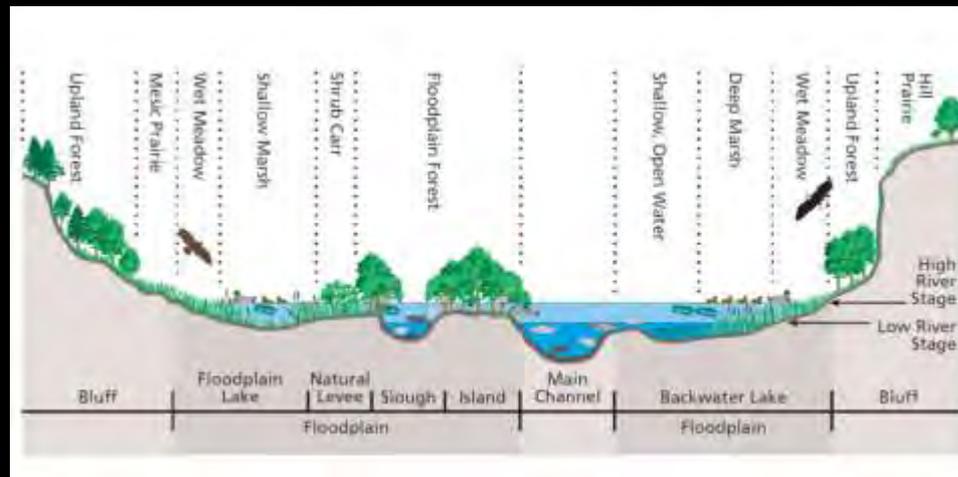
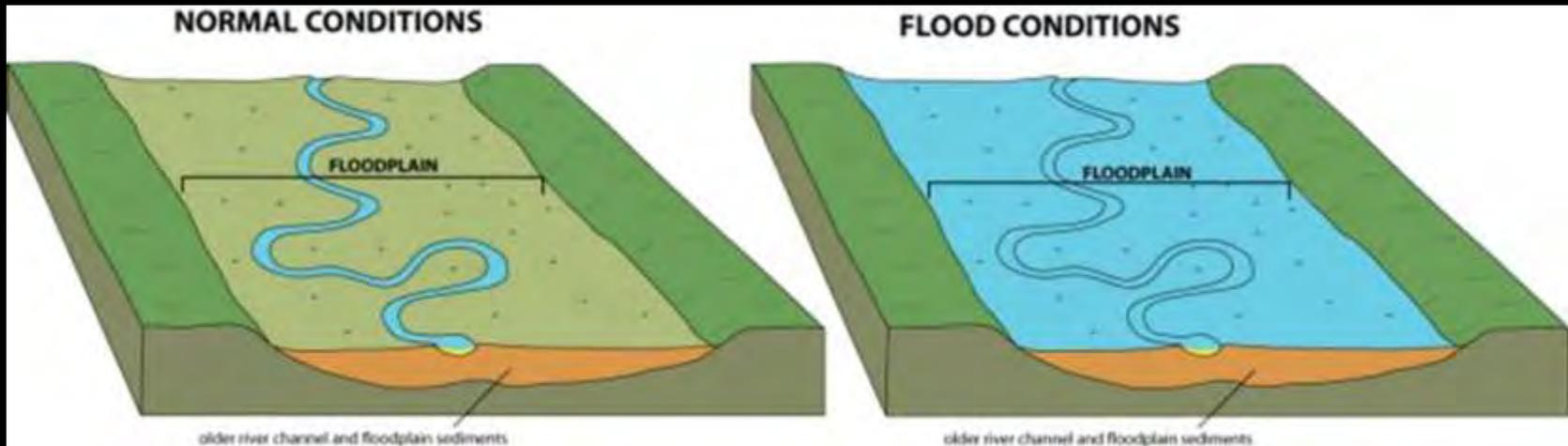


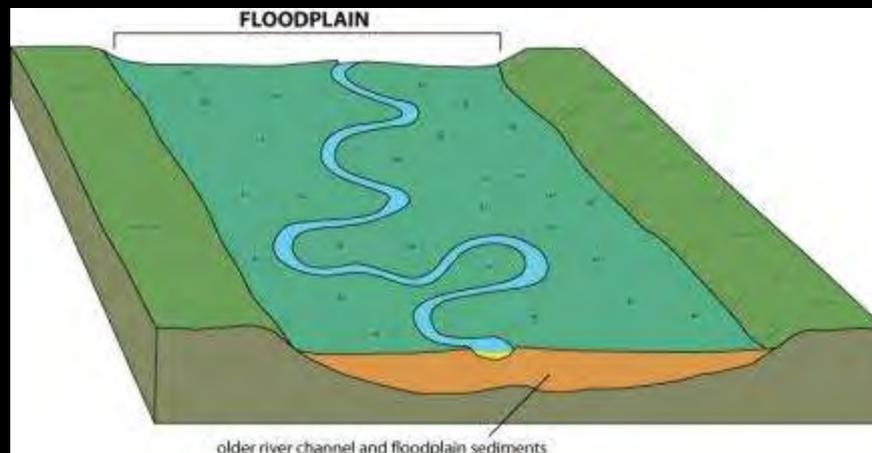
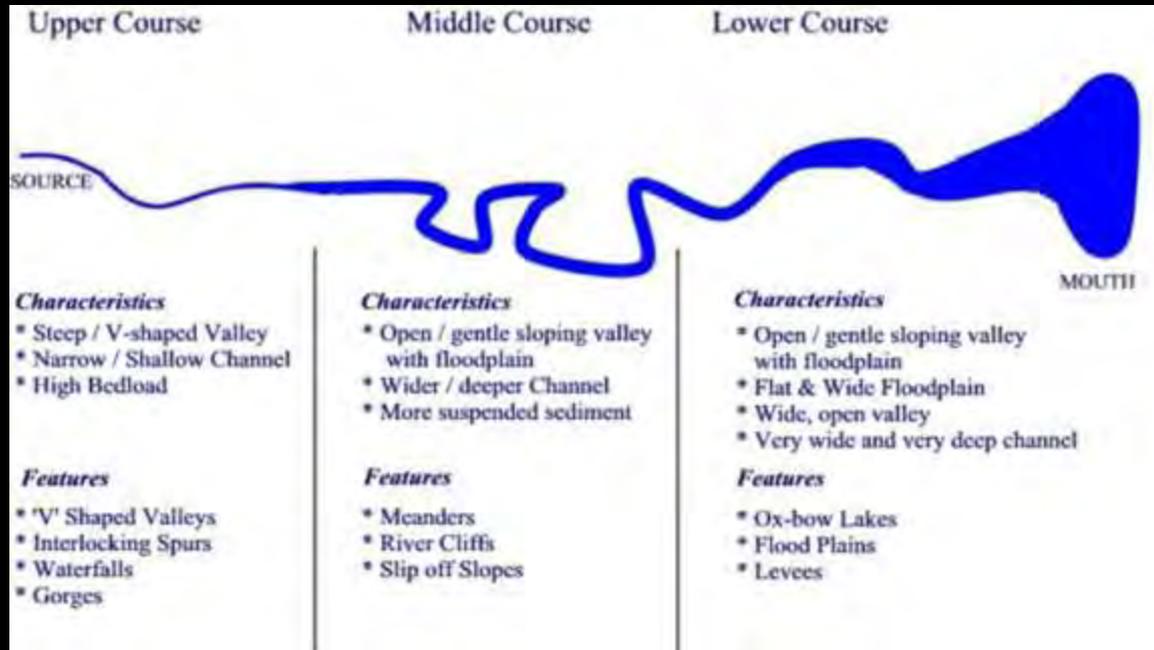
Bottomland: Floodplain Habitats

Kevin Anderson, Ph.D.

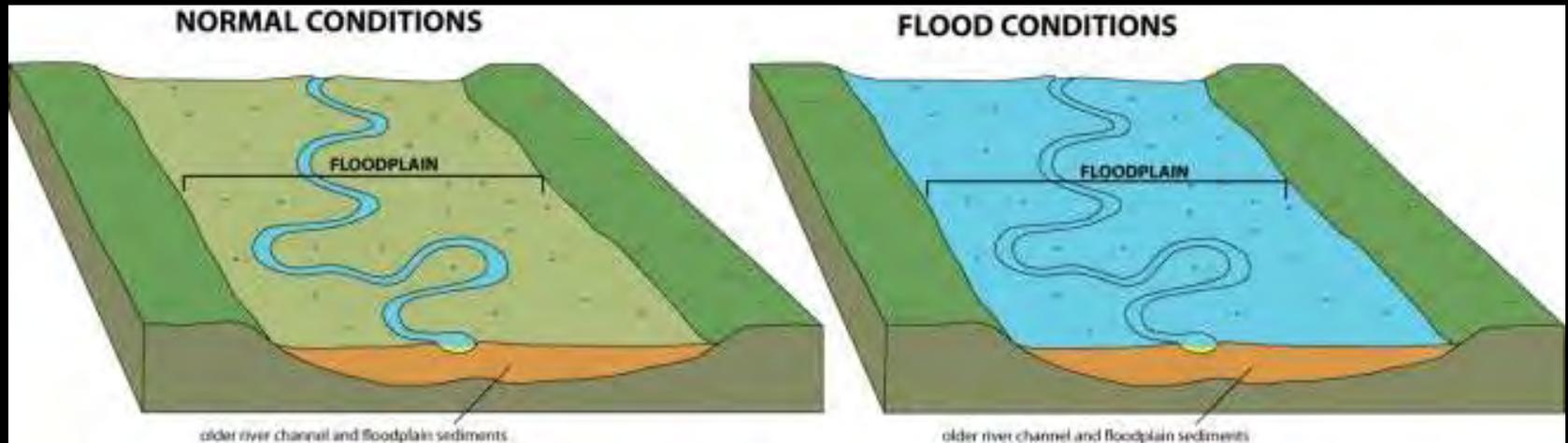
Austin Water - Center for Environmental Research



The Middle and Lower Course: Life in the Bottomland



Floodplain



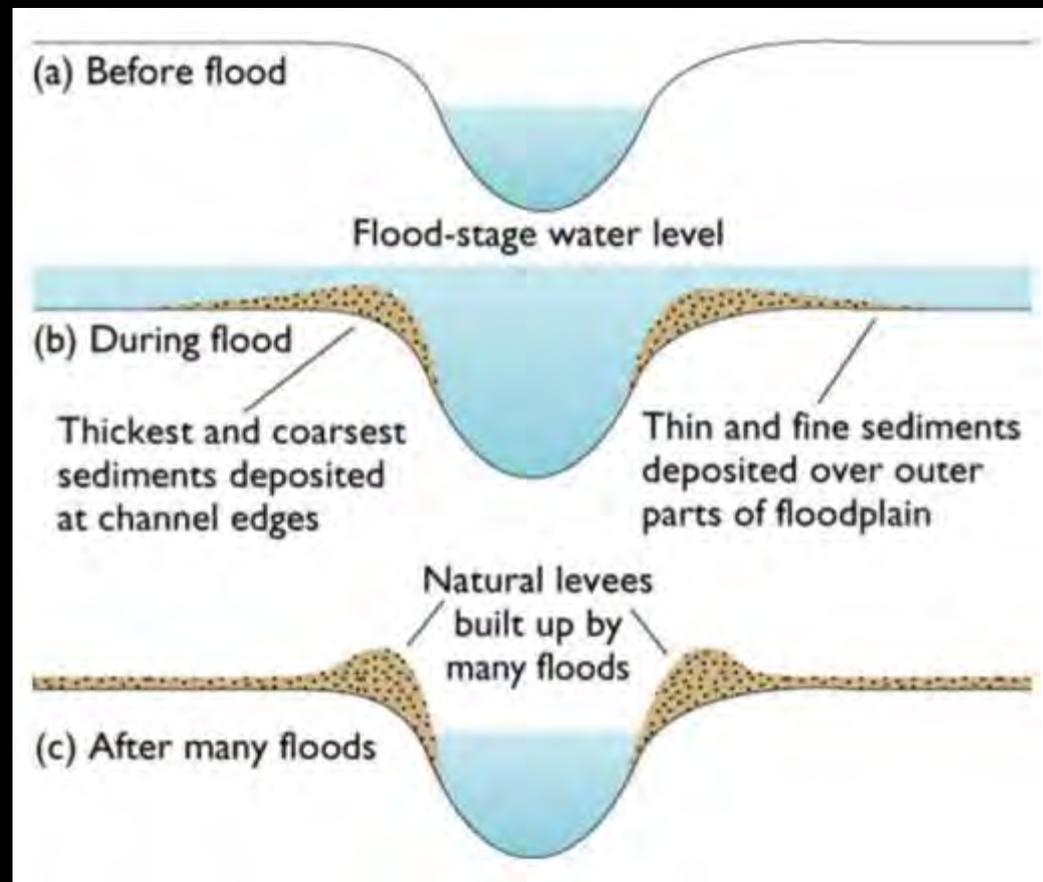
A floodplain is a low-lying plain on both sides of a river that has repeatedly overflowed its banks and flooded the surrounding areas.

When the floods subside, alluvium is deposited on the floodplain.

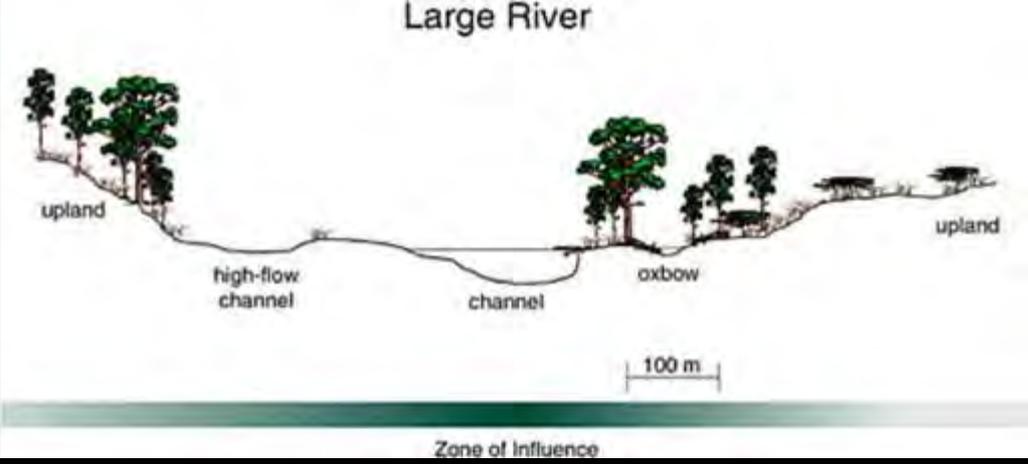
Floodplains and Levees

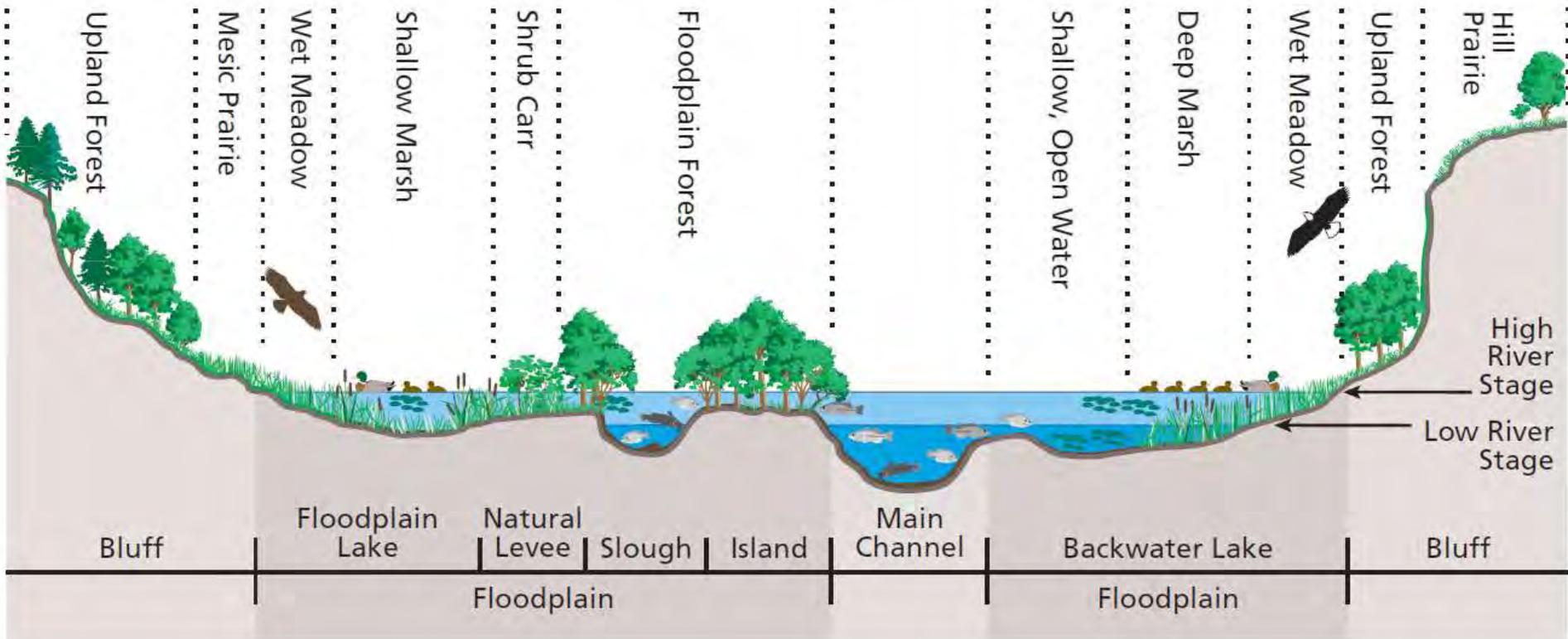
The larger suspended material, being heavier, is deposited at the river banks while the finer sediments are carried and deposited further away from the river.

The deposition at the river banks build up into embankments called levees.



High-flow Channels – Flood Scars

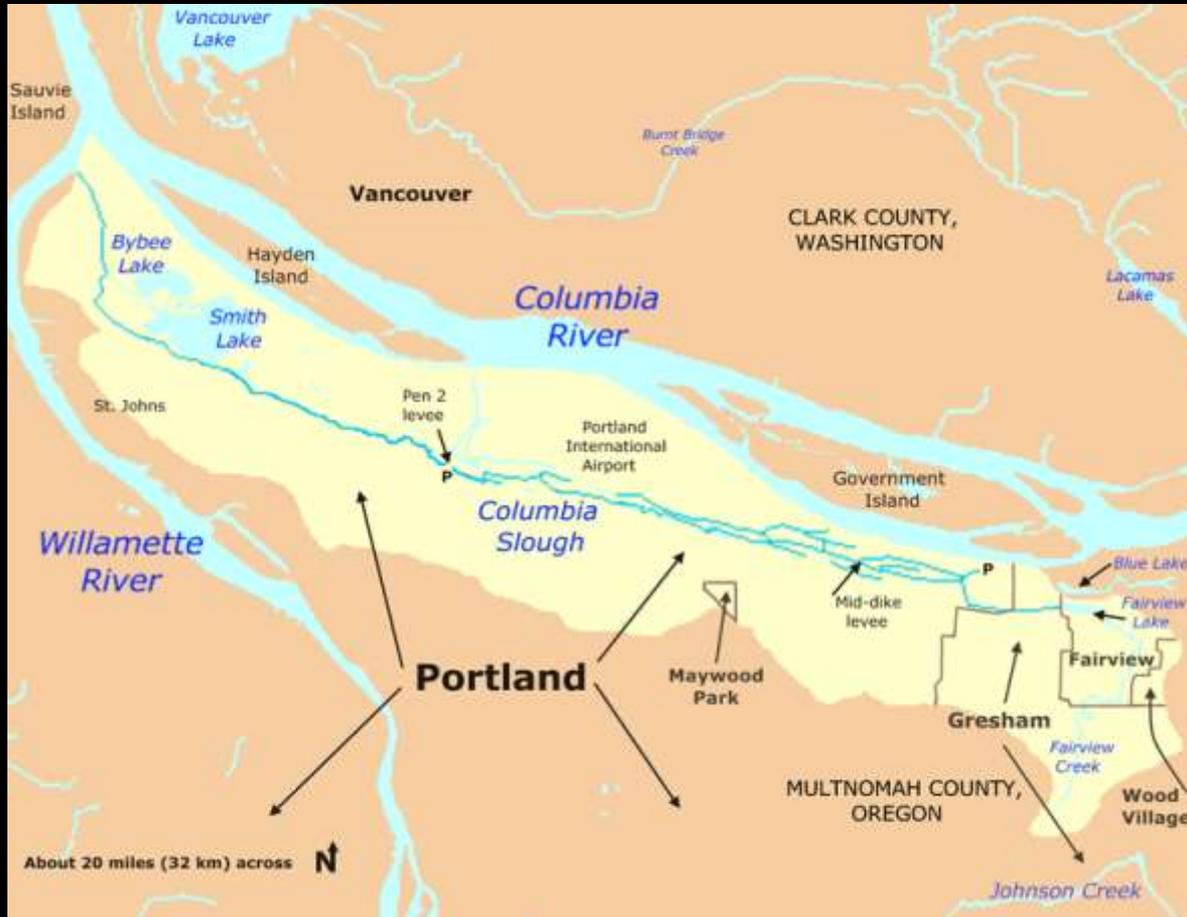




Slough

Slough usually rhymes with shoe in the U.S. except in New England, where it usually rhymes with now, the preferred British pronunciation.

Slough may mean a place of deep mud or mire, a swamp, a river inlet or backwater, or a creek in a marsh or tide flat.



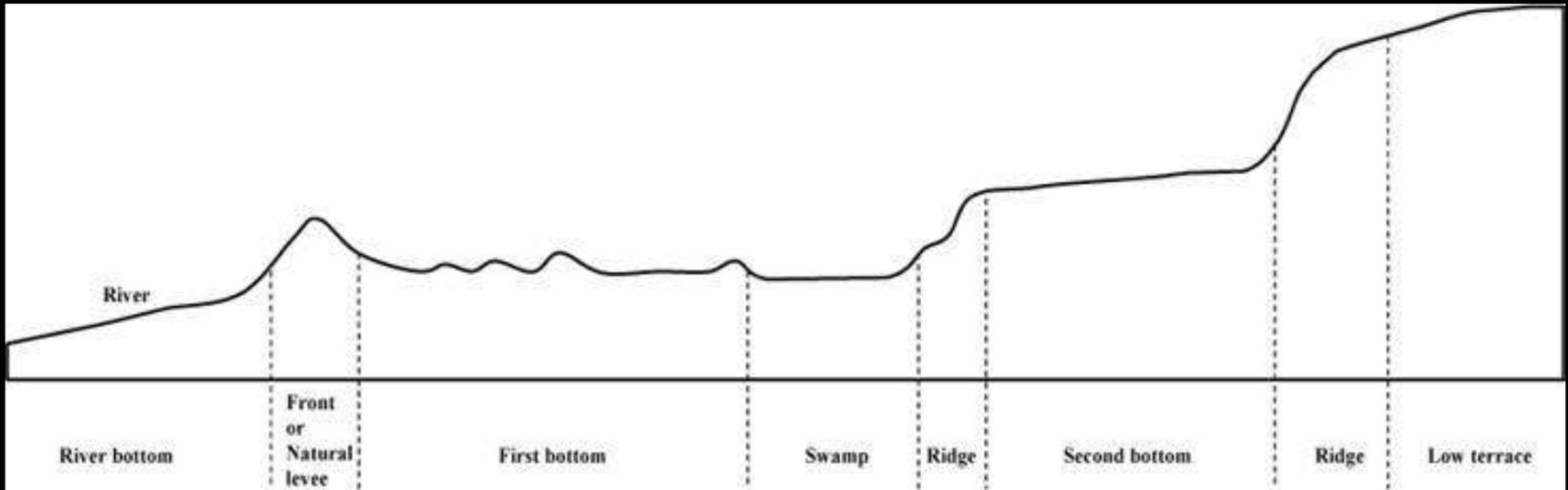
Oxbow Lake



Wet Meadow



Swamps



Bottomland Vegetation



Central Texas Wetland Plants

About This Guide

Central Texas Wetland Plants is a collection of institutional knowledge and photos taken in and around the Austin area. It is not intended to be comprehensive, but rather to be used as a supplement to other resources when identifying plants in Central Texas. Special Thanks to wetland biologist emerita Mike Lyday, whose 20 years of service, dedication and experience established the foundation for wetland protection in the City of Austin.

Wetland Indicator Categories

- **Obligate Wetland (OWL)**: Occur almost always in wetlands (probability >99%)
- **Facultative Wetland (FCW)**: Usually occur in wetlands (57%-89%)
- **Facultative (FAC)**: Usually likely to occur in wetlands or nonwetlands (34%-66%)
- **Facultative Upland (FACU)**: Occasionally found in wetlands (1%-32%)
- **Obligate Upland (OUL)**: Occur almost always in nonwetlands in the specified region

A positive (+) or negative (-) sign in used with the FAC category to indicate a regionally slighter or lower frequency of being found in wetlands, respectively.

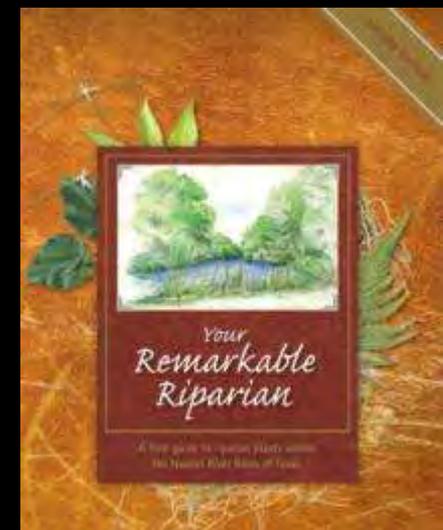
Photo credits: Mike Lyday, Bill Gier, Andrew Garman, Morgan Grubbs, Emily Pearson, and Scott Hiers

Field Guide

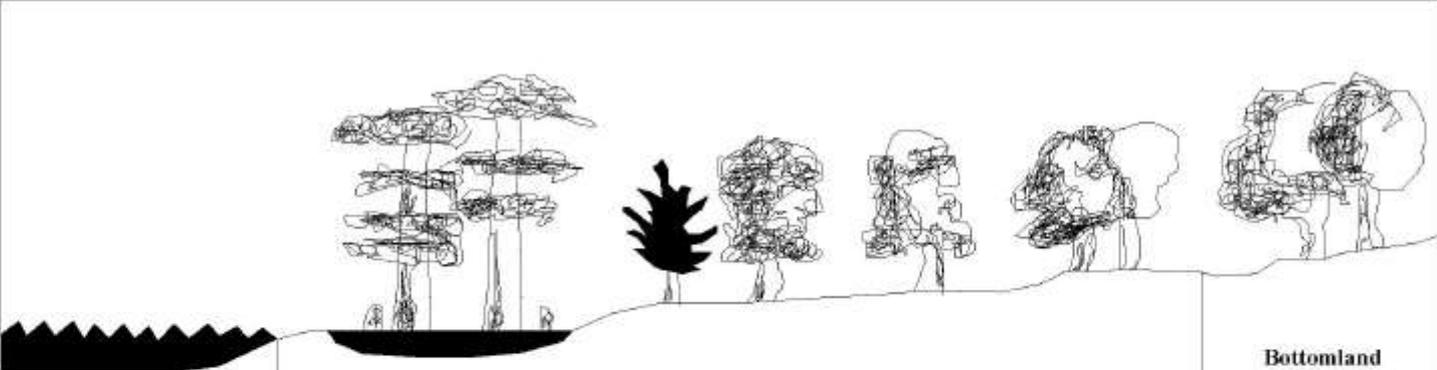


Plant community structured by hydrology

Hydric Soils



Bottomland Forest Vegetation



The diagram illustrates a cross-section of bottomland forest vegetation zones. From left to right, it shows an aquatic ecosystem (Zone I) with open water, a swamp (Zone II) with cypress trees, lower hardwood wetlands (Zone III) with various trees, medium hardwood wetlands (Zone IV) with trees, higher hardwood wetlands (Zone V) with trees, and a transition to uplands (Zone VI) with trees on a rising slope.

	Aquatic ecosystem	Bottomland hardwood ecosystem				Bottomland upland transition
Zone	I	II	III	IV	V	VI
Name	Open water	Swamp	Lower hardwood wetlands	Medium hardwood wetlands	Higher hardwood wetlands	Transition to uplands
Water modifier	Continuously flooded	Intermittently flooded	Semipermanently flooded	Seasonally flooded	Temporarily flooded	Intermittently flooded
Flooding frequency, % of year	100	~100	51 - 100	51 - 100	11 - 51	1 - 10
Flooding duration, % of growing season	100	~100	> 25	12.5 - 25	2 - 12.5	< 2

Bottomland/Floodplain Forest Vegetation



Vertical structure – groundcover, understory, canopy

Pennsylvania Bottomland Forest



Texas - Neches River



Bottomland Faunal Biodiversity



Table 1

PIF Physiographic Regions that Identify Bottomland Hardwoods and Forested Wetlands as Priority Habitats for Conservation with Associated Priority Bird Species¹

PIF Priority Species	Subtropical Florida (01)	Peninsular Florida (02)	South Atlantic Coastal Plain (03)	East Gulf Coastal Plain (04)	Mississippi Alluvial Valley (05)	Coastal Prairies (06)	Interior Low Plateaus (18)	Ozarks and Ouachitas (19)	West Gulf Coastal Plain (42)	Mid-Atlantic Coastal Plain (44)
Acadian Flycatcher							X	X		
American Redstart							X			
Black-throated Green Warbler ²			X							
Blue-gray Gnatcatcher					X					
Carolina Chickadee					X			X		X
Cerulean Warbler			X	X	X		X	X	X	X
Chimney Swift				X						X
Great-crested Flycatcher								X		
Hooded Warbler			X						X	
Kentucky Warbler				X	X			X	X	X
Louisiana Waterthrush								X	X	
Northern Parula			X		X		X			
Ovenbird								X		
Pileated Woodpecker								X		
Prothonotary Warbler			X	X	X	X	X	X	X	X
Red-headed Woodpecker				X	X				X	
Ruby-throated Hummingbird					X					
Scarlet Tanager										X
Summer Tanager			X					X		
Swainson's Warbler			X	X	X	X	X	X	X	X
Swallow-tailed Kite	X	X	X	X	X	X			X	
Yellow-billed Cuckoo			X	X	X			X	X	
Yellow-throated Vireo			X							X
Yellow-throated Warbler							X	X		
Wood Thrush			X		X		X			X
Worm-eating Warbler			X	X	X			X	X	X

¹ The "X" denotes priority species identified by PIF within each physiographic region.

² Refers to a subspecies, Wayne's Black-throated Green Warbler (*Dendroica virens waynei*), that breeds along the Atlantic coast in cypress swamps.



THE WOODS AREN'T deep enough. At least they aren't on the forest floor. In the lower-level woods they're just a log. The larger U.S. woodpecker, the ivory-billed woodpecker, is a bird that needs a lot of dead trees. It's a bird that needs a lot of dead trees.

MAKING DOLLARS AND SENSE IN IVORY-BILL COUNTRY

By Roger D. Simon

While biologists figure out how to protect the ivory-billed woodpecker, local residents are turning the endangered bird into cash.

PHOTO: JEFFREY M. HARRIS



Eastern Arkansas could teach pool tables a few things about being flat. Lying in the vast Mississippi River floodplain, the terrain on all sides stretches unimpeded to the most distant horizons. In such a level place, rivers feel mean to expand during flood season, eroding the soil and giving rise to lateral oxbow-lake floodplains that, 300 years ago, covered 20 million acres.

PHOTO: JEFFREY M. HARRIS



THE PLAYERS aren't the only ones who are playing. In the floodplain, the ivory-billed woodpecker is a bird that needs a lot of dead trees. It's a bird that needs a lot of dead trees. It's a bird that needs a lot of dead trees. It's a bird that needs a lot of dead trees.

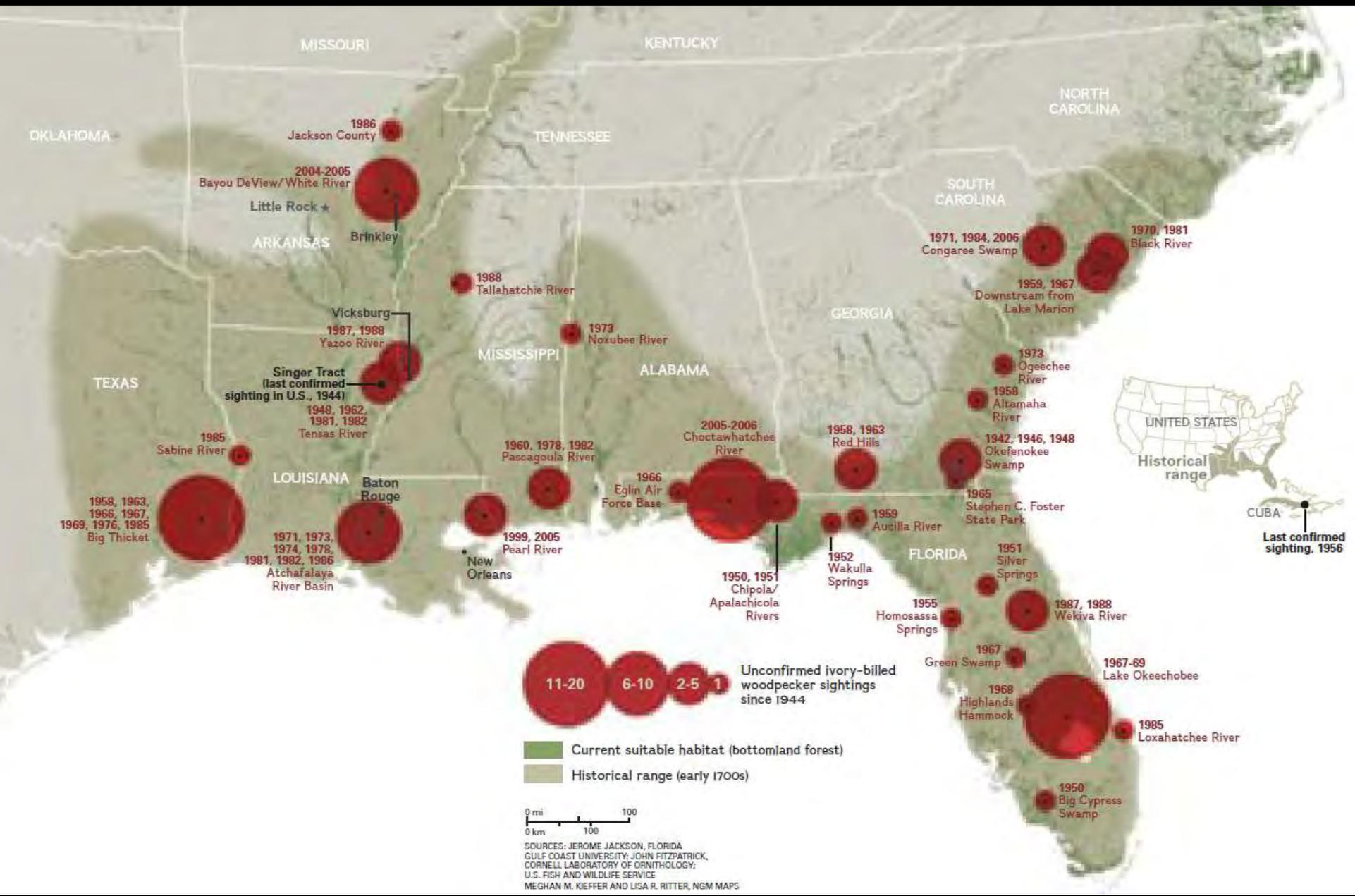


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PHOTO: JEFFREY M. HARRIS



MISSOURI

KENTUCKY

NORTH CAROLINA

OKLAHOMA

TENNESSEE

SOUTH CAROLINA

ARKANSAS

GEORGIA

TEXAS

MISSISSIPPI

ALABAMA

LOUISIANA

FLORIDA

UNITED STATES

Historical range

CUBA

Last confirmed sighting, 1956

1986 Jackson County

2004-2005 Bayou DeView/White River

Little Rock

Brinkley

1988 Tallahatchie River

Vicksburg

1987, 1988 Yazoo River

Singer Tract (last confirmed sighting in U.S., 1944)

1948, 1962, 1981, 1982 Tensas River

1985 Sabine River

1958, 1963, 1966, 1967, 1969, 1976, 1985 Big Thicket

1971, 1973, 1974, 1978, 1981, 1982, 1986 Atchafalaya River Basin

Baton Rouge

1960, 1978, 1982 Pascagoula River

1966 Eglin Air Force Base

1999, 2005 Pearl River

New Orleans

2005-2006 Choctawhatchee River

1950, 1951 Chipola/ Apalachicola Rivers

1958, 1963 Red Hills

1959 Aucilla River

1952 Wakulla Springs

1973 Ogeechee River

1958 Altamaha River

1942, 1946, 1948 Okefenokee Swamp

1965 Stephen C. Foster State Park

1951 Silver Springs

1987, 1988 Wekiva River

1967 Green Swamp

1967-69 Lake Okeechobee

1968 Highlands Hammock

1985 Loxahatchee River

1950 Big Cypress Swamp

Identifying Field Marks of an Ivory-billed Woodpecker and Similar Birds

In flight - view from below

Distinct Ivory-billed Woodpecker characteristics:

- White trailing edge of wing (vs. dark trailing edge of Pileated).
- Wing more slender than Pileated.
- Tail feathers longer and more pointed.
- Pale, ivory-white bill.

Pileated Woodpecker



Ivory-billed Woodpecker

White trailing edge of wing

Red-headed Woodpecker

Wood Duck

In flight - view from above

Distinct Ivory-billed Woodpecker characteristics:

- White trailing edge of wing (vs. dark trailing edge of Pileated).
- Two white stripes converge on lower back.
- Tail feathers longer and more pointed.
- Pale, ivory-white bill.



White trailing edge of wing

Pileated Woodpecker

Red-headed Woodpecker

Wood Duck

Illustrations:
© David Allen Sibley

All views

Distinct Ivory-billed Woodpecker characteristics:

- Two white stripes converge on lower back.
- Entirely white secondary feathers give appearance of white "saddle" on back.
- Largely dark face and dark chin (vs. white chin of Pileated).
- Pale, ivory-white bill.
- Crest is curved and pointed; male crest is red with black forehead (Pileated male crest is entirely red).



Male Ivory-billed Woodpecker

Male Pileated Woodpecker

Red-headed Woodpecker

Female Head

- Female Ivory-bill crest is entirely black (female Pileated crest resembles male ivory-billed red crest with black forehead - use chin color as distinguishing feature)



Female Pileated Woodpecker

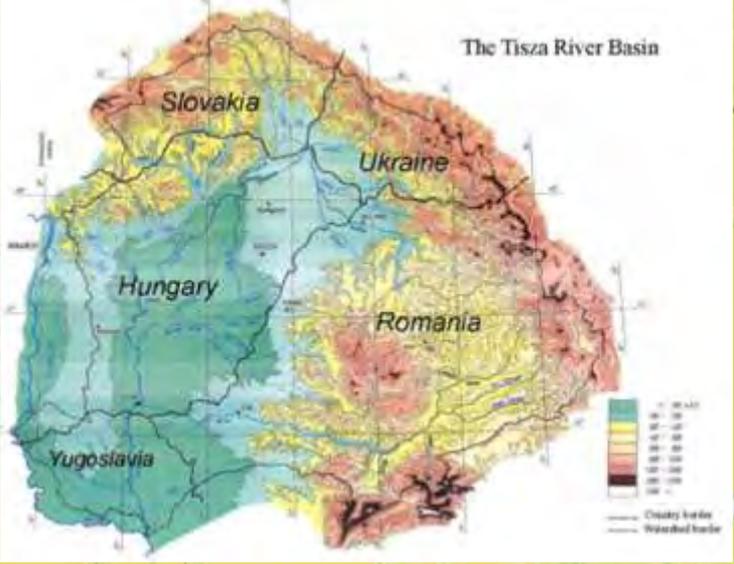
Female Ivory-billed Woodpecker

Case Study

The River Tisza Hungary







The Mythic River
896AD
Magyar
Tribal Leaders
Arpad
Szabolcs



The Magyar River 900 - 1526



The
River of
Refuge
1526 -
1687



Habsburg
Empire

1526-1867

Austro-
Hungarian
Empire

1867-1918



The Lost River – Trianon Treaty 1920

The Dismemberment of Hungary by the Treaty of Trianon - 4 June 1920



Figure 1: Map of the Tisza River Basin.

The Tisza River is about 600 miles long
100 miles lies in Ukraine and Romania
400 miles in Hungary
100 miles in Serbia



The boundaries and names shown and the designations used on these maps do not imply official endorsement or acceptance by the United Nations.

UNEP/DEWA/GRID-Geneva

Kilometres 0 30 60 90 120 150

Tisza river basin



The Upper Tisza River 240 miles

Bodrog River 42 miles



Image © 2013 DigitalGlobe

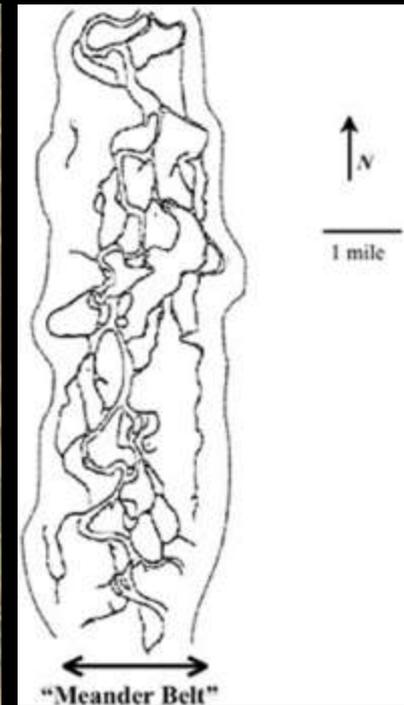
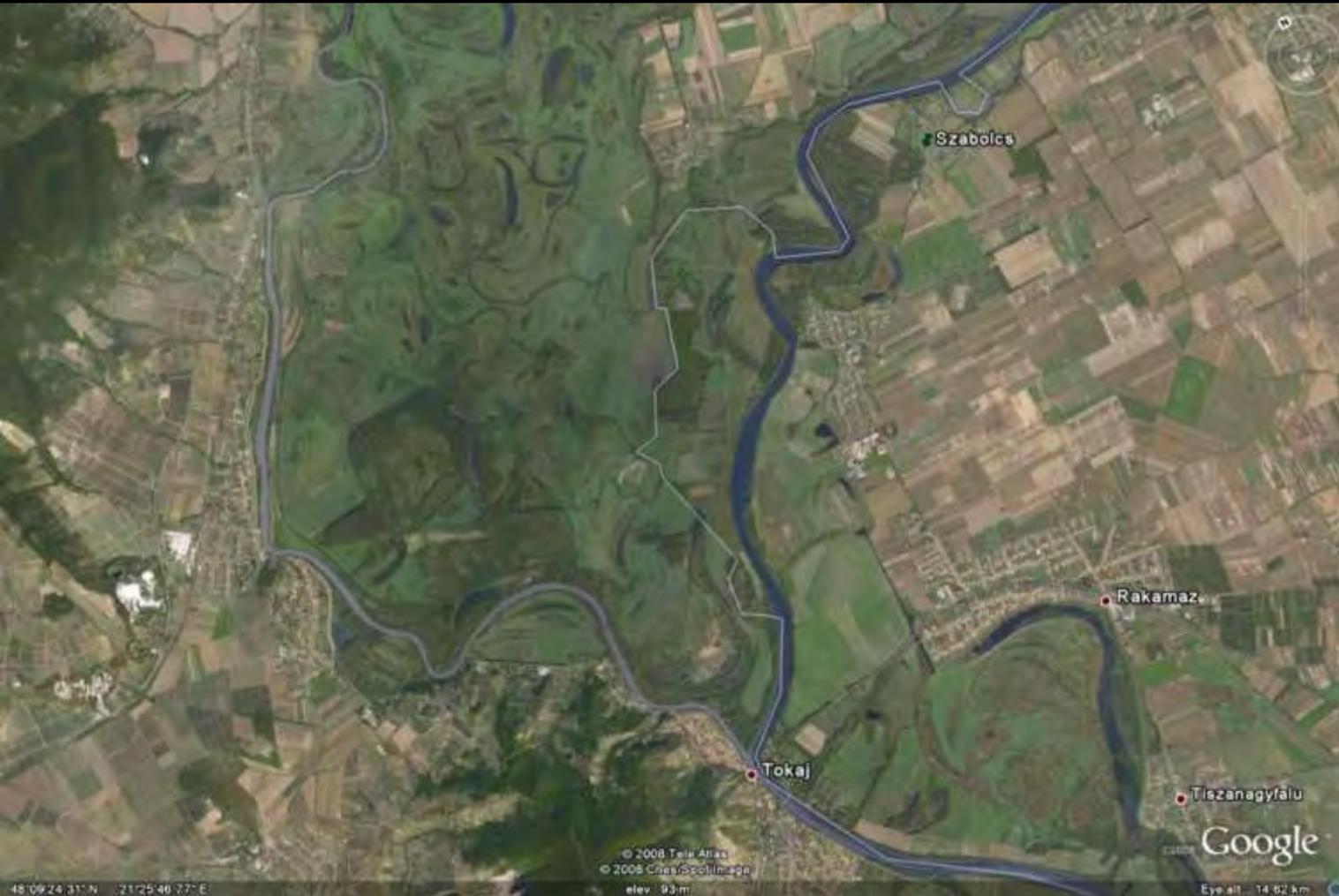
Image Landsat



Imagery Date: 4/9/2013 48°11'06.61" N 22°00'23.71" E elev: 96 ft eye alt: 68.03 km

Bottomland Habitat

Bodrog River meets the Tisza River



Upper Tisza River
Bottomland
Habitat





Szeged

Szeged

Bodrogkisfalud

Bodrogkeresztúr

Zalkod

Szabolcs

Timár

Visz

© 2013 Google
Image © 2013 DigitalGlobe



2010

Imagery date: 15/21/2011 48°1'09.06"N 21°25'52.11"E elev: 95m eye alt: 11.35km





© 2013 Google
Images © 2013 DigitalGlobe

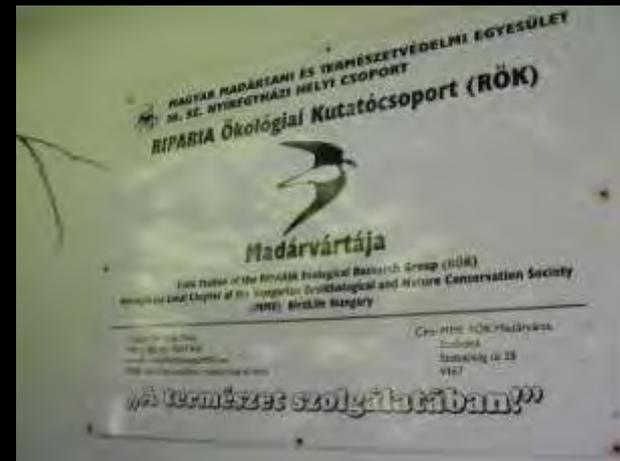


2010

Treasury Dept 12/21/2011 4621031.4111 21°29'45.07" E elev 105 m eye alt 830 m

Tisza River Ecological Research Field Center

Established 2002



SZABOLCS

This is the village that Szabolcs county was named after. From St. Stephen's reign until the Mongol invasion of 1241-42, Szabolcs belonged to the king: it was only in the second half of the thirteenth century that it passed into the hands of private owners. In 1092, the parliament was held here under the chairmanship of King László.

The Szabolcs Earthworks date back to the tenth century and are perhaps the most spectacular of all such earthworks in the Carpathian Basin. Anonymous, the great historian, believed them to have been built on the instructions of Szabolcs, one of the leaders of the seven tribes of the Hungarian conquest. The earthworks served as a cemetery until 1973.

The other monument of great value to be found in Szabolcs is the Calvinist church. This romanesque building, originally dedicated to Mary the Virgin, was presumably founded by St. Stephen. The neo-baroque mansion of the Mudrány family is another monument worth admiring. The building, renovated in 1980, now houses the handicrafts collection of the Jóna András Museum of Nyíregyháza.





The Mythic River 896AD Magyar Tribal Leaders Arpad Szabolcs

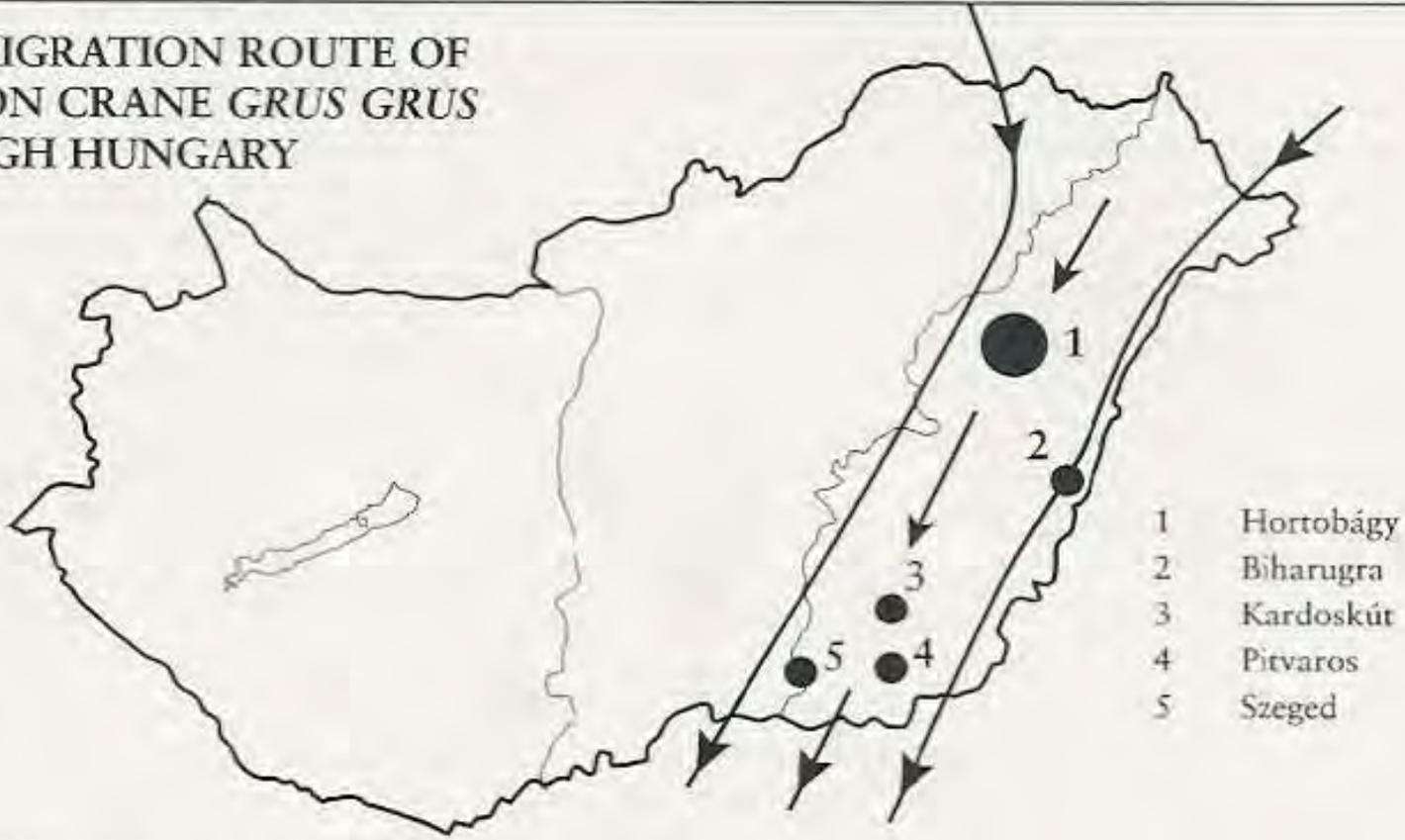


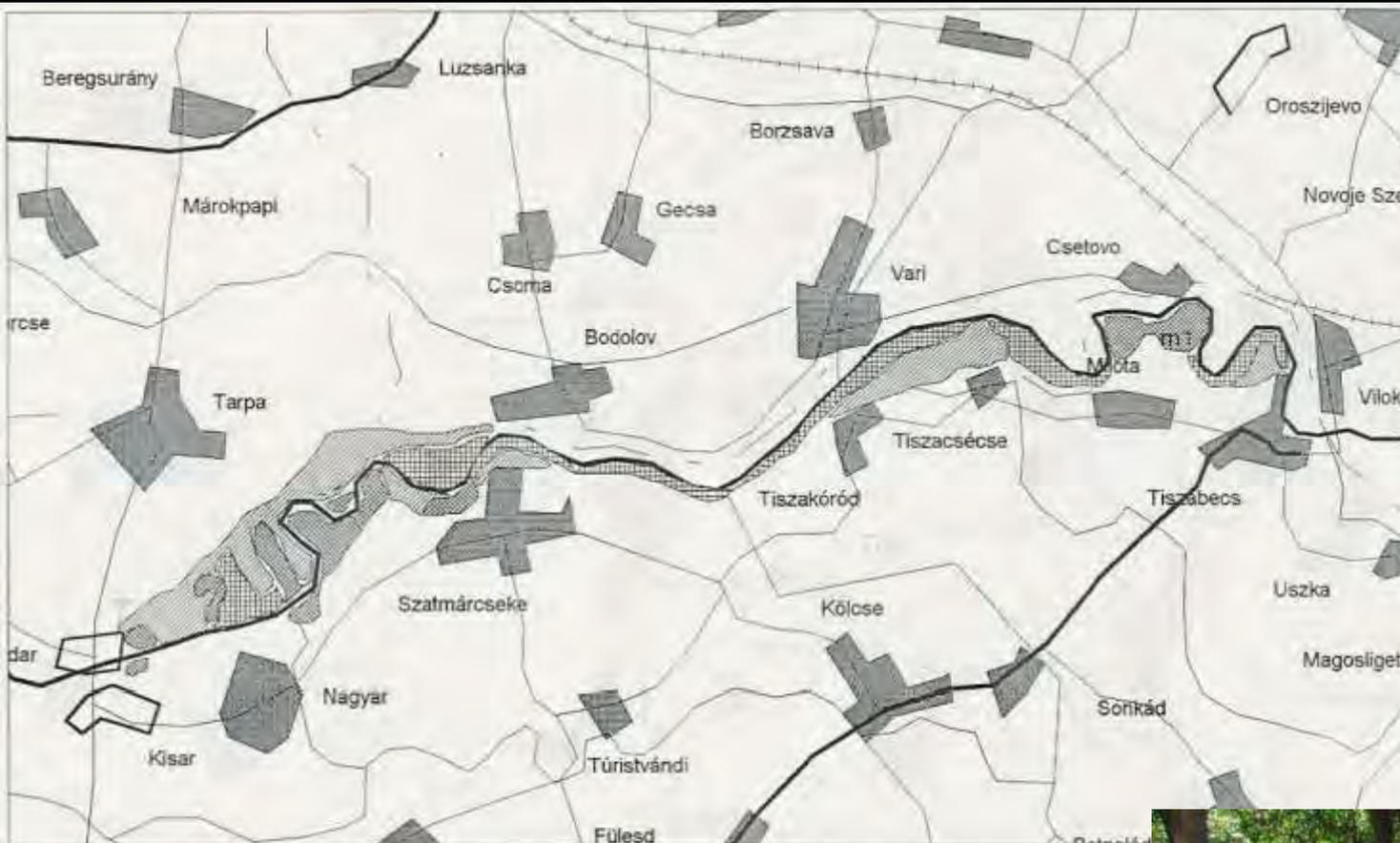
Breeding site for Storks

[*Cinconia cinconia*]



MAIN MIGRATION ROUTE OF
COMMON CRANE *GRUS GRUS*
THROUGH HUNGARY





Valuable natural area



Natural area

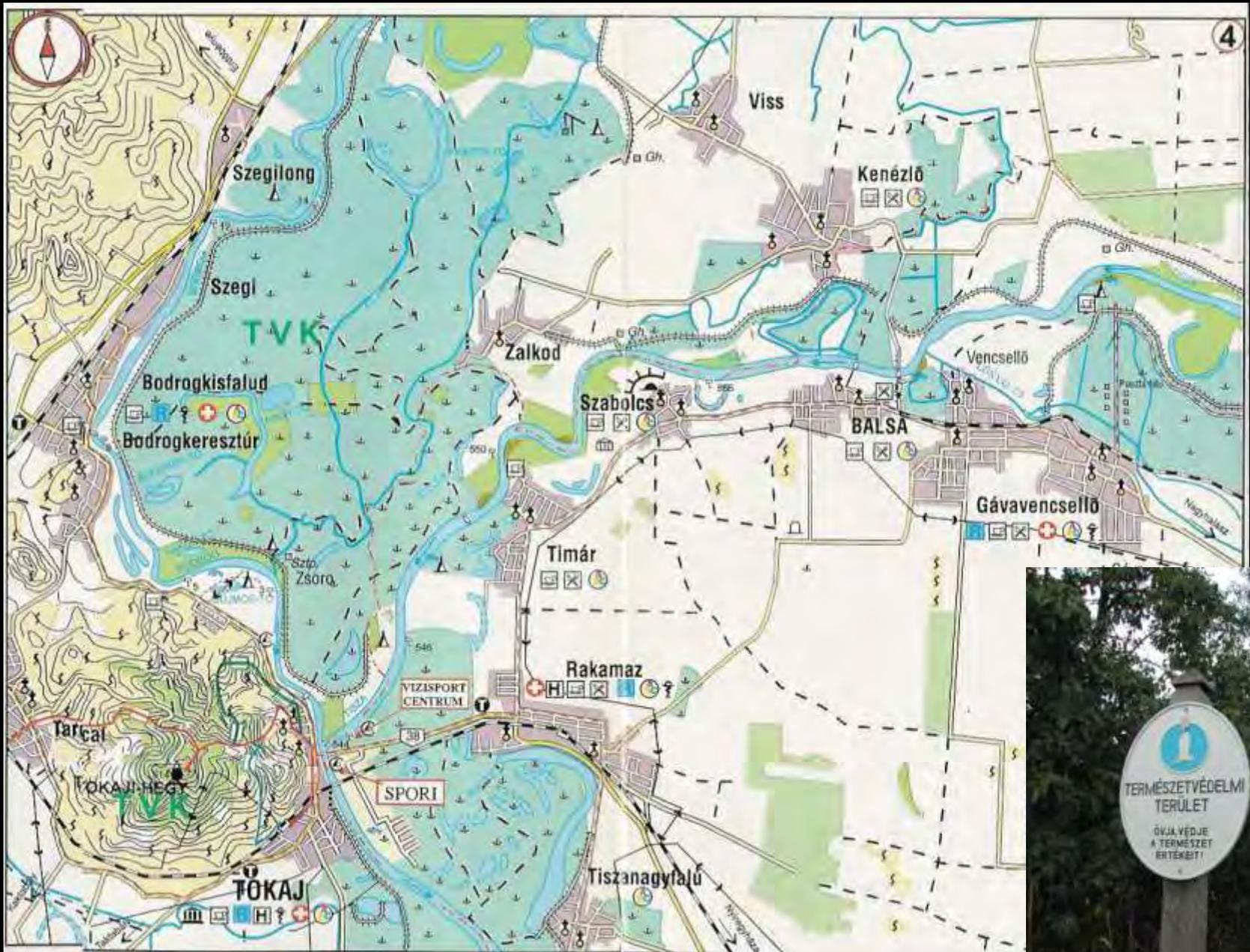


Regeneration area

Riparian Habitat Mapping Project 1991

225km along the upper Tisza River

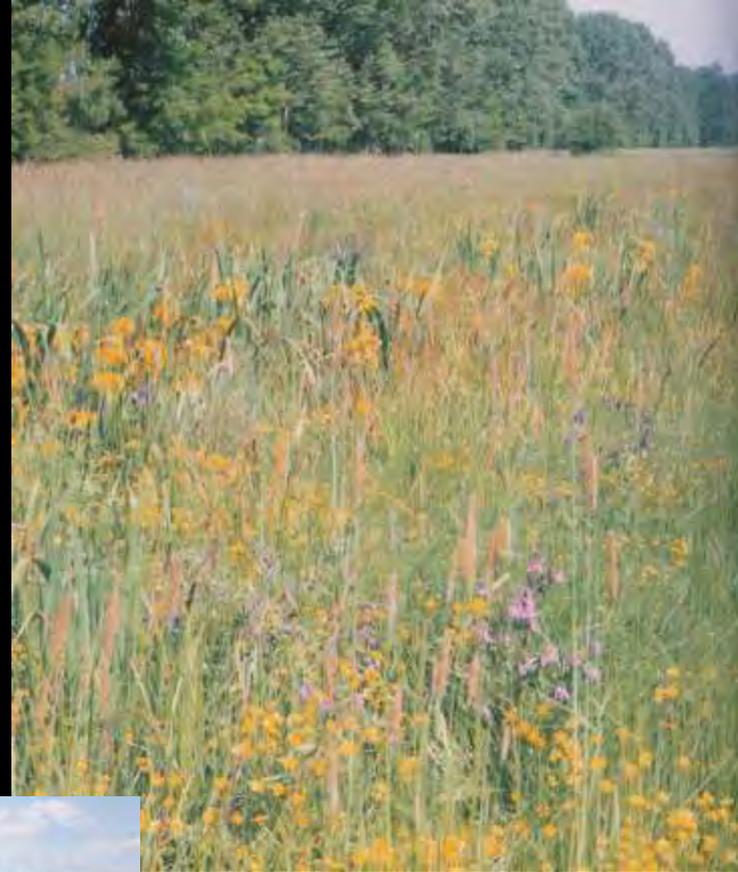






Forest wetland

Tisza River
Bodrog River
Bottomland
Habitats
Oxbow lake wetland



Wet meadow





VISZONTLÁTÁSRA !