

Bottomland: Floodplain Habitats and the River Tisza

Kevin Anderson, Ph.D.

Austin Water - Center for Environmental Research

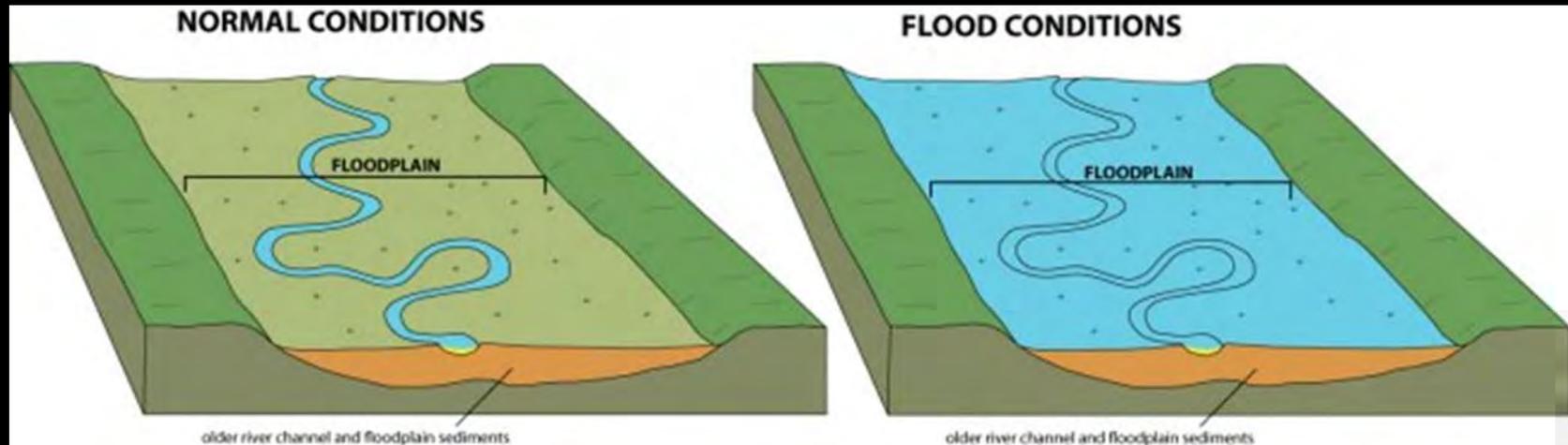
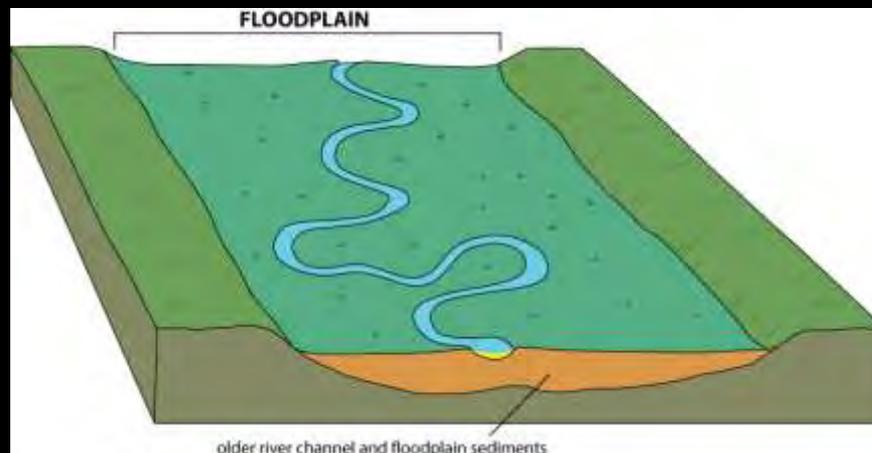
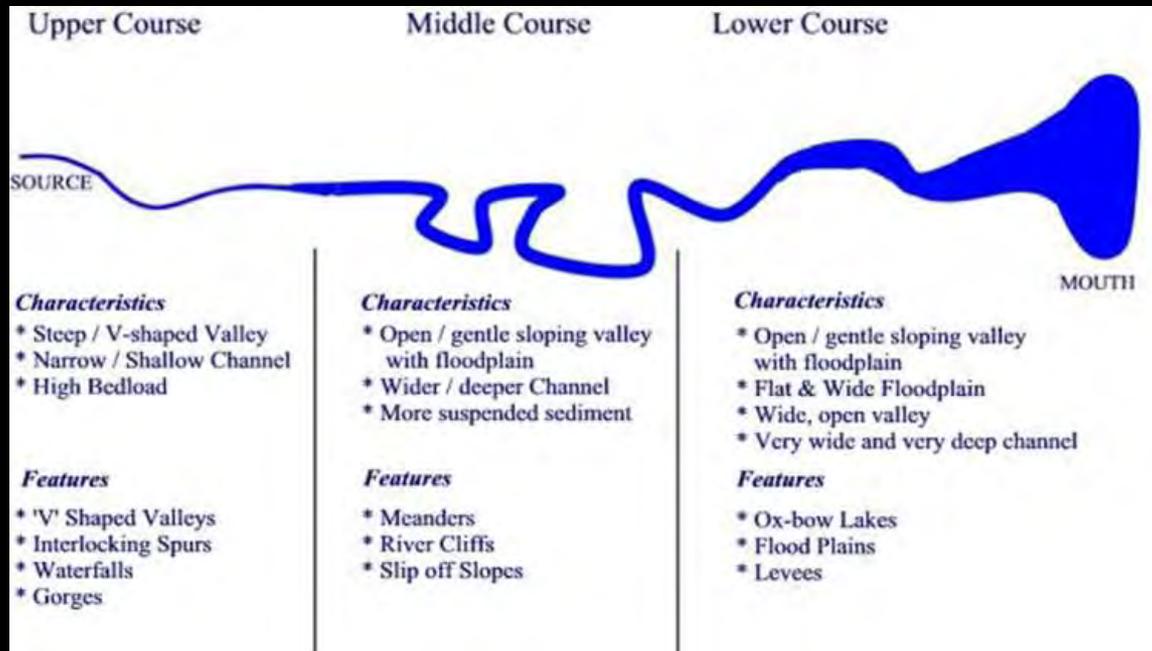


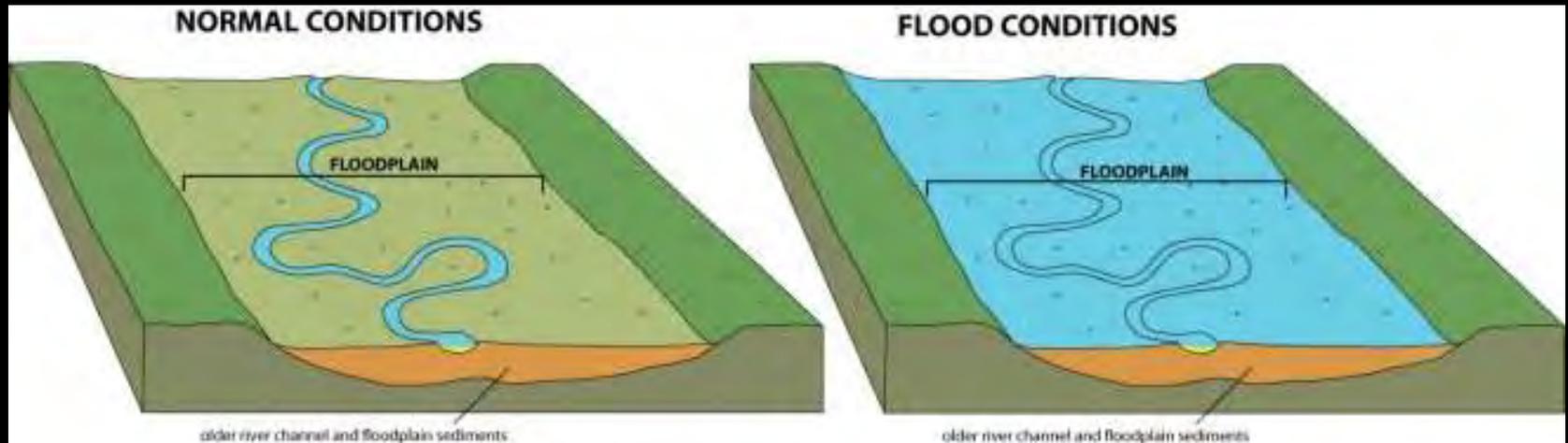
Figure 1. Map of the Tisza River Basin.



The Middle and Lower Course: Life in the Bottomland



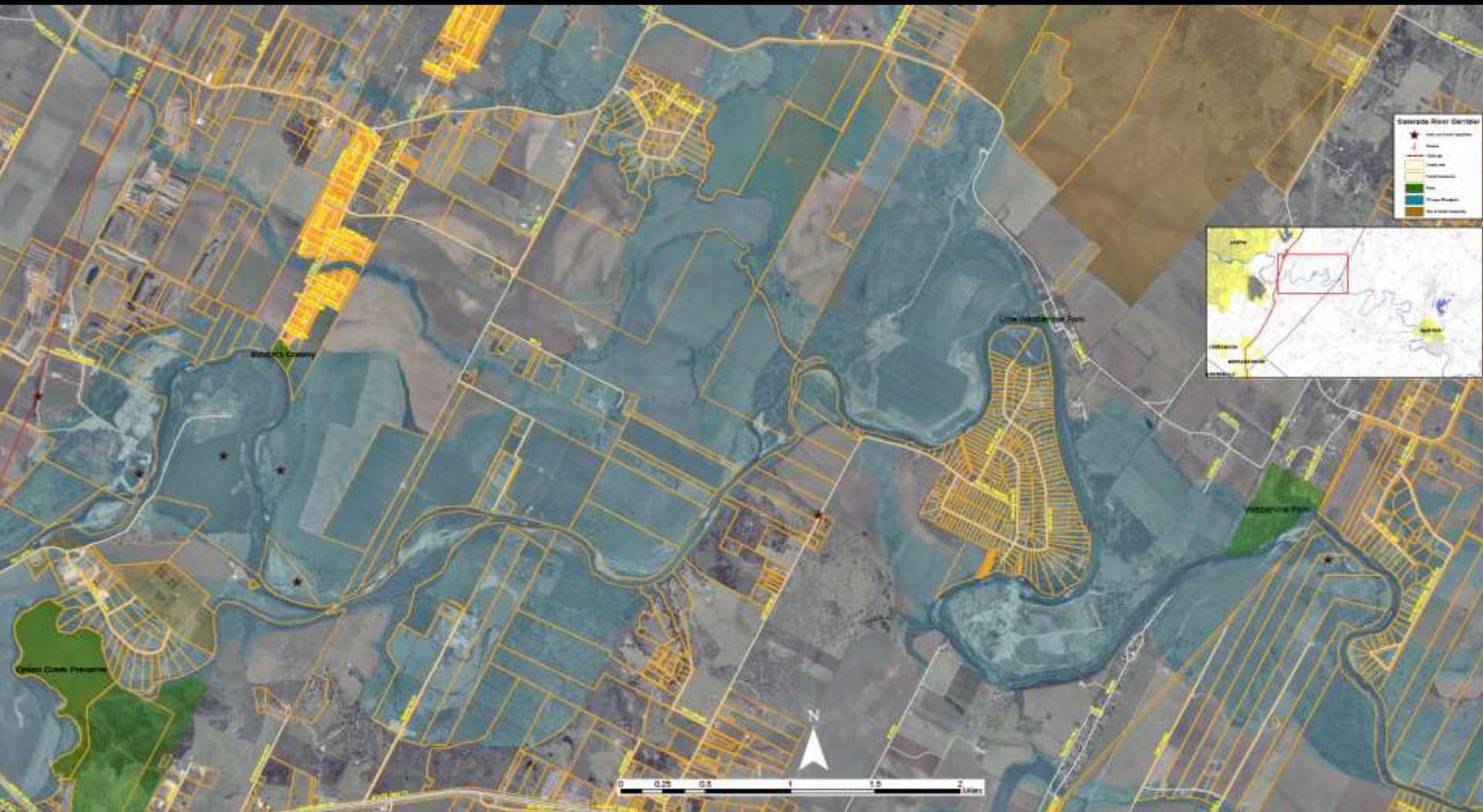
Floodplain – Floods build the bottomland



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.

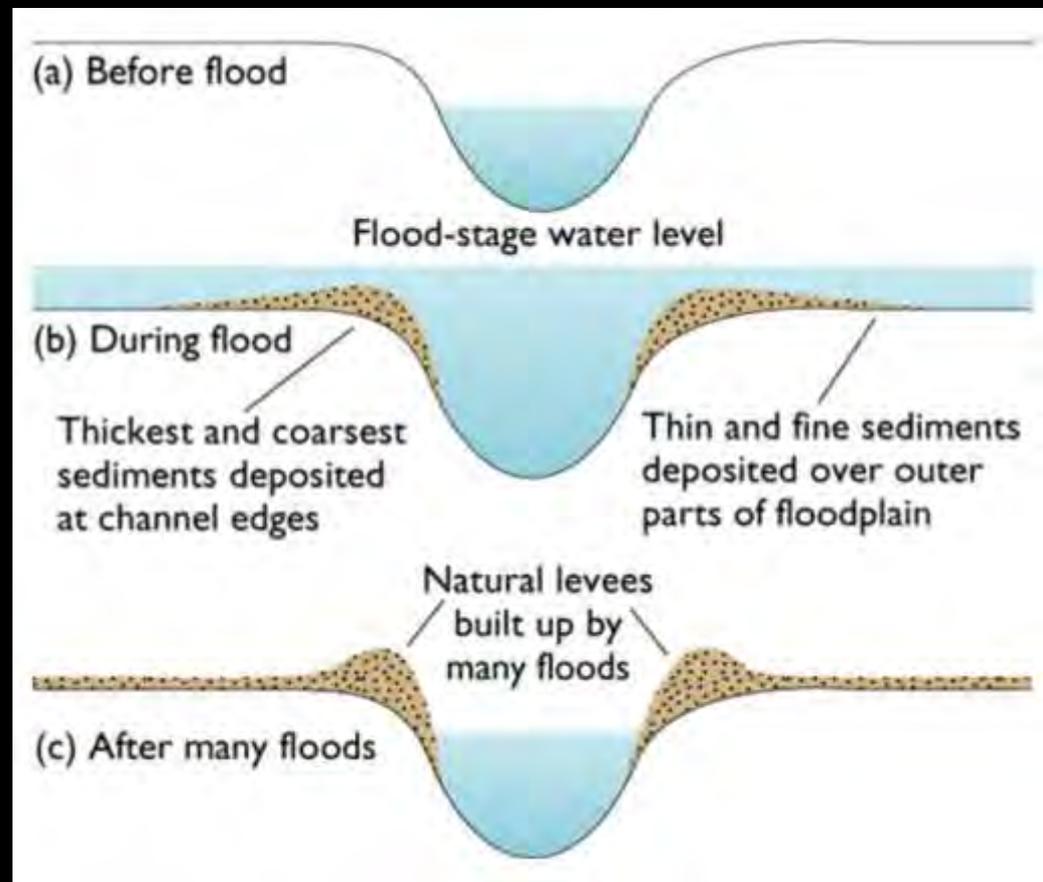
Floodplain – Humans settle in the bottomland



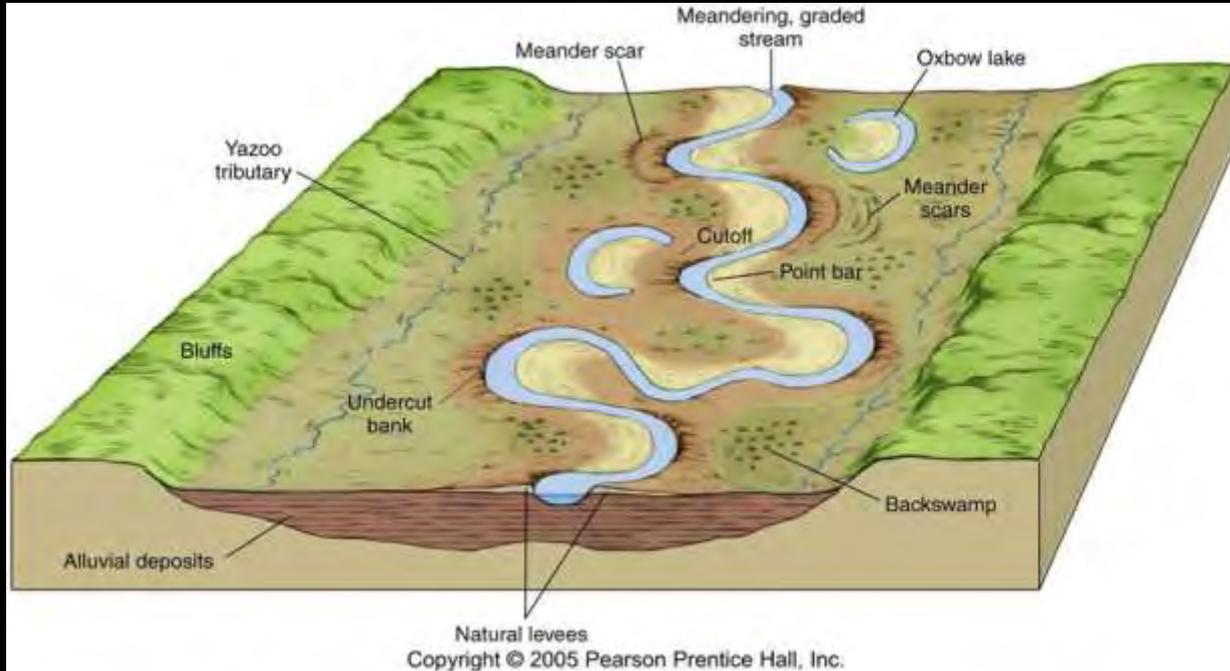
Floodplains and Natural Levees

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.

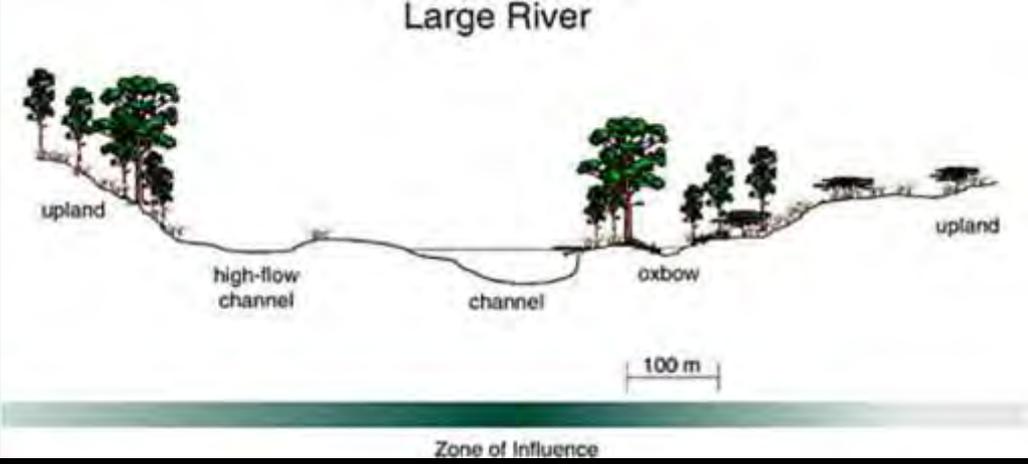
The deposition at the river banks build up into embankments called levees.



Floods shape the bottomland

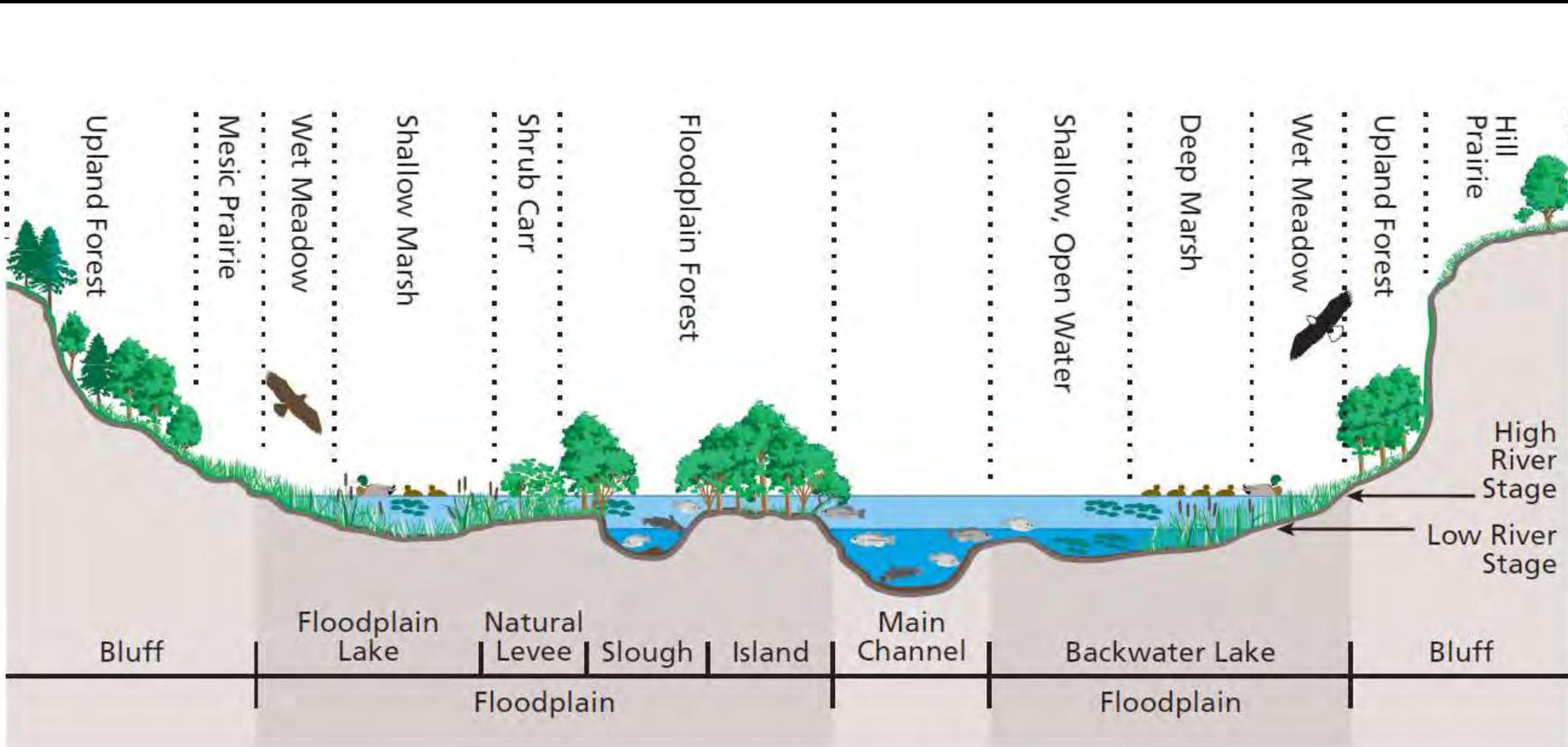


High-flow Channels – Flood Scars



Bottomland Ecology

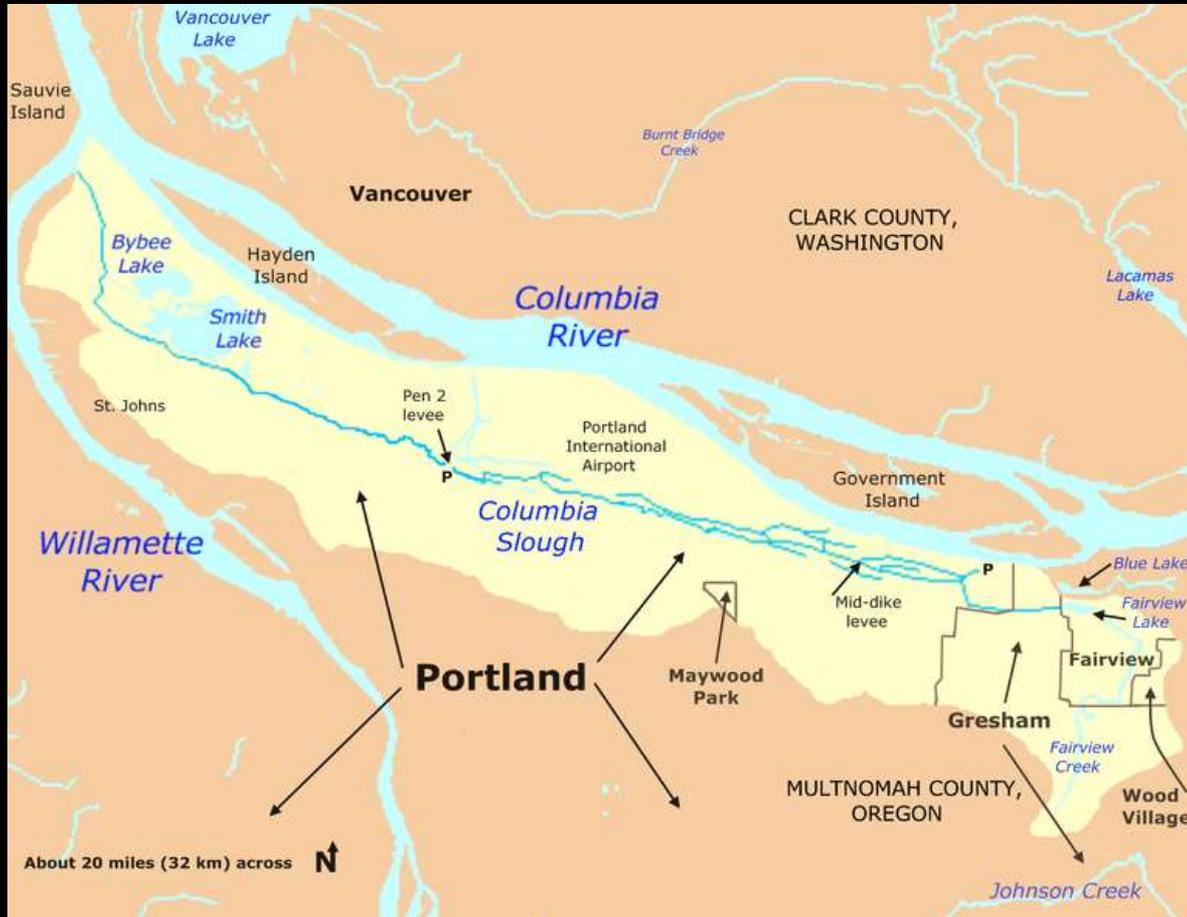
Habitat Richness = High Biodiversity



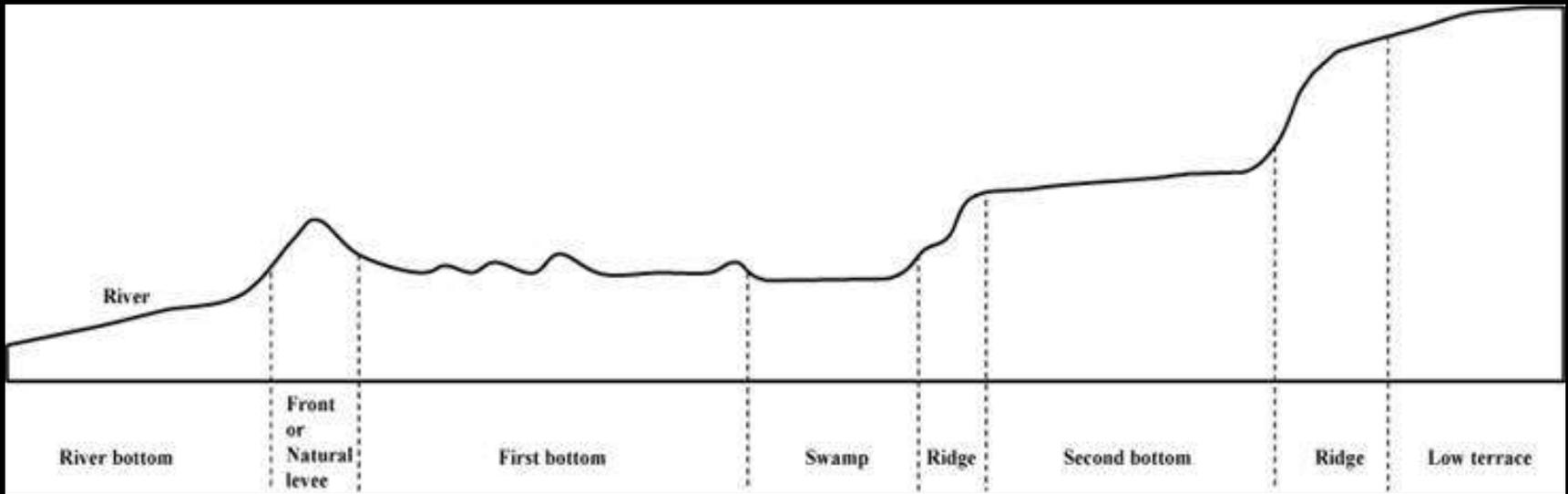
Slough

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.



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 expertise established the foundation for wetland protection in the City of Austin.

Wetland Indicators Categories

- **Obligate Wetland (OWL)**: Occur almost always in wetlands (probably >99%)
- **Facultative Wetland (FACW)**: Usually occur in wetlands (67%-90%)
- **Facultative (FAC)**: Equally 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 is used with the FAC category to indicate a regional higher or lower frequency of being found in wetlands, respectively.

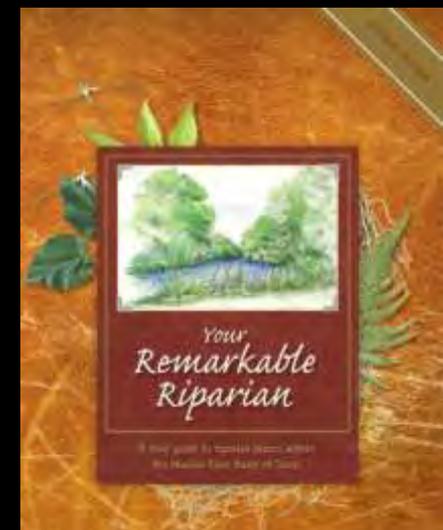
Photo credit: Mike Lyday, Bill Carr, Anthony Chastain, Morgan Drobish, Emily Yeevan, and AustinH2O

Wetland Indicators

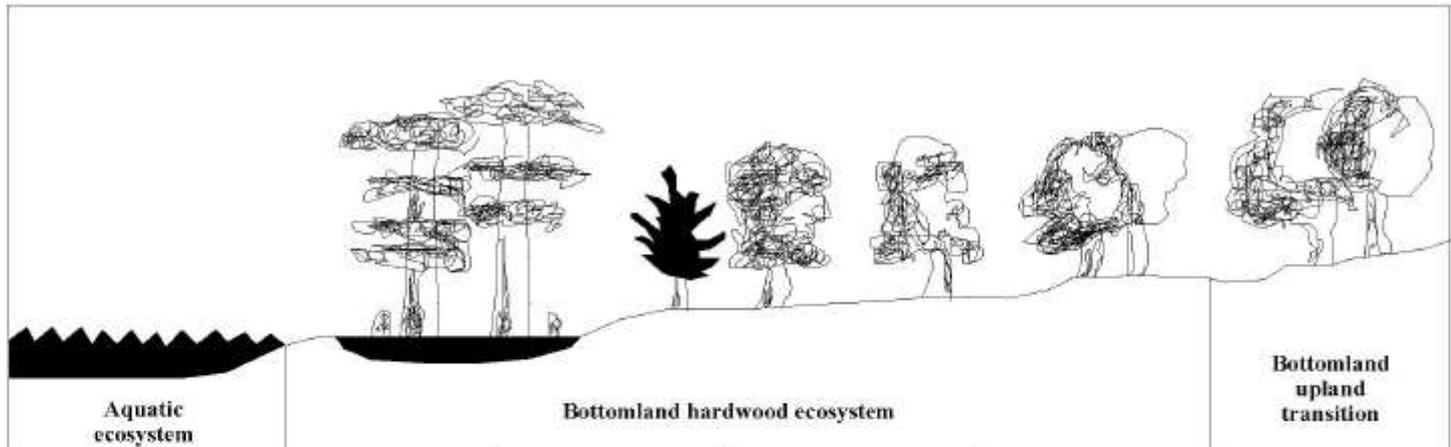


Plant community structured by hydrology

Hydric Soils



Bottomland Forest Hardwood Vegetation



The diagram illustrates a cross-section of a wetland landscape. From left to right, it shows an aquatic ecosystem (Zone I) with a wavy water surface, a swamp (Zone II) with a flat water surface and emergent plants, lower hardwood wetlands (Zone III) with short trees, medium hardwood wetlands (Zone IV) with taller trees, higher hardwood wetlands (Zone V) with even taller trees, and a transition to uplands (Zone VI) with a rising ground surface and scattered trees.

	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

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.



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.



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 had reason to expand during flood seasons, eroding the soil and giving rise to flatland hardwood forests that, 200 years ago, covered 20 million acres.

PHOTO: NICHOLAS

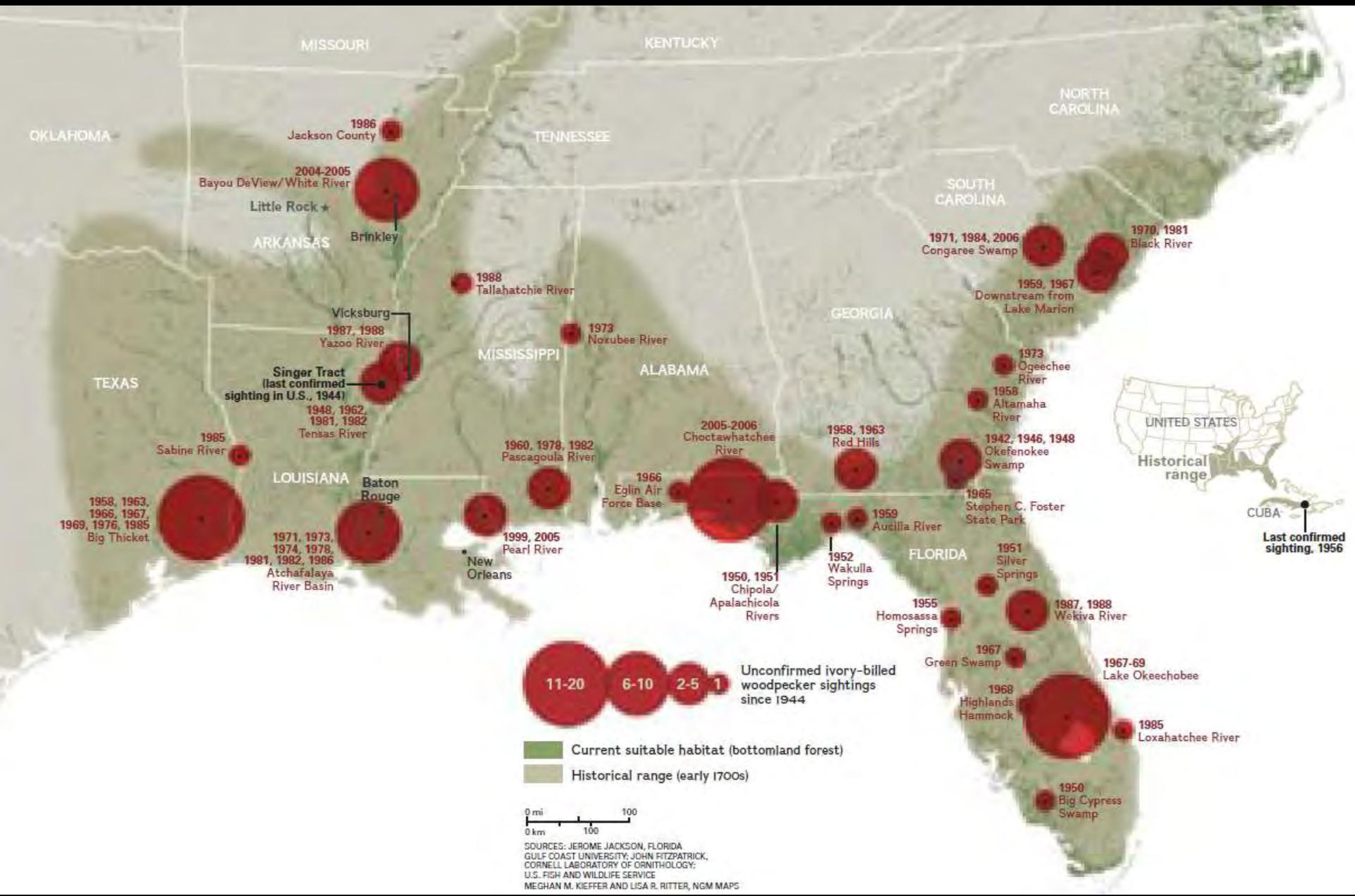
PHOTO: GUY LAWRENCE



THE WOODS AREN'T what you think of when you think of Arkansas. The state is famous for its cotton, rice, and soybean fields, but it's also home to a vast, flatland hardwood forest. In the heart of this forest, the Ivory-billed Woodpecker has made its home. The bird is critically endangered, with only a few dozen left in the wild. Conservationists are working to protect the bird and its habitat, but the forest is being lost to development and agriculture. The Ivory-billed Woodpecker is a symbol of the loss of the forest and the need for conservation.

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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

Access

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



Bottomland Bird – Hornsby Bend

Black-bellied Whistling Duck

50 YEARS OF BIRDING



AUSTIN TEXAS
Hornsby Bend
1959 2009

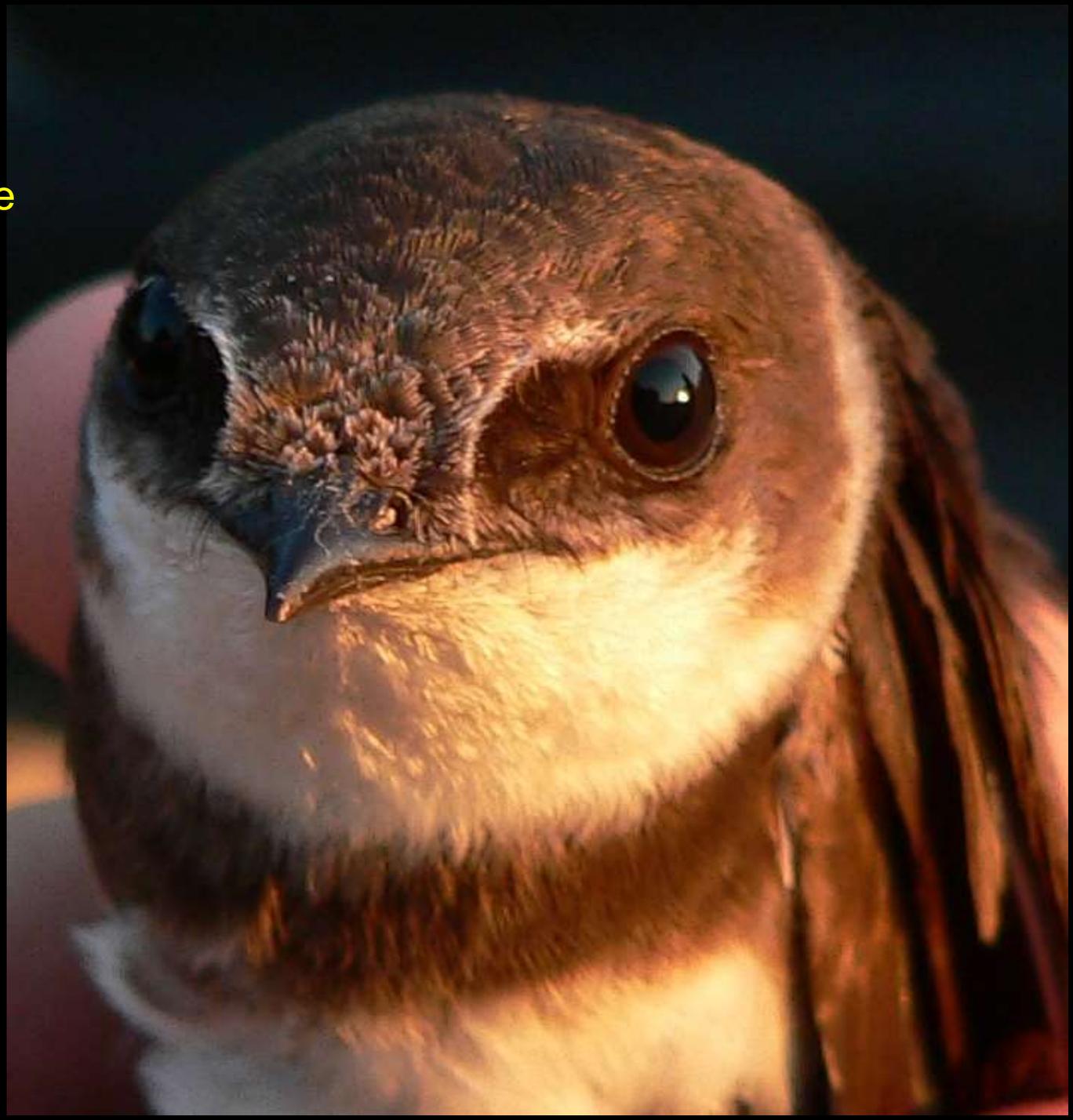


Life at the River's Edge

Riparia riparia
(Linnaeus, 1758)

Sand Martin
Bank Swallow

The Tisza River
Hungary





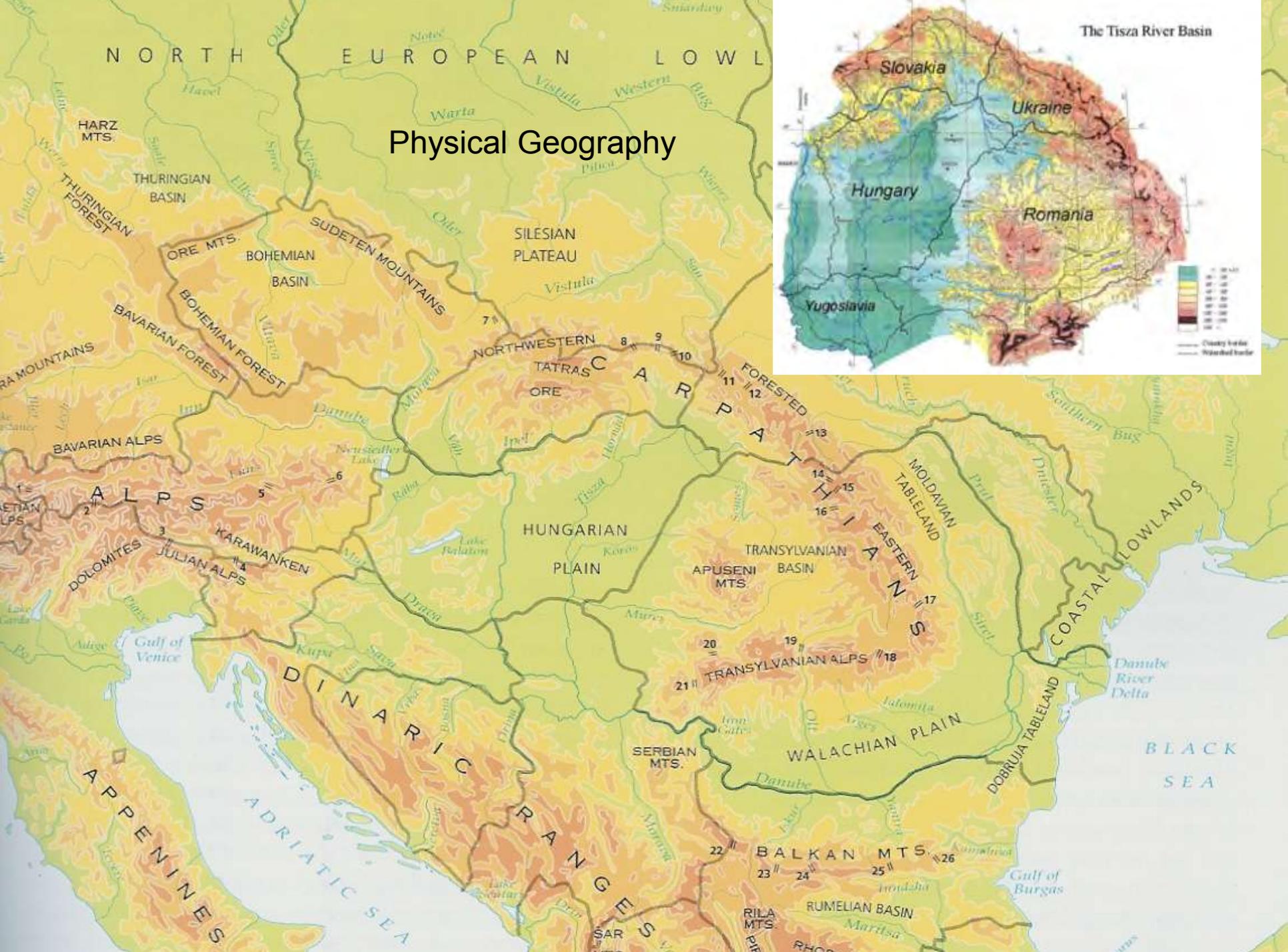
Case Study

The River Tisza Hungary





Physical Geography



Hungary



Hungary = Magyarország

Population 9,800,000

Two Rivers – The Danube and The Tisza (largest tributary of the Danube)



Capital – Budapest

Danube River [Duna]



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



Sándor Petőfi, The Tisza

Cultural Geography

Ottan némán, mozdulatlan álltam,

I stood there, silent, without stirring,

Mintha gyökeret vert volna lábam,

As if my feet were rooted to the spot,

Lelkem édes, mély mámorba szédült

My soul intoxicated by a sweet, profound ecstasy

A természet örök szépségétül.

Induced by nature's eternal beauty.

Óh természet, óh dicső természet!

Oh nature, oh glorious nature!

Mely nyelv merne versenyezni véled?

What language would dare compete with you?

Mily nagy vagy te! mentül inkább hallgatsz,

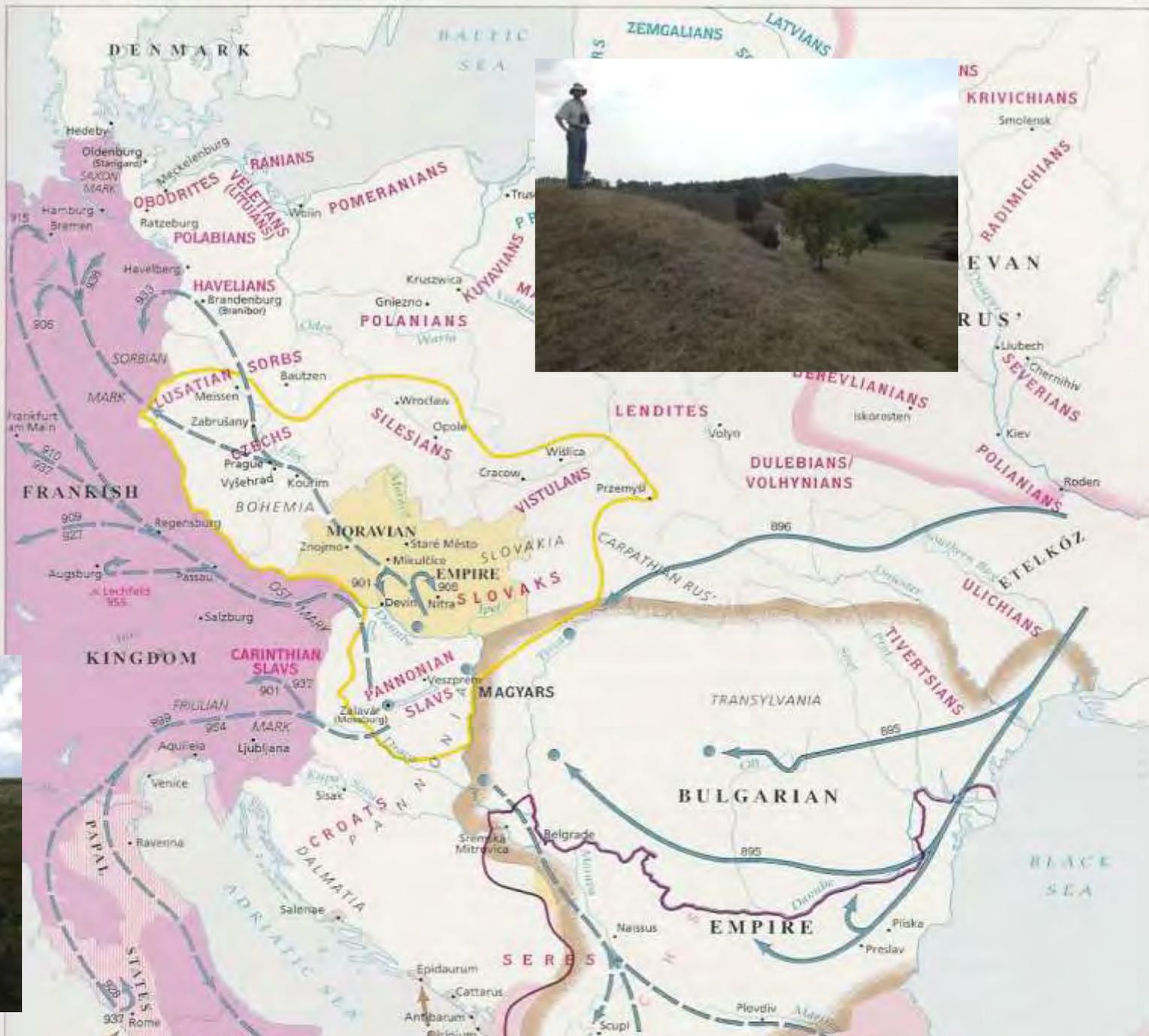
How splendid you are! the more you are silent,

Annál többet, annál szebbet mondasz.

The more you say, the more the beauty of your expression.



The Mythic River
896AD
Magyar Tribal Leaders
Arpad Szabolcs



The Magyar River

900 – 1526

The Kingdom of Hungary



Central Europe, 1648

The River of
Refuge
1526 – 1687

The Ottoman
Occupation



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

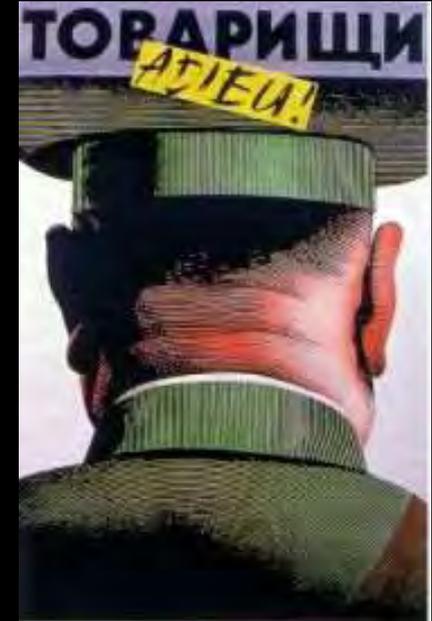




1956 Hungarian Revolution



Revolution and Post Communist Hungary 1989-1992



In May 1989, the first visible cracks in the Iron Curtain appeared when Hungary began dismantling its 150 mile long border fence with Austria.

The relatively open border with the West allowed hundreds of East Germans on holiday in Hungary to escape to Austria and then travel safely to West Germany.

Hungary held its first multiparty elections in 1990 and initiated a free market economy.

It joined NATO in 1999 and the EU in 2004.

Bush to Dispatch 60 Peace Corps Volunteers to Work in Hungary July 12, 1989

BUDAPEST, Hungary — In what was called a "historic day" for the Peace Corps, President Bush said today the agency will send 60 American volunteers to Hungary as English teachers--the first time volunteers are being assigned to a Communist nation.

It also will be the first time that volunteers are sent to Europe.

"The teaching of English is one of the most popular American exports," Bush said, adding that the program will help "open the global market to more Hungarians."

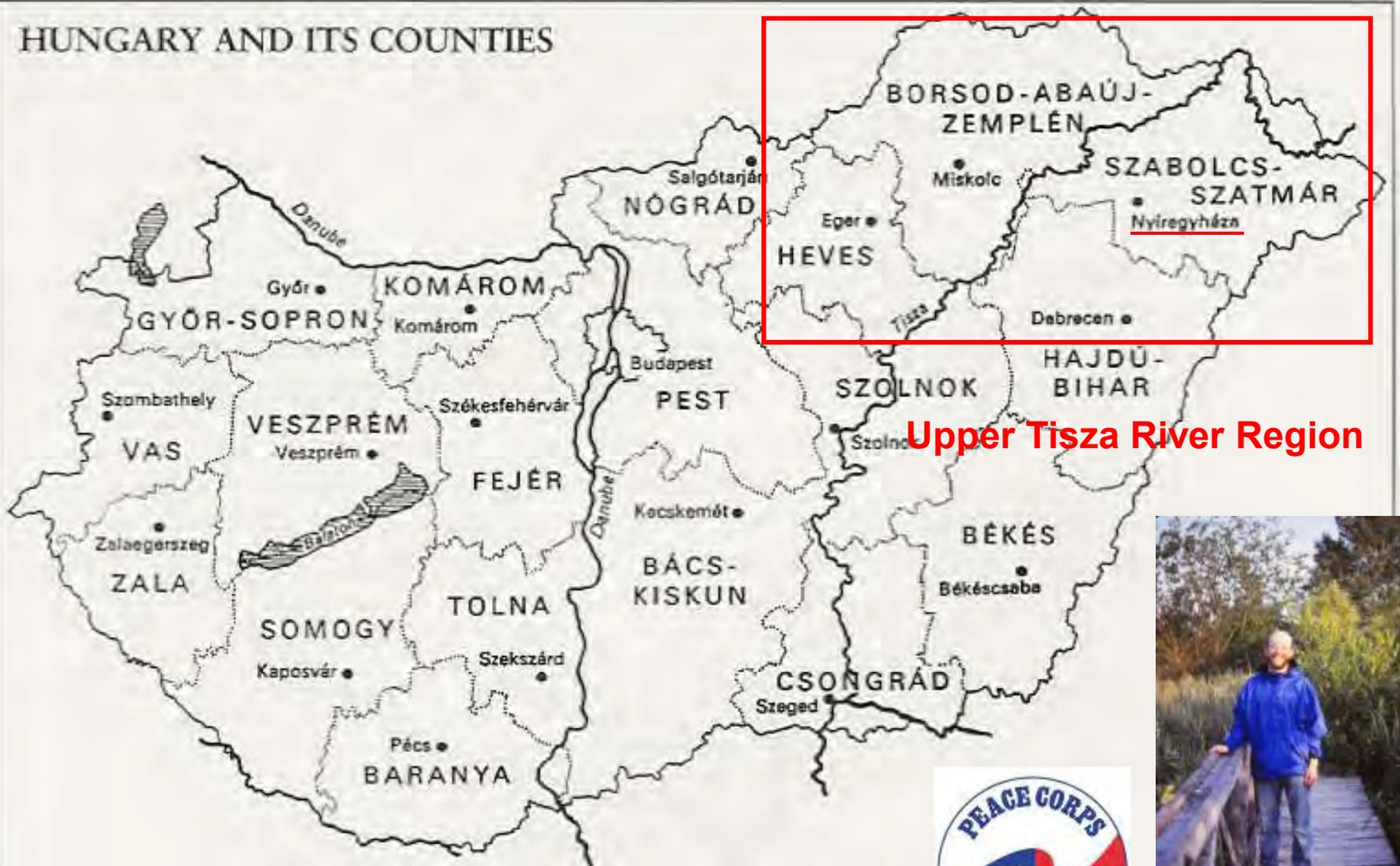
Bush, declaring that "the Iron Curtain has begun to part," also promised today to give Hungary unlimited access to American markets. And Bush, warmly applauded by his audience at Karl Marx University, also offered a \$25-million grant to spur this reform-minded East Bloc nation's fledgling free-enterprise system.

'Threshold of a New Era'

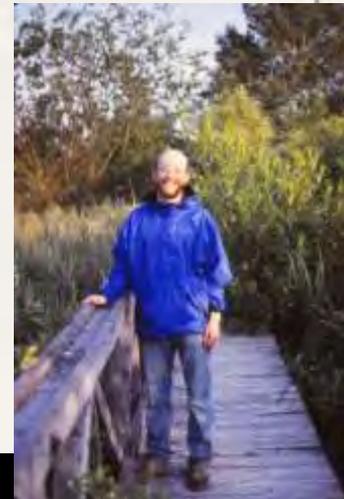
In Washington, Paul Coverdell, director of the Peace Corps, said, "This is a historic day and the threshold of a new era for the U.S. Peace Corps."



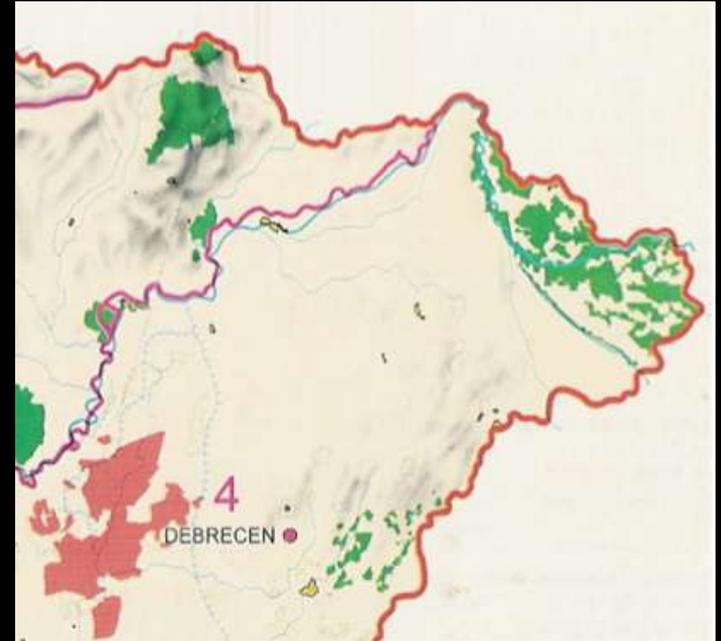
HUNGARY AND ITS COUNTIES



Upper Tisza River Region



The Upper Tisza Region - Szabolcs-Szatmar-Bereg County

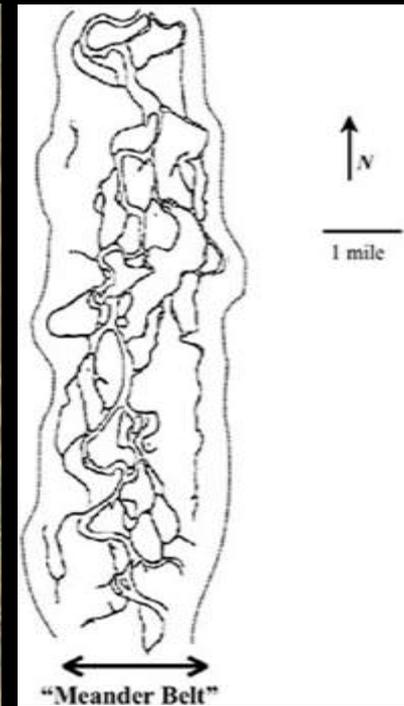
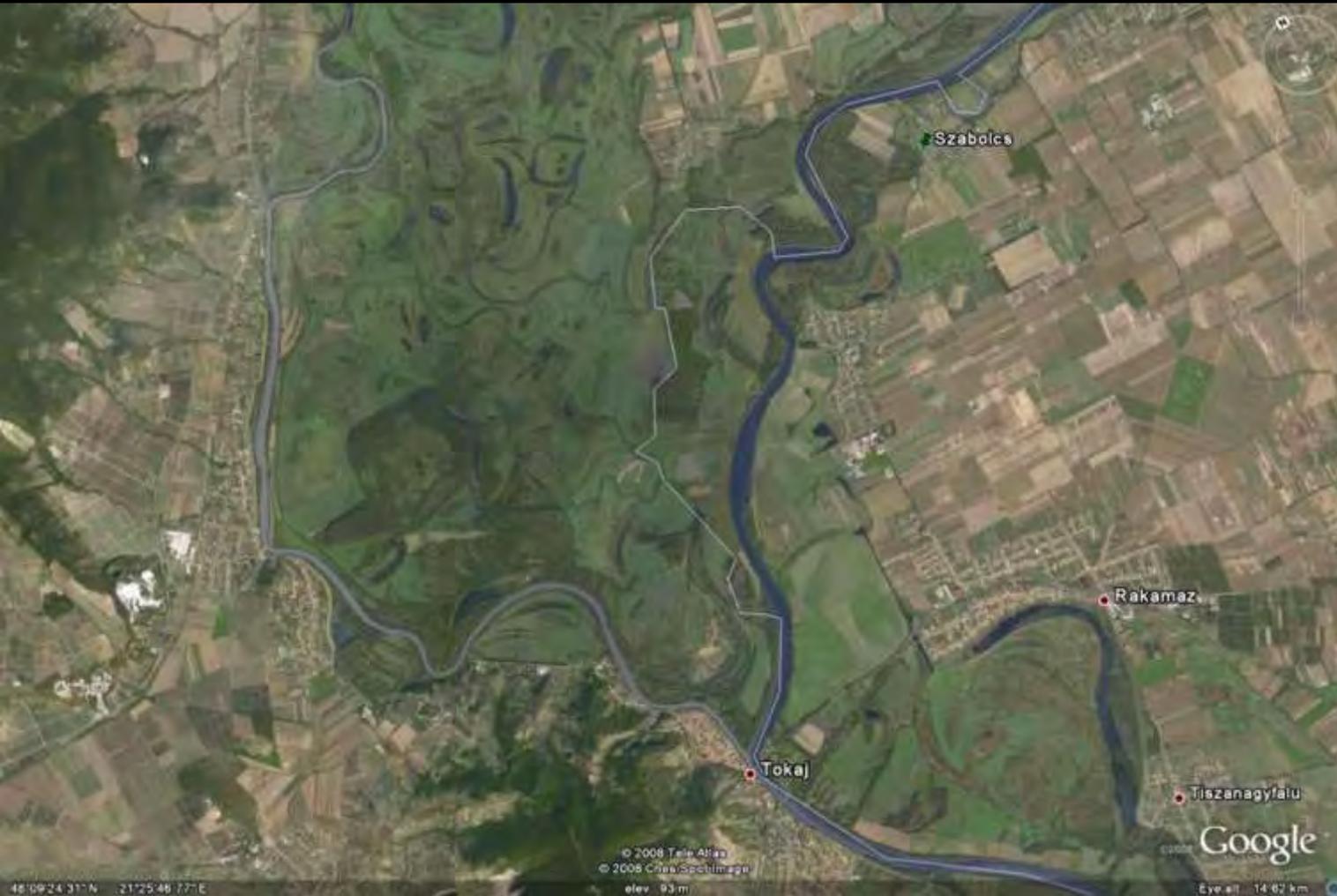


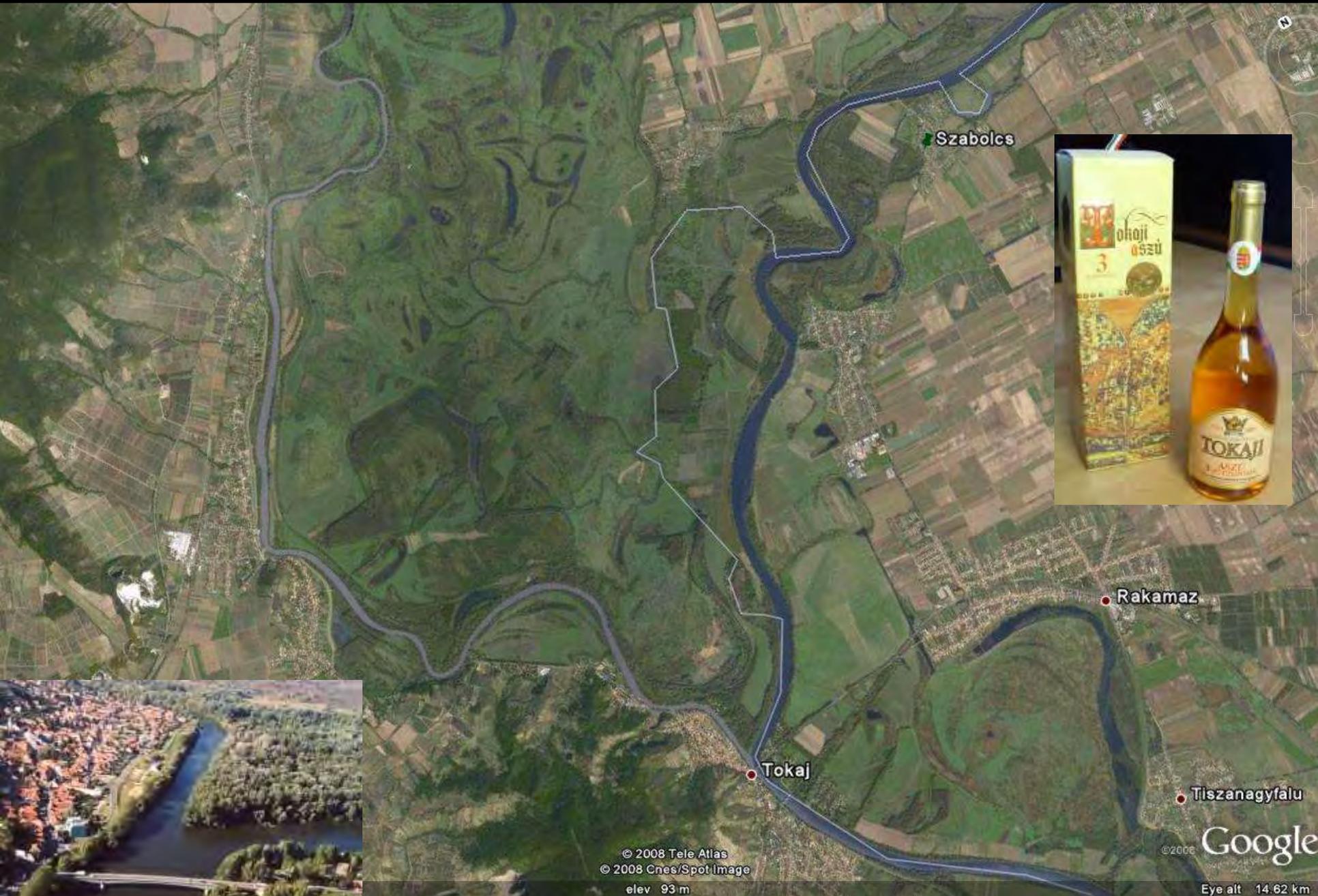
Green – Nature “Protected” Areas

Red – Hortobagy National Park

Bottomland Habitat

Bodrog River meets the Tisza River





© 2008 Tele Atlas
© 2008 Cnes/Spot Image
elev 93 m

© 2008 Google

Eye alt 14.62 km



Tokaj Wine Region



Tisza River
Bodrog River
Bottomland
Habitats

Oxbow lake wetland



Forest wetland



Wet meadow

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



Breeding site for White Storks (*Ciconia cinconia*)
and Black Storks (*Ciconia negra*)



THINKING GLOBALLY

THE PEACE CORPS JOINS IN

Can teaching English help the upper Tisza?

by Judy Braus

When it first flows into Hungary from the Soviet Union, the Tisza River is relatively clear—especially when compared to its infamous neighbor, the Danube. But before long the water quality of the Tisza begins to plummet.

The Szamos and Kraszna rivers, flowing from Romania, dump heavy metals, phosphates, and other pollutants into the Tisza as it makes its way south. At Tokaj, near the lower end of the Upper Tisza, the Bodrog River, flowing from Czechoslovakia, dumps more tainted water. And along its 600-kilometer path through Hungary, the Tisza relentlessly receives in-country pollution, including waste and run-off from chemical factories, power plants, and agricultural fields.

Pollution of the Tisza River is just one example of many serious environmental problems facing Hungary. Like the rest of Central Europe, the country suffers from acid rain, smog, hazardous waste disposal, habitat destruction, and other

environmental problems. But there is a bright spot in the doom and gloom of the pollution and degradation. Armed with enthusiasm and innovative ideas and backed by an agency-wide commitment to environmental education, U.S. Peace Corps volunteers have begun tackling environmental problems at the grass roots level, working in camps, schools, and communities across Hungary.

An environmental education workshop conducted in the dead of winter in a small town near the Czechoslovakian border gave many volunteers their first opportunity to get involved with Hungary's environmental problems. During the workshop, more than 60 volunteers working as English teachers and their Hungarian colleagues took part in sessions focusing on air and water pollution, solid waste, and natural resource issues—as well as on teaching strategies for incorporating environmental education into their English teaching lesson plans. They also studied strategies for motivating

students to get involved in local environmental issues and for helping students develop lifelong problem-solving skills.

As a result of the workshop, many of the volunteers immediately began incorporating environmental topics into their daily lesson plans. During site visits, Kathryn Rulon, Associate Peace Corps Director for Education, found that volunteers were successfully using environmental content to teach English, encouraging student creativity, and empowering students to make a difference: "I couldn't believe how many of the volunteers were creatively adapting environmental content to match the interests and concerns of their students. I'd walk into classrooms and the students would be debating environmental issues, writing environmental poetry, or performing pollution raps. Environmental education and English teaching are a natural fit!"

Several volunteers also took the activities and lesson plans developed during the workshop to camp. They



On assignment in Hungary, Peace Corps volunteers teach English and environmental literacy at the same time.

Paul E. Conklin photo. Copyright 1991, Peace Corps.

As for the problems in the upper Tisza River, one Peace Corps volunteer, Kevin Anderson, channeled his concern into a concrete proposal for action. Before the workshop, Kevin had been working with the Nyireghyaza Chapter of the Hungarian Ornithological and Nature Protection Society to band sand martins and also to organize a summer environmental camp. Through his work, he discovered that the Upper Tisza not only supports the largest colony of sand martins in Europe, but it is also rich in forest and wetland habitats that provide homes to some of the most diverse wildlife in the country. He realized that a public awareness campaign would be important, given that many of his neighbors in the rural town of Nyireghyaza consider the area an undeveloped "wasteland" that would be more useful if it were developed.

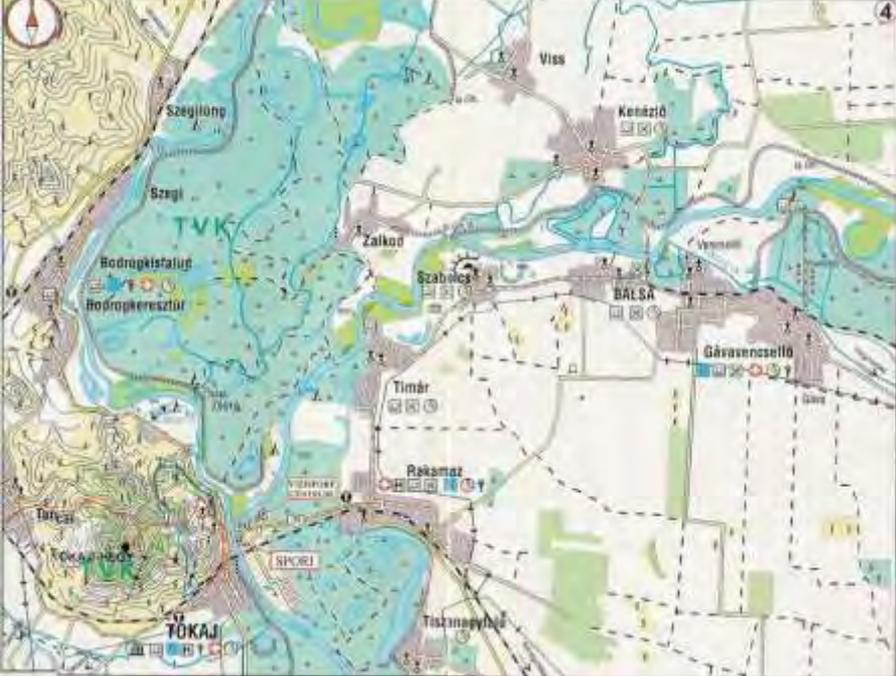
It was after attending the workshop





**Bottomland Habitat
Mapping Project 1991
225km along the upper
Tisza River**





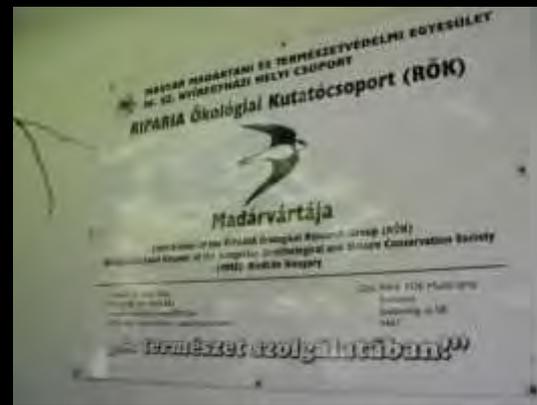
Oxbow lake managed by Upper Tisza Foundation

River Conservation Efforts



Tisza River Ecological Research Field Center

Established 2002



Bodrogzug and Felső-Tisza Ramsar Sites

1:500000

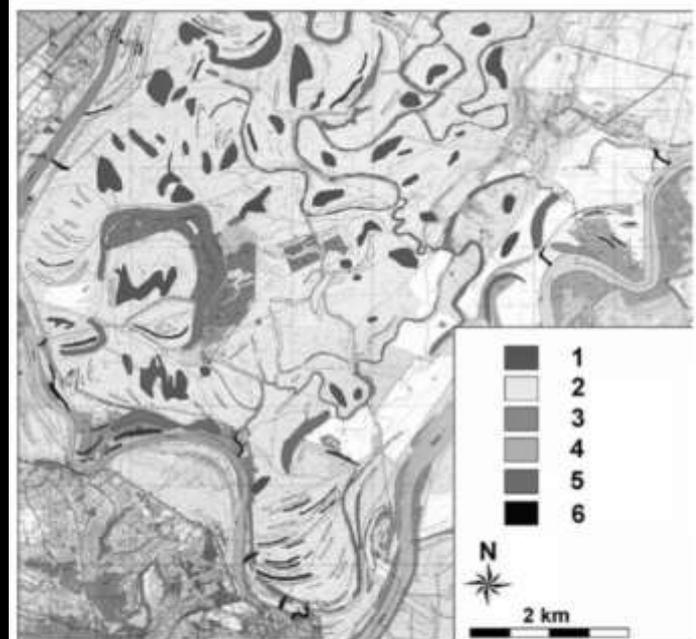
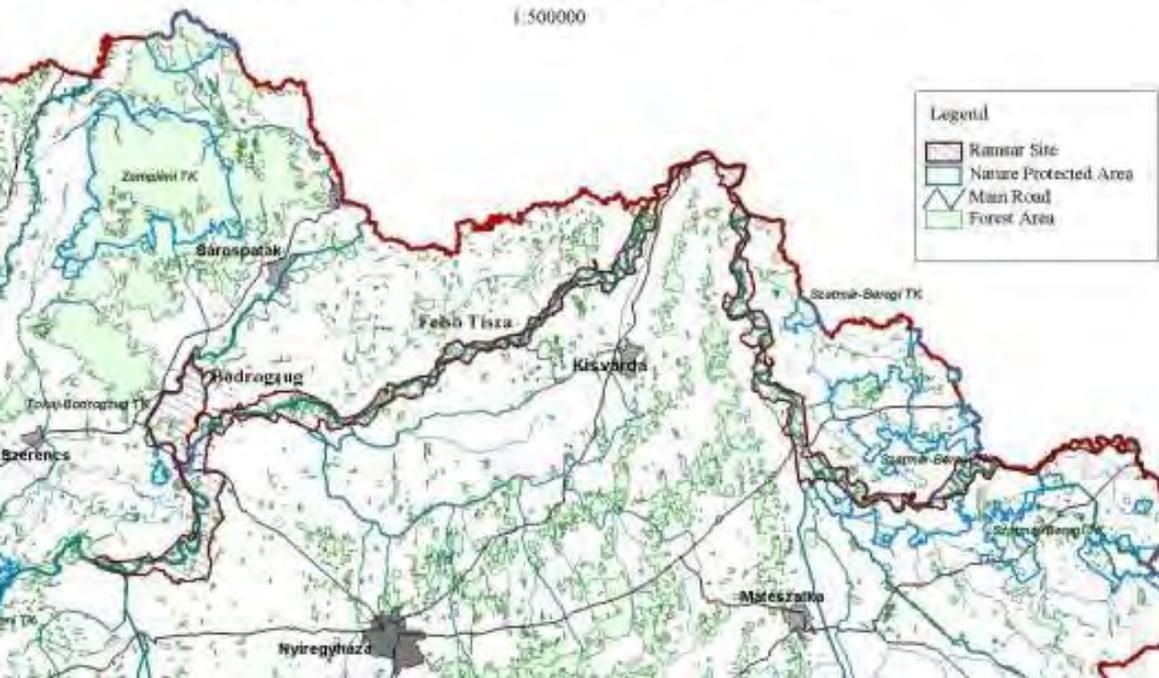
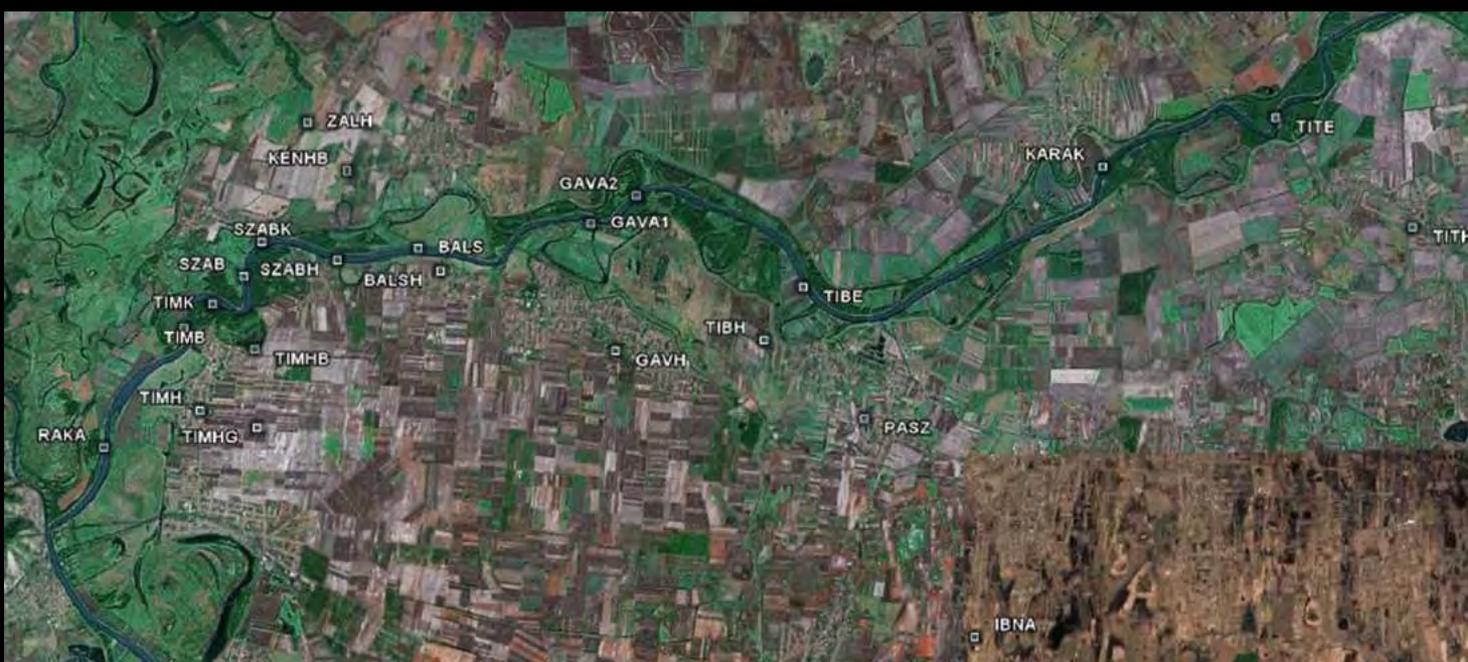


FIG. 2 - Landforms of the SW Bodrogköz (In: Szabó & alii, 2004). 1: fluvial ridge, 2: swale, 3: abandoned cut-offs, 4: present natural levee, 5: backswamps, 6: (remnants of) one-time flood-plain ditches.



The Upper Tisza River in northeastern Hungary. 2003
 Now a cross-border UN Ramsar Wetland of International Importance







VISZONTLÁTÁSRA !