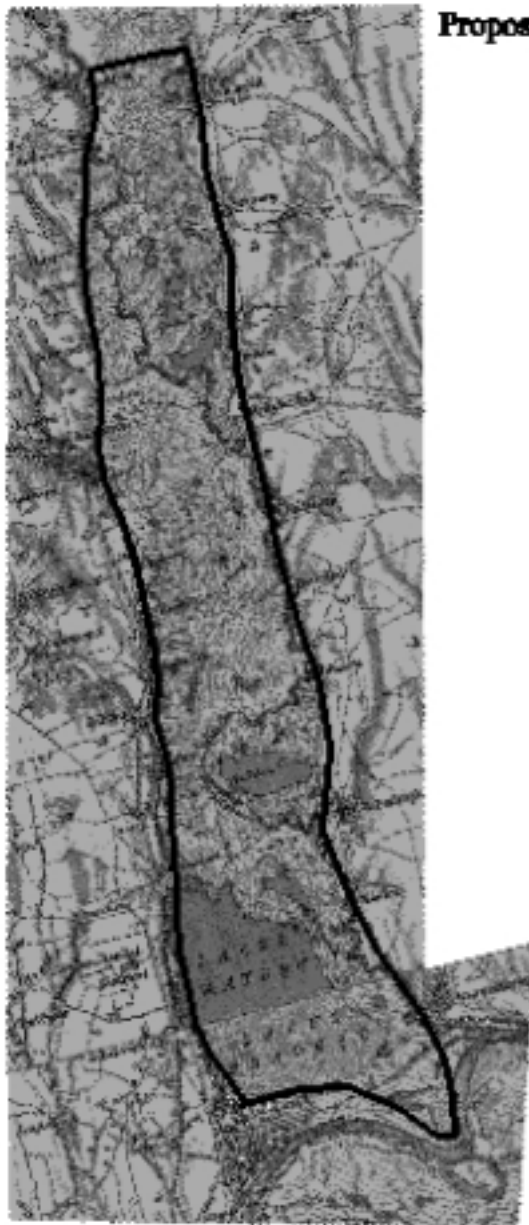
0 2.5 5 7.5 10 kilometers






Danube Pollution Reduction Programme		
	United Nations Development Programme Global Environment Facility ECE/E - Programme Coordination Unit 1400 Vienna, P. O. Box 300, Austria	
Financed by WWF Climate-Change Programme		
WWF Swiss Institute (WWF-Geneva)		
Facility: 1, D-70177 Stuttgart 1999		
		

Comparison of historical and recent view

Proposed Restoration Area Nr. 14: Lower Prut

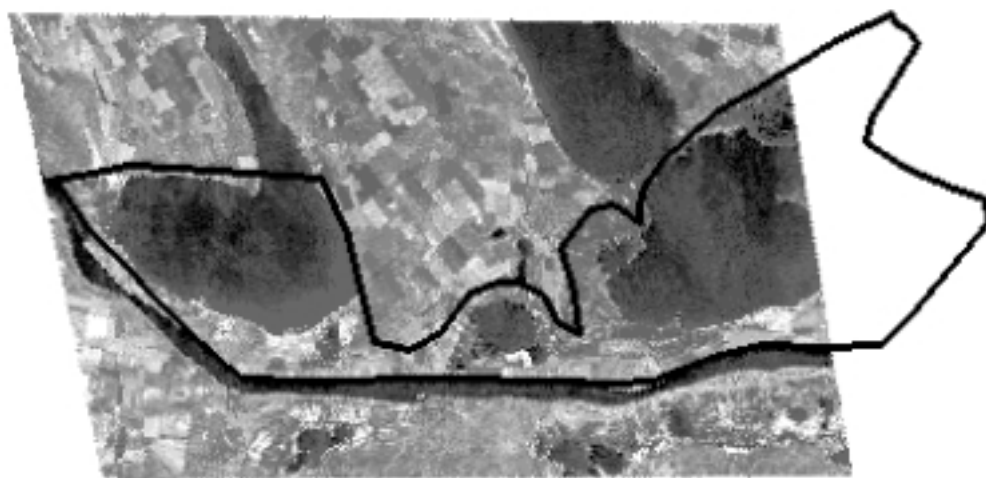


0 2.5 5 7.5 10 kilometers

Danube Pollution Reduction Programme		
	United Nations Development Programme Global Environment Facility K2ES - Programme Coordination Unit 1400 Plaza, P. O. Box 300, Austin	
Financed by WWF Danube-Capital Programme		
WWF, Jean-Sebastien (WWF-Germany)		
Frankfurt, D-70477 Frankfurt		1999

Comparison of historical and recent view

Proposed Restoration Area Nr. 15: Limen Lakes



0 2.5 5 7.5 10 kilometers



Danube Pollution Reduction Programme		
	United Nations Development Programme Global Environment Facility EUSE - Programme Coordination Unit 1400 Vienna, P. O. Box 200, Austria	
Financed by WWF Danube-Chapline Programme		
WWF Swiss Institute (WWF-Geneva) Sankta. 1, D-74177 Postfilz 1999		

Comparison of historical and recent view

Proposed Restoration Area Nr. 16: Polder Pardina in the Danube Delta



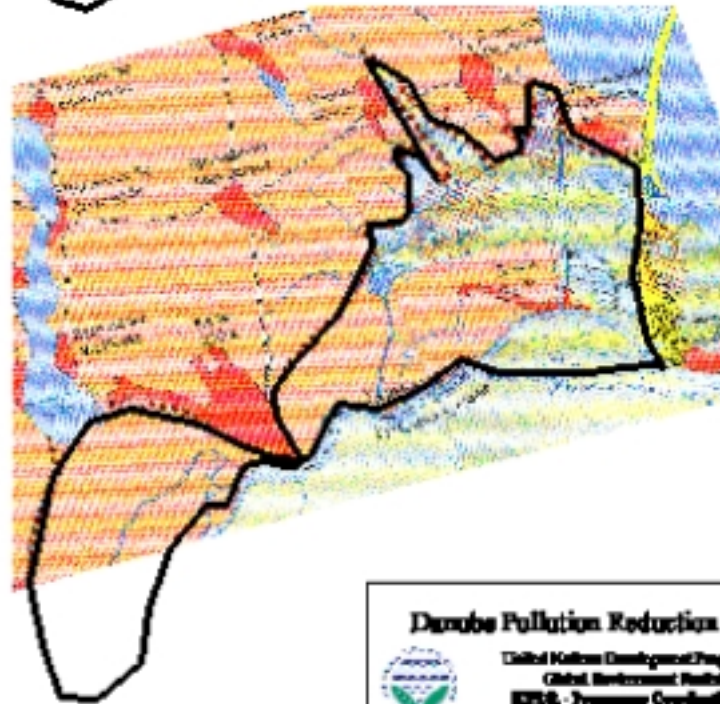
0 2.5 5 7.5 10 kilometers





Danube Pollution Reduction Programme		
	United Nations Development Programme Global Environment Facility EPPR - Programme Coordination Unit 1400 Vienna, P. O. Box 200, Austria	
Financed by WWF Danube-Capital Programme		
WWF - Jean-Sebastien (WWF-Germany)		
Sankta. L. D-74177 Stuttgart 1999		
		

Comparison of historical and recent view

Proposed Restoration Area Nr. 17: Ukrainian part of Danube-Delta



0 2.5 5 7.5 10 kilometers


Danube Pollution Reduction Programme		
	United Nations Development Programme Global Environment Facility EPPR - Programme Coordination Unit 1400 Vienna, P. O. Box 20, Austria	
Financed by WWF Danube-Capital Programme		
WWF, Jean-Luc Gattol (WWF Germany) Senften, L, D-74477 Korbach 1999		