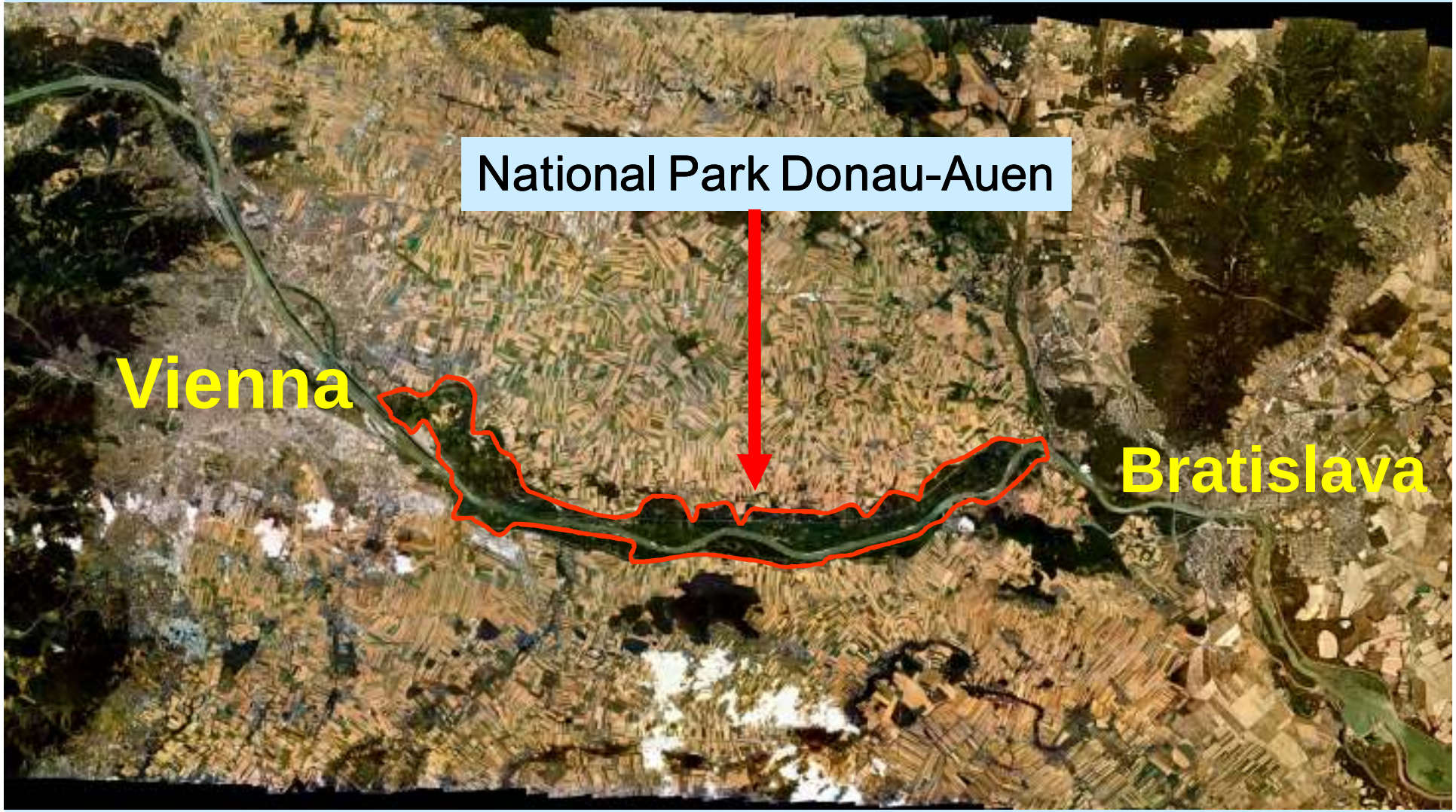
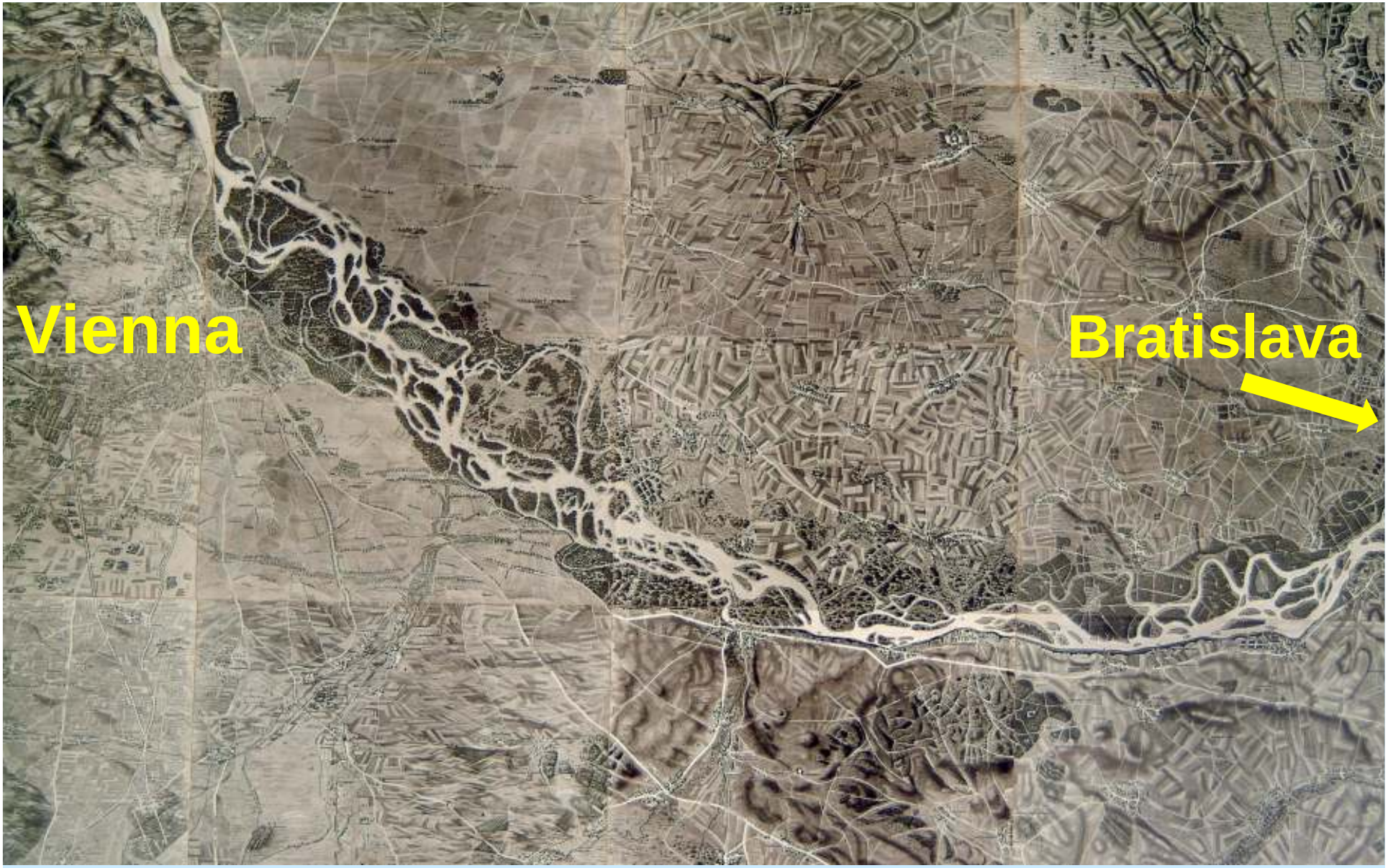
Pilot-Project Bad Deutsch Altenburg: River Restoration and Prevention of Riverbed-Erosion in the Danube Floodplain National Park (Austria)

Stefan Schneeweihs
Mohács, 2013 11 18

Pictures: F. Kovacs, G. Frank, C. Baumgartner, et.al.


National Park Donau-Auen
Vienna
Bratislava



Schweickart 1830 – 1846

Historical state

Braiding

- Division of the flow between main stem and side arms
- Formation of islands

Flooding

- Periodic water bodies

Erosion and Sedimentation

- Pionier- stages of the floodplain vegetation

Successional Processes

- Semiterrestric habitats

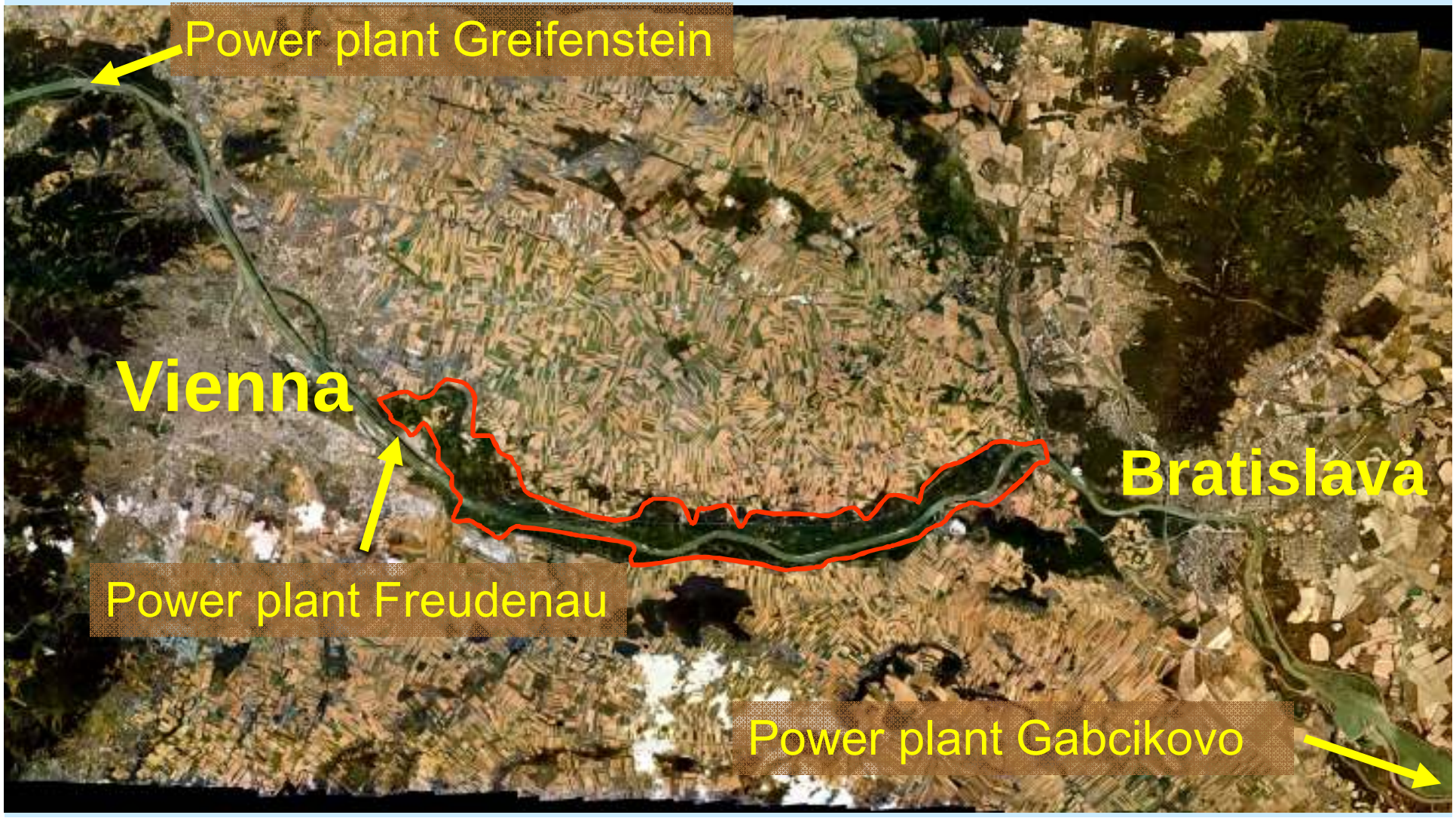
Danube-Regulation east of Vienna

19th century
- Bank Regulation and channelisation
- Construction of flood prevention damm

20th century
- Regulation at low water level for navigation
- (groynes, spur dikes)

20th century
- Hydro power plants along the Danube

Present state



2004

Effects of the Danube regulation, 1875

Immediate effects:

- loss of riverine inshore habitat
- reduced hydrological connectivity
- reduced geomorphic processes

Longterm trends:

- deepening of the channel
- isolation of backwaters
- desintegration between river and floodplain

Danube east of Vienna

Free flowing

Low water discharge = 915 m^3/sec
Mean water discharge = 1930 m^3/sec
V_{MQ} = 1,6 bis 2,0 m/sec

Bed load: gravel

$diameter_{Median}$ = 29 mm
Bed load transportation capacity: ca. 350.000 m^3/y

Fine sediment load: 3 - 5 mio. t/y

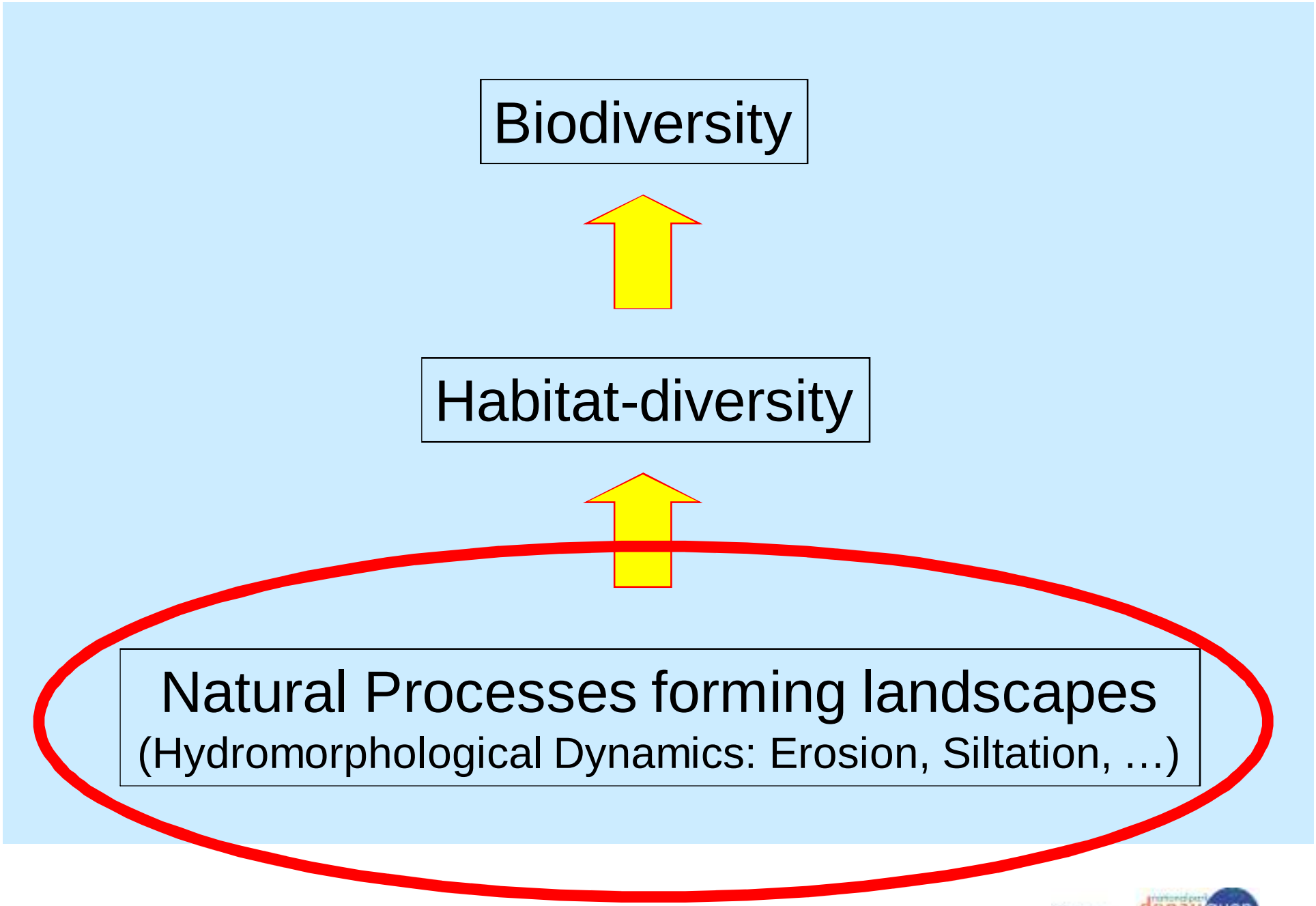
River bed erosion: 1 – 3,5 cm / year

main constraints
- flood protection
- navigation

restoration potential
- river bank restoration
- side arm restoration
- groynes & spur dike modification

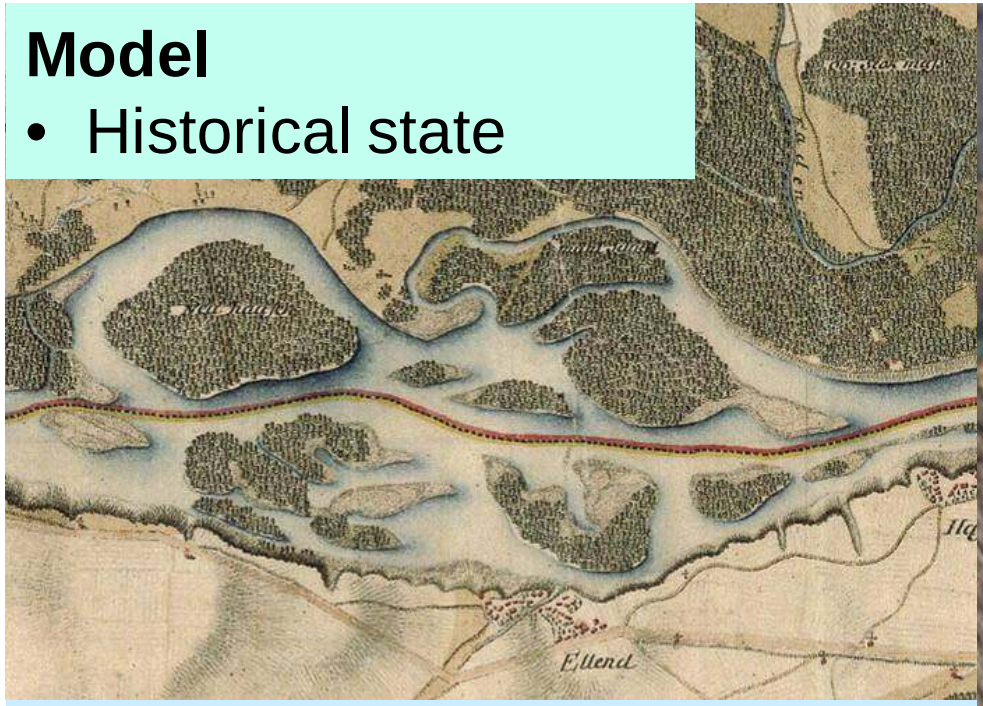
problem: sediment load
- river bed erosion

?


Biodiversity
Habitat-diversity
Natural Processes forming landscapes
(Hydromorphological Dynamics: Erosion, Siltation, …)

Model

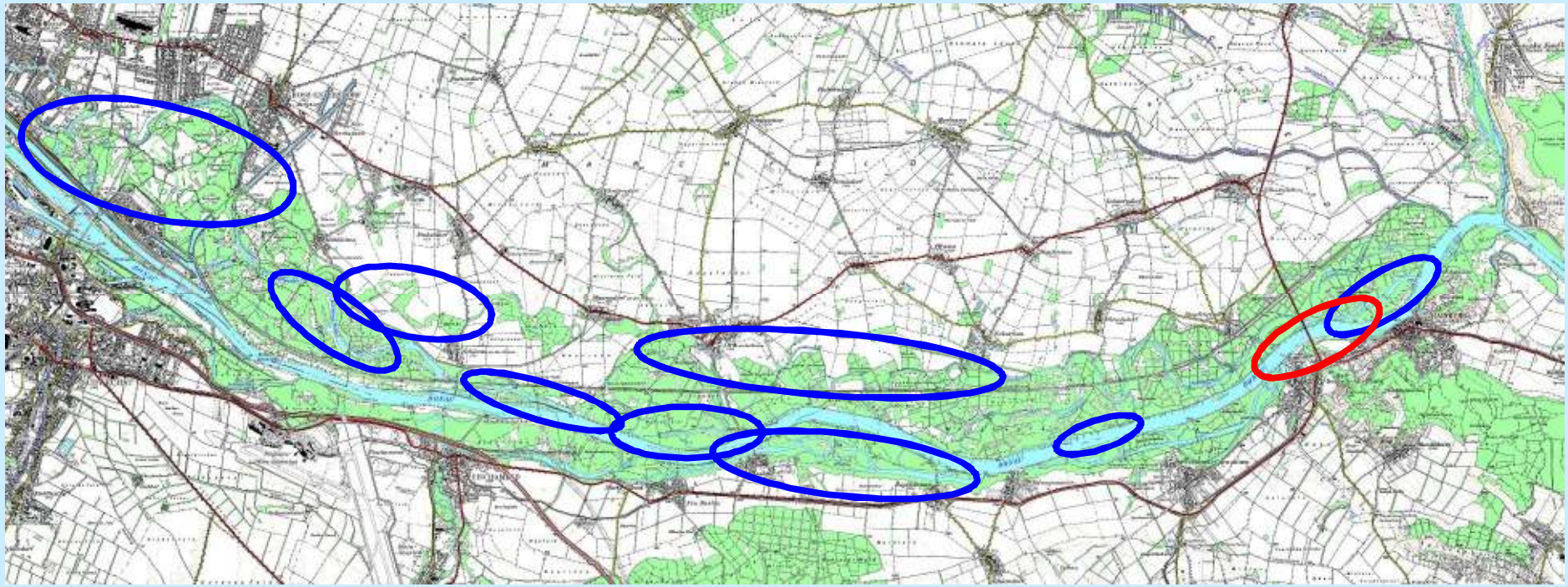
- Historical state



Goal

- Set measures to enable natural processes
- Developement towards near natural riverine landscape
- Within restrictions of modern society (flood prevention, navigation)

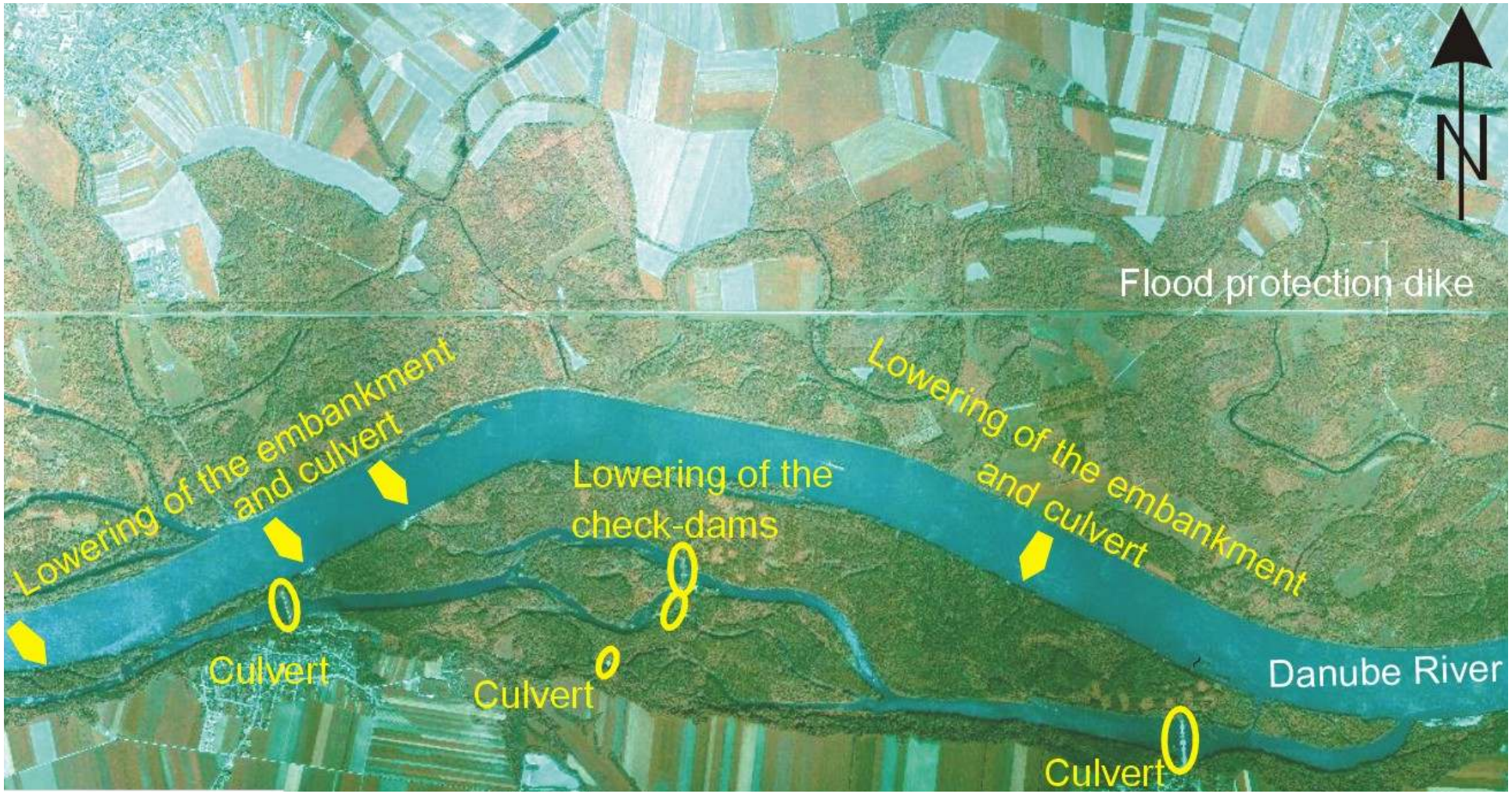
Restoration projects



Projects 1990 - 2009

Project 2012 - 2014 Pilot Project **Bad Deutsch Altenburg**

Side arm reconnection Haslau-Regelsbrunn 1995

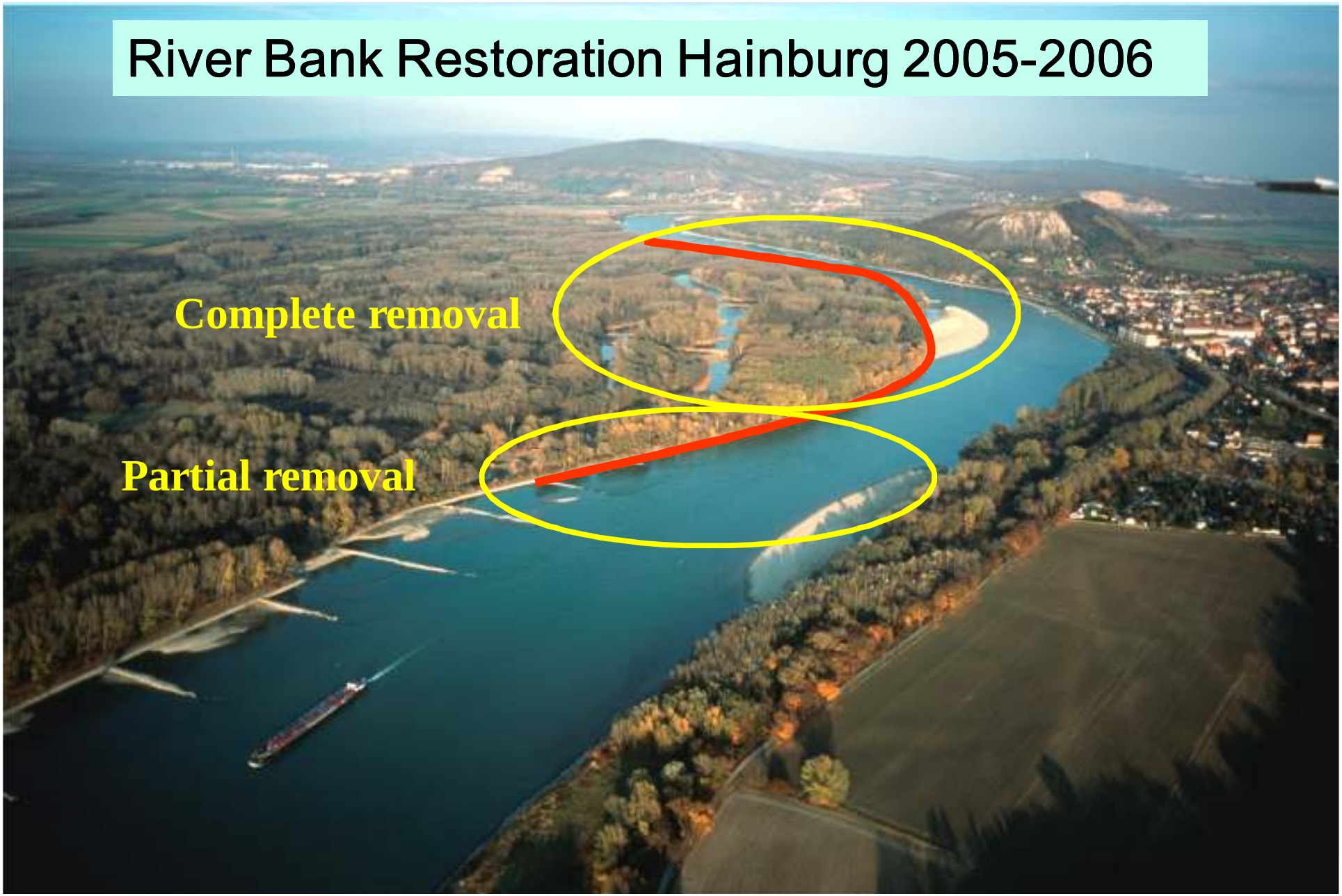


Lowering of inflows

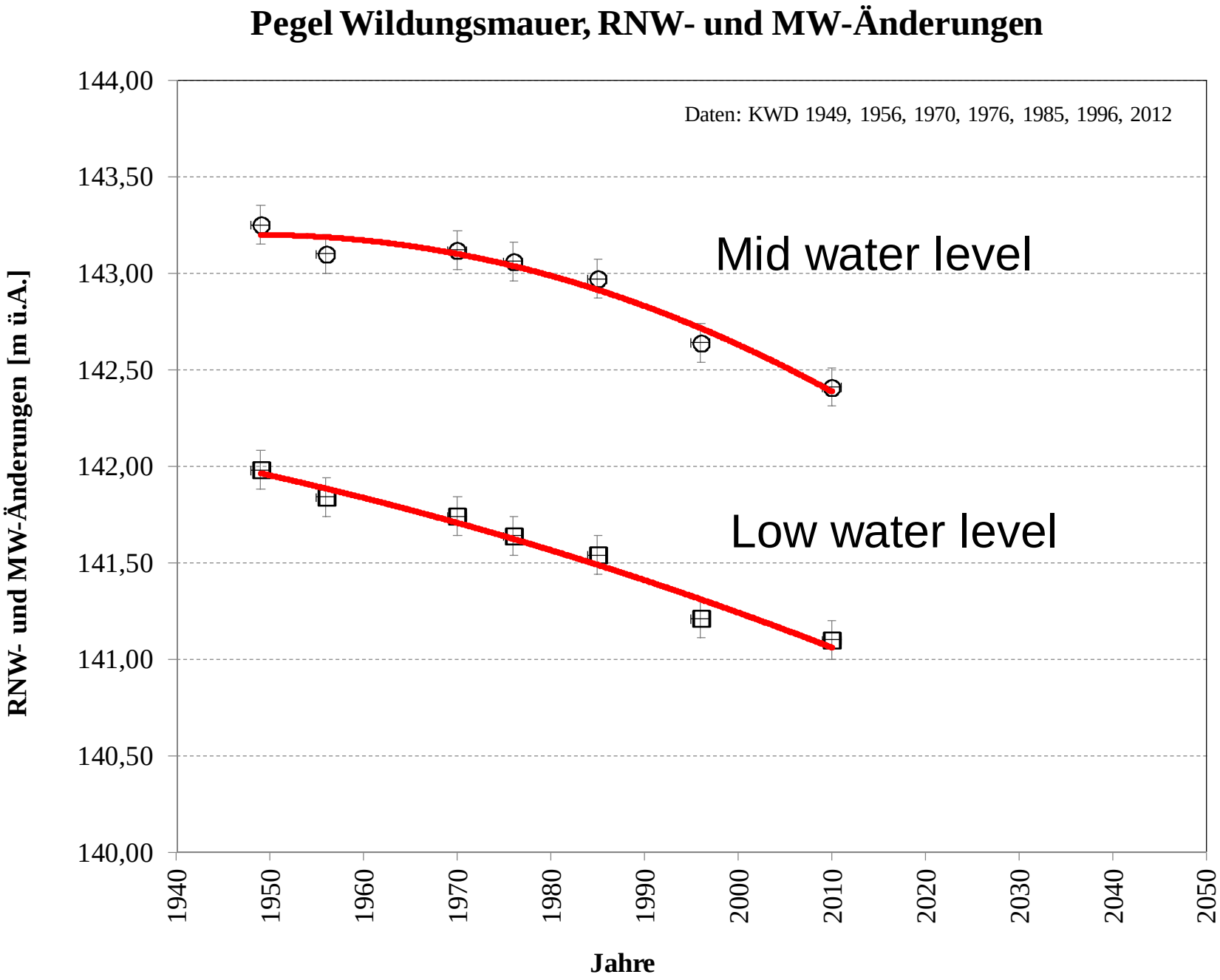
Construction of inflow openings

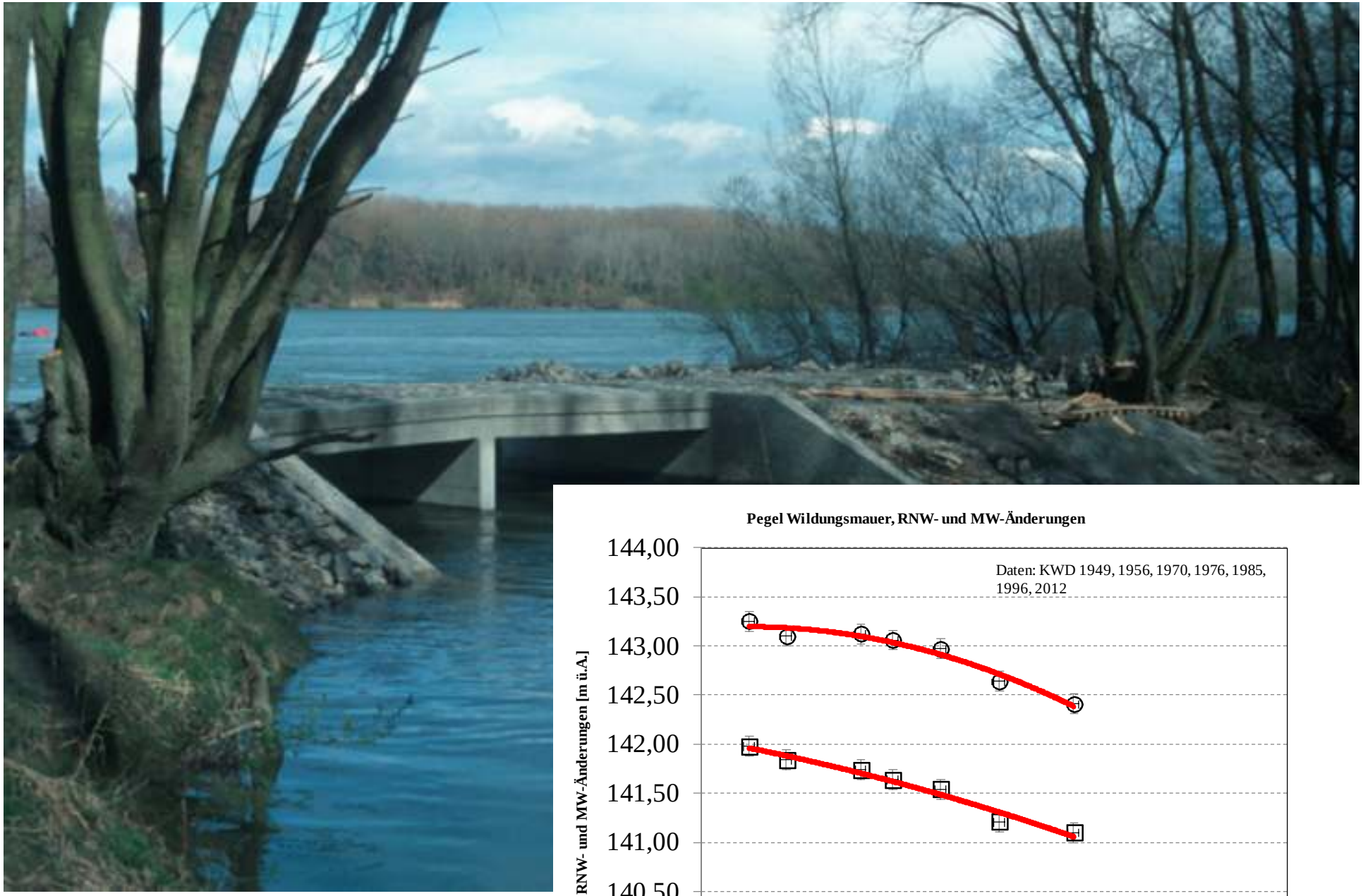
Side arm reconnection Haslau-Regelsbrunn 1995

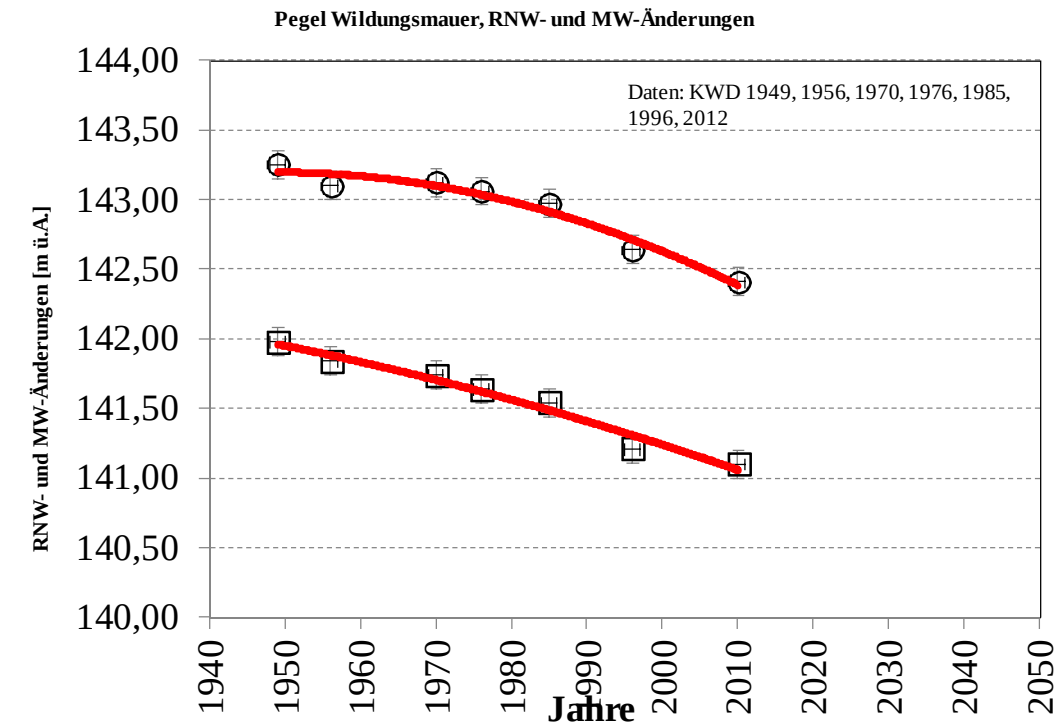
River Bank Restoration Hainburg 2005-2006



River Bank Restoration Hainburg 2005-2006


Pegel Wildungsmauer, RNW- und MW-Änderungen
Daten: KWD 1949, 1956, 1970, 1976, 1985, 1996, 2012
Mid water level
Low water level
RNW- und MW-Änderungen [m ü.A.]
144,00
143,50
143,00
142,50
142,00
141,50
141,00
140,50
140,00
1940
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
Jahre

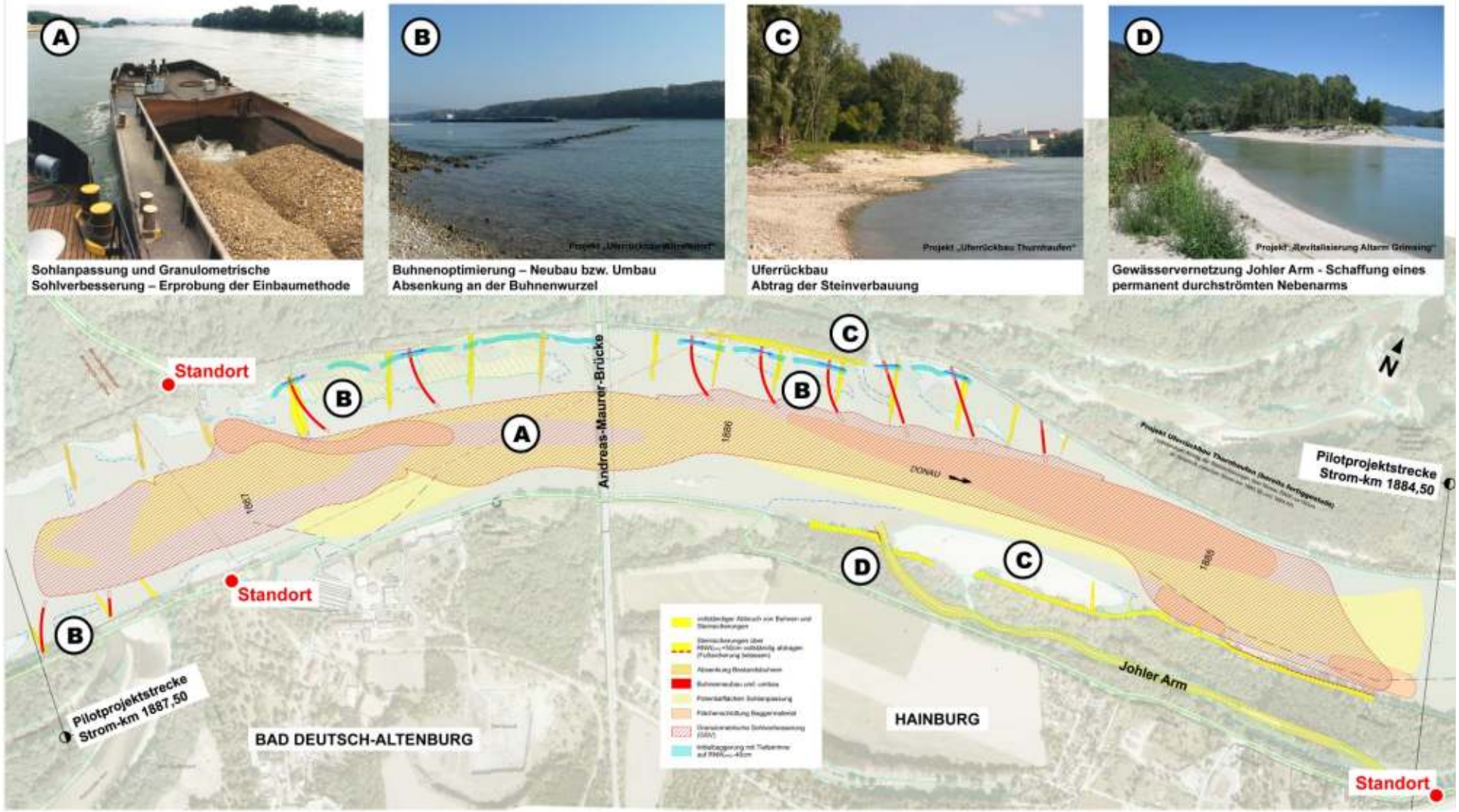




Side arm reconnection Hasla

Side arm reconnection Haslau - Regelsbrunn

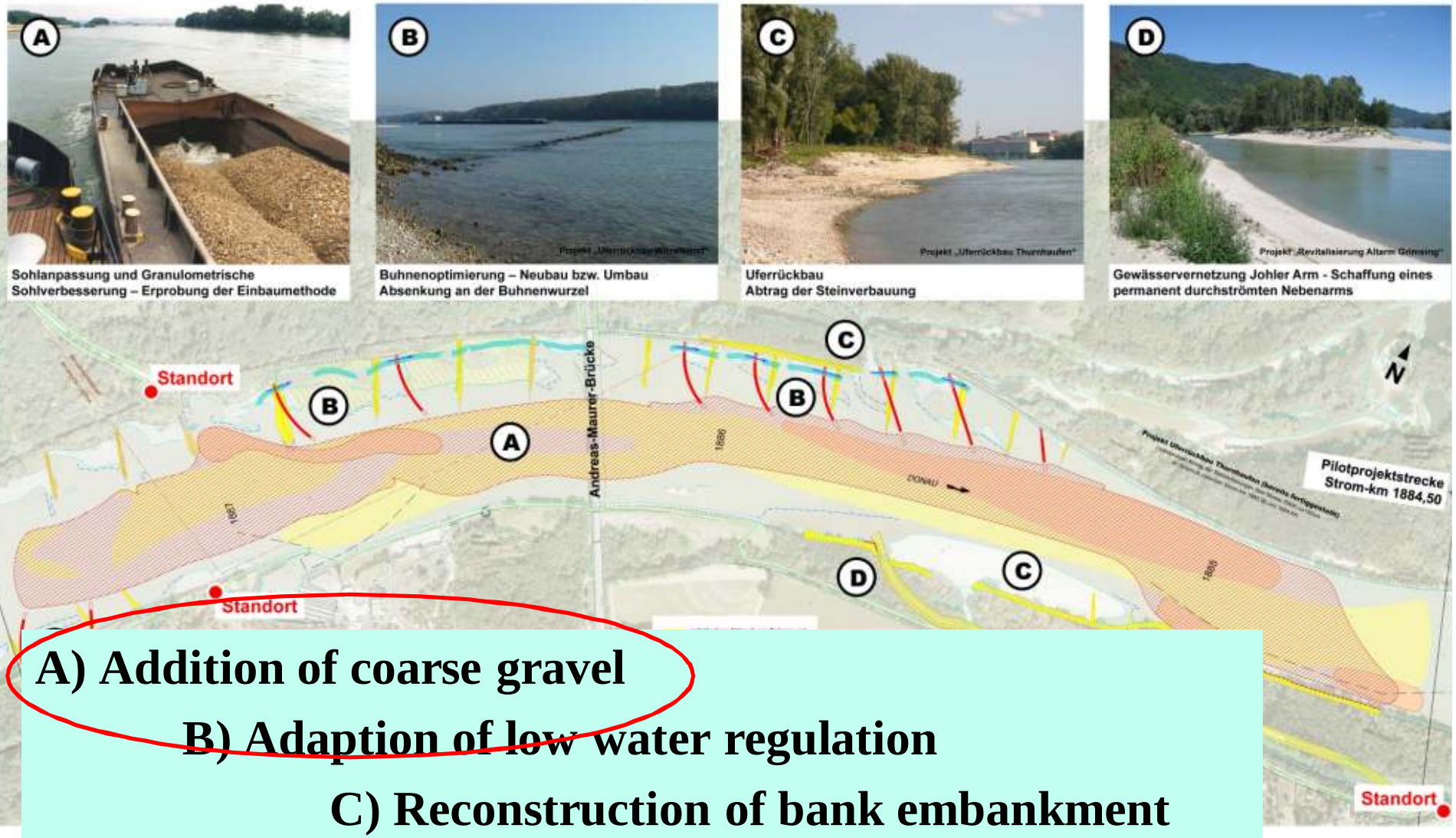
Pilot Project Bad Deutsch Altenburg 2012-2014



Source: viadonau

EU Co-financed (50% TEN)

Pilot Project Bad Deutsch Altenburg 2012-2014



A) Addition of coarse gravel

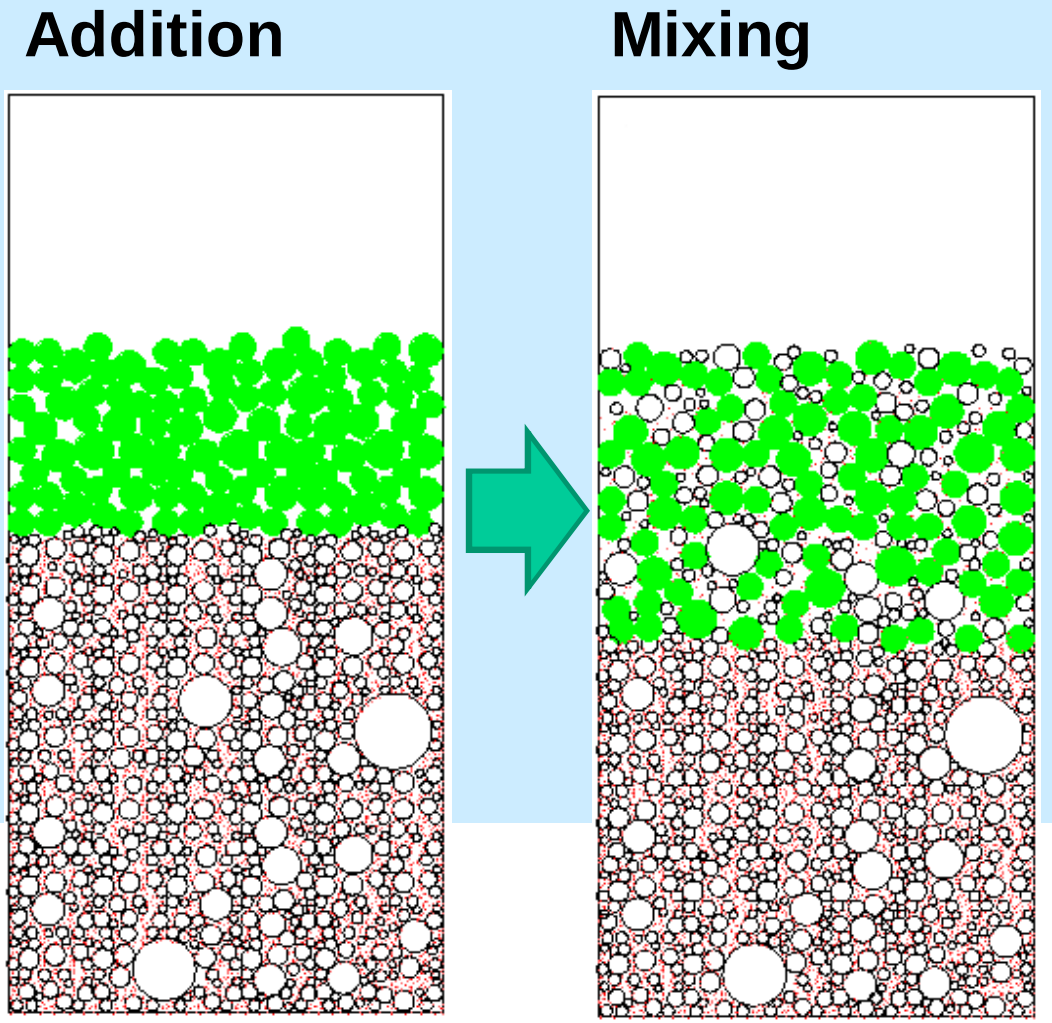
B) Adaption of low water regulation

C) Reconstruction of bank embankment

D) Side arm reconnection

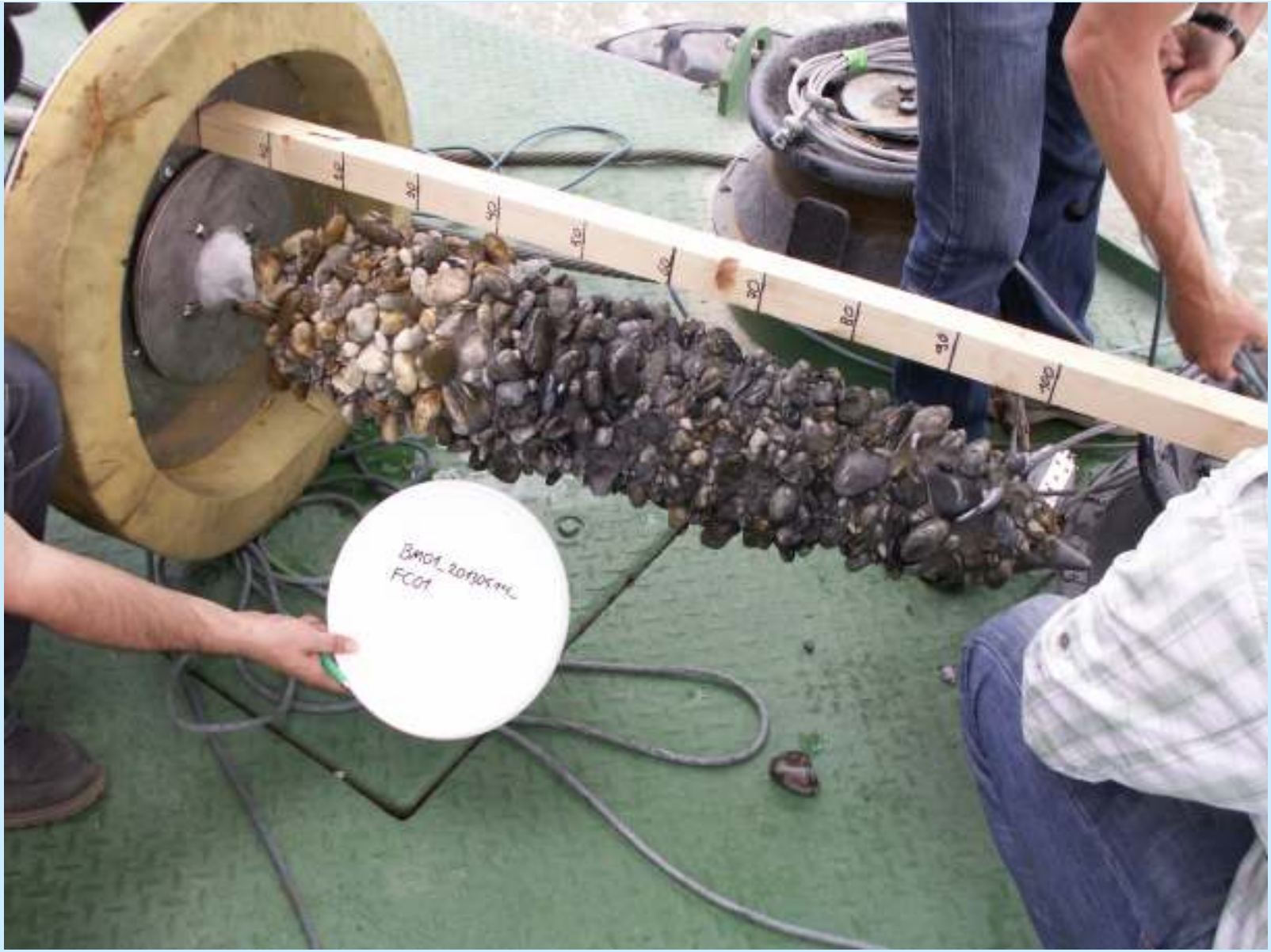
A) Addition of coarse gravel „Granulometrische Sohlverbesserung“

- Addition of gravel 40/70 mm
- Turbation with bed load
- Reduction of bed load transport: 90 %
- First time in large river



A) Addition of coarse gravel

View direction

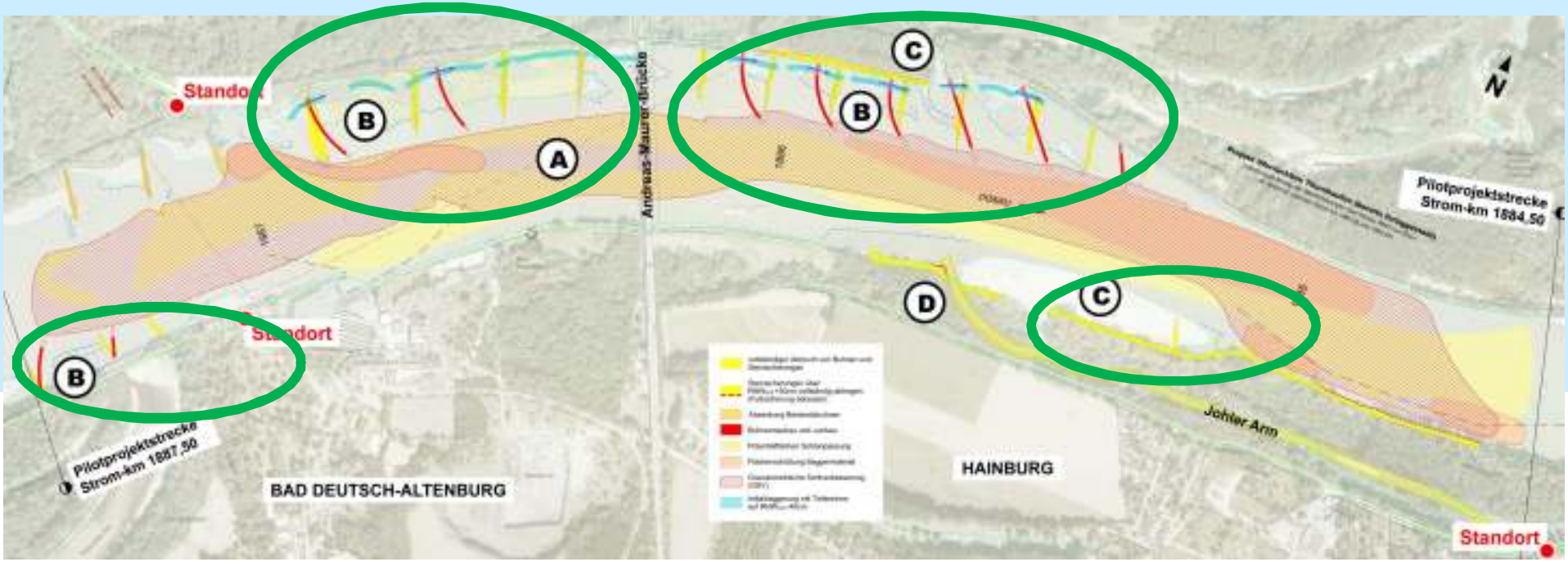


Freeze core sampling

Radio Tracer
Average transport velocity

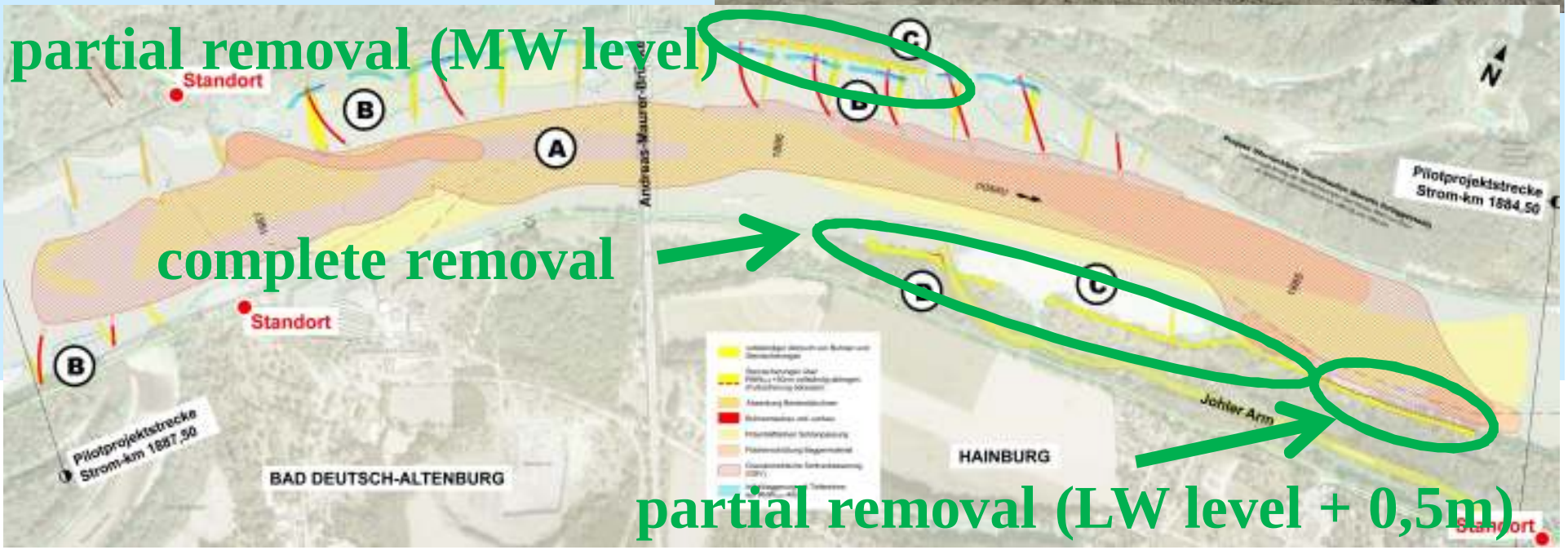
B) Adaption of Low Water Reglation (groynes)

- Deconstruction of existing groynes
- Construction of new shaped groynes at lower level
- Less sedimentation in groyne fields
- More current towards banks
- Connection between groyne fields



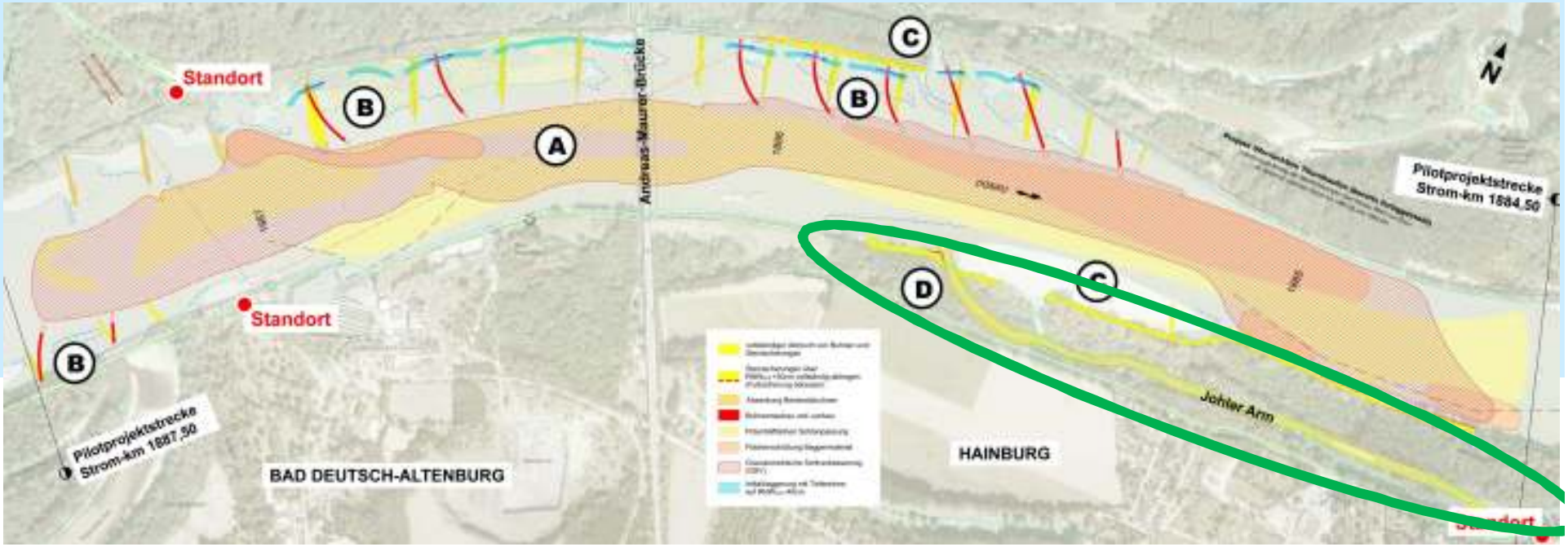
Witzelsdorf, 5.10.2009

C) River Bank Restoration



D) Side Arm Reconnection Johler Arm

- 1.5 km
- Connection at Low Water Level -1.5m
- Connected throughout whole year



Pilot project Bad Deutsch Altenburg

- Monitoring program
- 5 years pre-monitoring
- 15 years post-monitoring
- abiotic parameters (hydromorphology, …)
- Biotic parameters (habitats, species, …)

Thank you for your attention

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