Argyll & Bute Local Biodiversity Partnership

Catchment Management

Community Demonstration Project

Marina Curran-Colthart
Local Biodiversity Officer
Argyll & Bute

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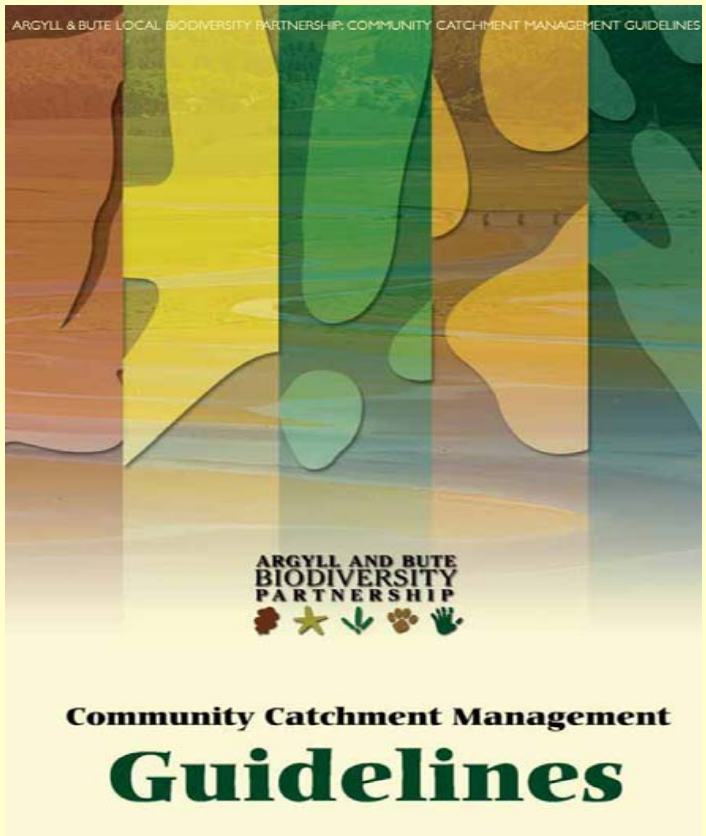
Argyll & Bute Local Biodiversity Partnership

Catchment Management



The aim of the Guide is to provide a tool to help in the development of local catchment management plans in Argyll & Bute.

These plans are seen as a way of focussing on the relationship between biodiversity, habitat management and the local community

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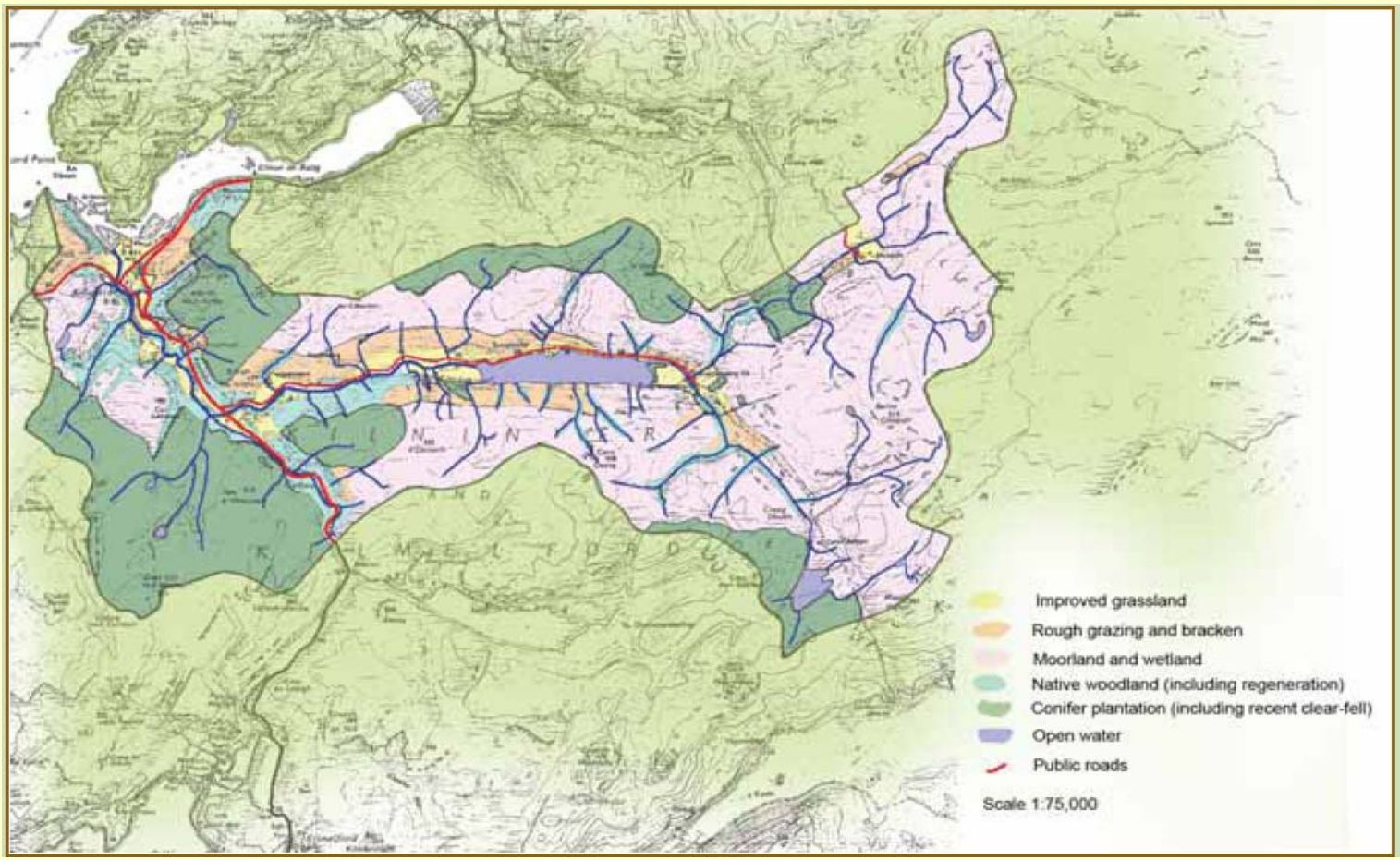
Catchment Management



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Catchment Management

Issues-Water Framework Directive

- water quality
- river water management
- fisheries management
- habitats and species
- farming
- forestry and woodlands
- recreation, access and community

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Catchment Management

The Euchar Catchment

Rural area, low population, small hill farms, extensive forestry

- **Water:** quality high with low levels of pollution from a number of sources
- **River management:** localised flood control measures, drainage of wetlands and water abstraction from headwaters
- **Fisheries:** significant drop in fish populations in common with other catchments.

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Catchment Management

Issues:

- **Habitats and species:** information is patchy
- **Farming and Forestry:** key activities in the catchment, management effort focussed now on environmental issues
- **Recreation:** low-key , primarily fishing and walking

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Catchment Management

Management objectives:

1. **Water quality:** Ensure guidelines for farming, forestry and road construction are adhered to
2. **River Management:** Introduce an integrated approach to flood management and water abstraction
3. **Fisheries Management:** Increase knowledge of population distribution and requirements of salmonids, reduce threats
4. **Farming:** Ensure that current changes in farm support have a beneficial impact on the ecology of the area
5. **Forestry & woodlands:** Restructure conifer plantations and shelterbelts to increase biodiversity and increase the area of positively managed native woodlands
6. **Community etc:** Minimise any negative impact on the aquatic environment arising from housing and recreational activity

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Catchment Management

Biodiversity

1. **Habitats and Species:** Extend knowledge of species status and distribution and develop habitat management plans to optimise habitat condition for key species

Biodiversity is one of the key indicators of a good quality environment. The Euchar has a number of nationally and locally important species:

1. Wych Elm
2. Lichens and Bryophytes
3. Otter
4. Black grouse
5. Salmon and sea trout
6. Variety of birds, dippers etc
7. Dragon flies/damselflies
8. Pearl-bordered Fritillary
9. Water vole

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Catchment Management

Community Action for Biodiversity Phase II
Demonstration project

Project aim: Engage the local community in biodiversity issues

Objectives:

1. to demonstrate how the community can help conserve local biodiversity through monitoring what they pour down their sinks- the ***Sink Link***. A survey with be carried out involving households and the school with each one monitoring usage for a set period.
2. to construct a Reedbed and monitor biodiversity activity and water quality

Legacy:

1. An informed community and production of advice in the form of a T-Towel
2. Reedbed.
3. A final report will be produced.

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Catchment Management

Opportunities:

Other local catchments

Possible transnational projects with:

1. **The Blackwater Catchment in Co. Kerry –Ireland**
1. **Sweden- Kustlandett region**

For further information:
www.argyll-bute.gov.uk/partnerships

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River Restoration Centre 7th Annual Conference

Edinburgh April 2006

ECOURBANISM

Gatton Brook

when is a stream not a stream?

Luke Engleback MLI Principal of Studio Engleback
Gary Grant CEnv MIEEM Director of EcoSchemes Ltd

www.studioengleback.com

www.ecoschemes.co.uk

DEFINITIONS

THEORY OF EVOLUTION : Three Principles

- Species interdependence
- The relationship between the organism & its environment
- The dynamic balance of nature

Charles Darwin *On the origin of species* 1859

ECOLOGY

- OECOLOGIE Term first used in 1866 by Ernst Haeckel
- Ecology is ‘Scientific Natural History’
- Derived from the Greek Oikos -meaning:
  family household & its daily operations & maintenance

Haeckel viewed living systems as an economic unit
related in mutual conflict as well as in mutual aid

LANDSCAPE ECOLOGY

A scion of modern ecology that looks at the inter-relationships between man & both open & built up landscapes

ECOURBANISM

- An Holistic approach to urban design
- This means looking beyond city boundaries

"Ecourbanism… addresses the development of multi-dimensional sustainable communities designed to be harmonious and balanced environments."

Miguel Ruano 1999

The overarching issue of sustainability…

SUSTAINABLE DEVELOPMENT

A country's ability to develop more sustainably depends on the capacity of its people and institutions to understand complex environment and development issues so that they can make the right development choices

Agenda 21 Rio Earth Summit

SUSTAINABLE DEVELOPMENT

The Schumacher briefing on creating sustainable cities (1999) argues that cities need to be viewed as a whole…

"…their economies, infrastructure, architecture, social networks, cultural realities and their environmental base, in order to grasp the full meaning of sustainable development"

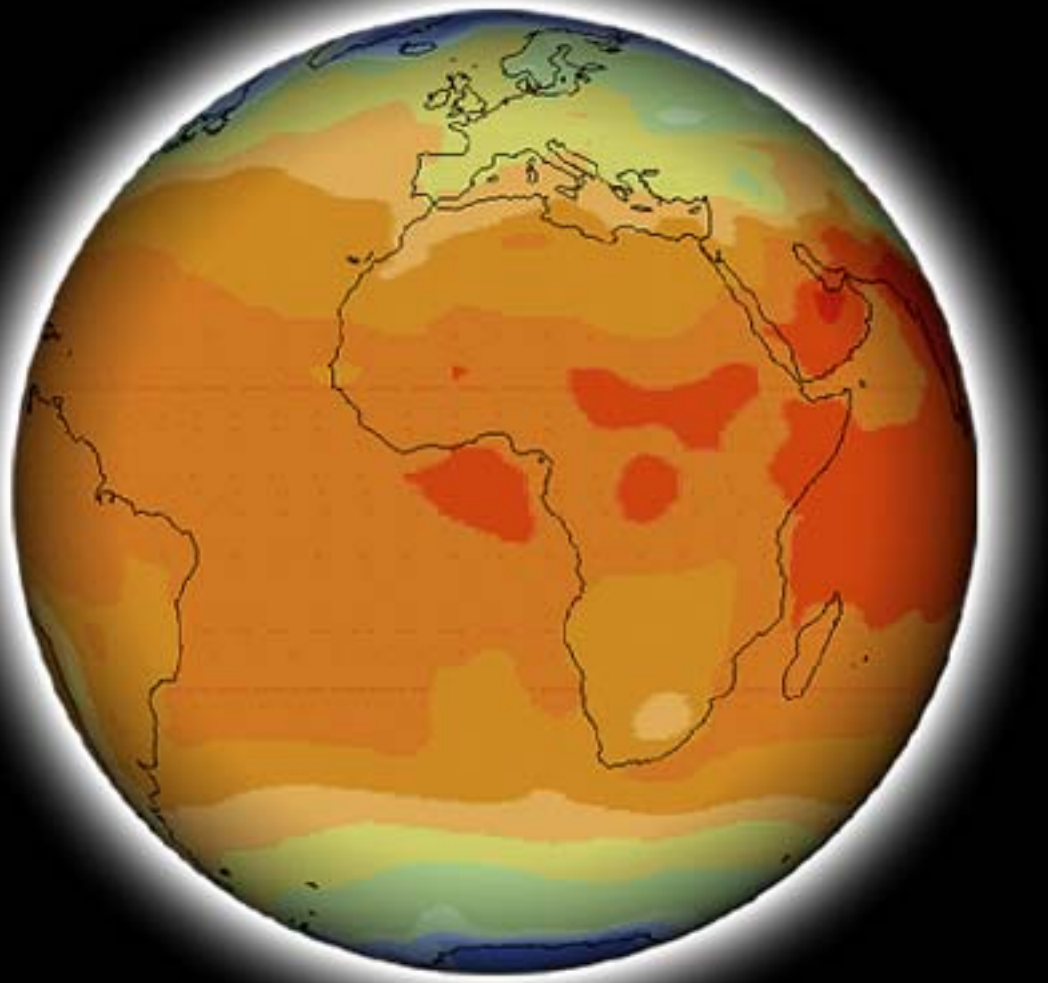
INTER-GENERATIONAL EQUITY

"A sustainable city is organised so as to enable all its citizens to meet their own needs without compromising the ability of future generations to meet their needs"

Herbert Giradet

CONTEXT

CLIMATE CHANGE



CLIMATE CHANGE

ON THE EDGE

Greenland ice cap breaking up at twice the rate it was five years ago, says scientist Bush tried to gag

BY JIM HANSEN

A satellite study of the Greenland ice cap shows that it is melting far faster than scientists had feared – twice as much ice is going into the sea as it was five years ago. The implications for rising sea levels – and climate change – could be dramatic.

Yet, a few weeks ago, when I – a Nasa climate scientist – tried to talk to the media about these issues following a lecture I had given calling for prompt reductions in the emission of greenhouse gases, the Nasa public affairs team – staffed by political appointees from the Bush administration – tried to stop me doing so. I was not happy with that, and I ignored the restrictions. The first line of Nasa's mission is to understand and protect the planet.

This new satellite data is a remarkable advance. We are seeing for the first time the detailed behaviour of the ice streams that are draining the Greenland ice sheet. They show that Greenland seems to be losing at least 200 cubic kilometres of ice a year. It is different from even two years ago, when people still said the ice sheet was in balance.

Hundreds of cubic kilometres sounds like a lot of ice. But this is just the beginning. Once a sheet starts to disintegrate, it can reach a tipping point beyond which break-up is explosively rapid. The issue is how close we are getting to that tipping point. The summer of 2005 broke all records for melting in Greenland. So we may be on the edge.

Our understanding of what is going on is very new. Today's forecasts of sea-level rise use climate models of the ice sheets that say they can only disintegrate over a thousand years or more. But we can now see that the models are almost worthless. They treat the ice sheets like a single block of ice that will slowly melt. But what is happening is much more dynamic.

Once the ice starts to melt at the surface, it forms lakes that empty down crevasses to the bottom of the ice. You get rivers of water underneath the ice. And the ice slides towards the ocean.

Our Nasa scientists have

CONTINUED ON PAGE 2

THE PACE OF CHANGE

- Paleoclimatologists using ice and sea bed cores find current green house gas levels 36% higher than the highest levels in the last 500 000 years
- In 25 years time, at current trends, these levels will be 45% higher - this seems to be fuelled by human actions
- ‘Global Dimming’ may have retarded rate of warming until now
- Current global warming 30 times faster than in past warmings

CLIMATE CHANGE MEANS PLANNING FOR:

- Threat to landscape health & threat to biodiversity
- Threat to green infrastructure and green services
- Integrated Water Management Systems
- Need for tougher construction to weather storms
- Human comfort and energy management

HUMAN ISSUES

HAMONIOUS TOWN & COUNTRY

Good & Bad Government

Two frescos by Lorenzetti 1338-40 Sala dei Nove, Palazzo Pubblico, Sienna

Good Government shows town & country working together

(Bad Government shows a desecrated landscape & a ruined town)

CULTURAL HERITAGE : Planning as a Cultural Act

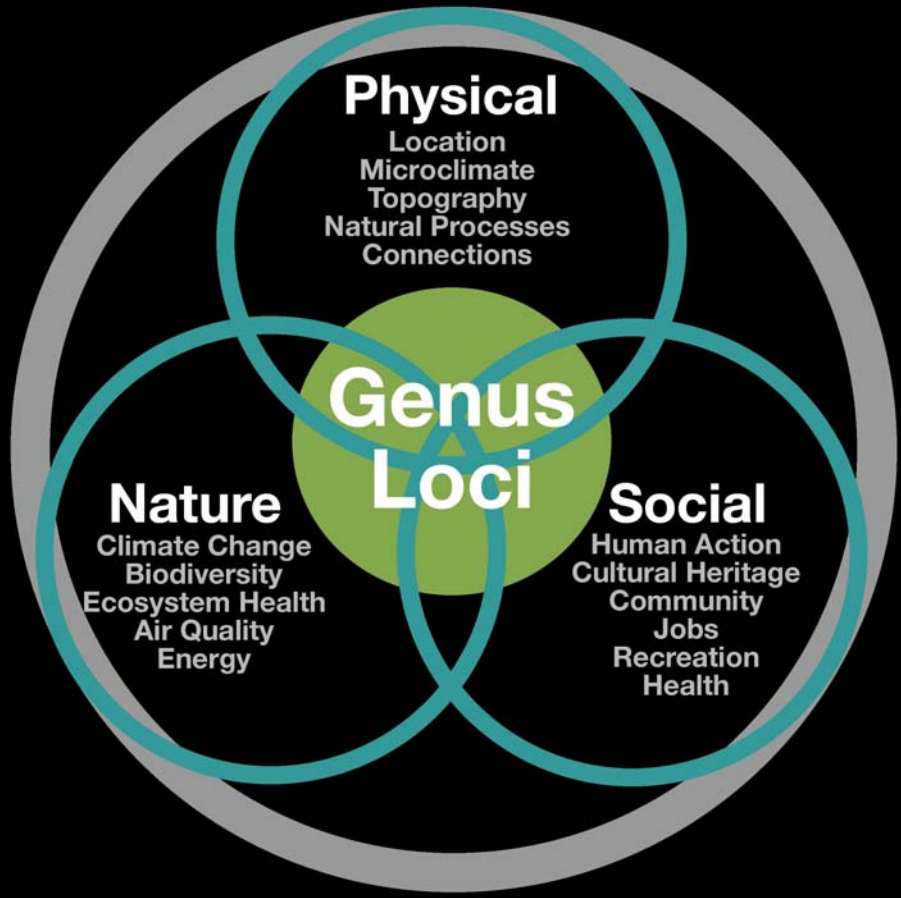
"Cultural history is an expression of cultural identity it is of truly vital importance as it raises the culture, the society and the individual above the immediate, and places them within the scale of time"

The Belvedere Memorandum (1999)

Concern for cultural identity is reflected in the Maastricht Treaty section 112

LOCAL DISTINCTIVENESS

Alexander Pope wrote of consulting ‘the genius of the place in all’



LOCAL DISTINCTIVENESS

The character of a landscape, its sense of place comprises:

The Grain of a landscape

Worked landscapes are always changing but reflect under lying grain such as:

- geology and soils
- drainage
- climate

Landscape Signatures

- responses to soil, slope, climate
- land husbandry responding to natural processes

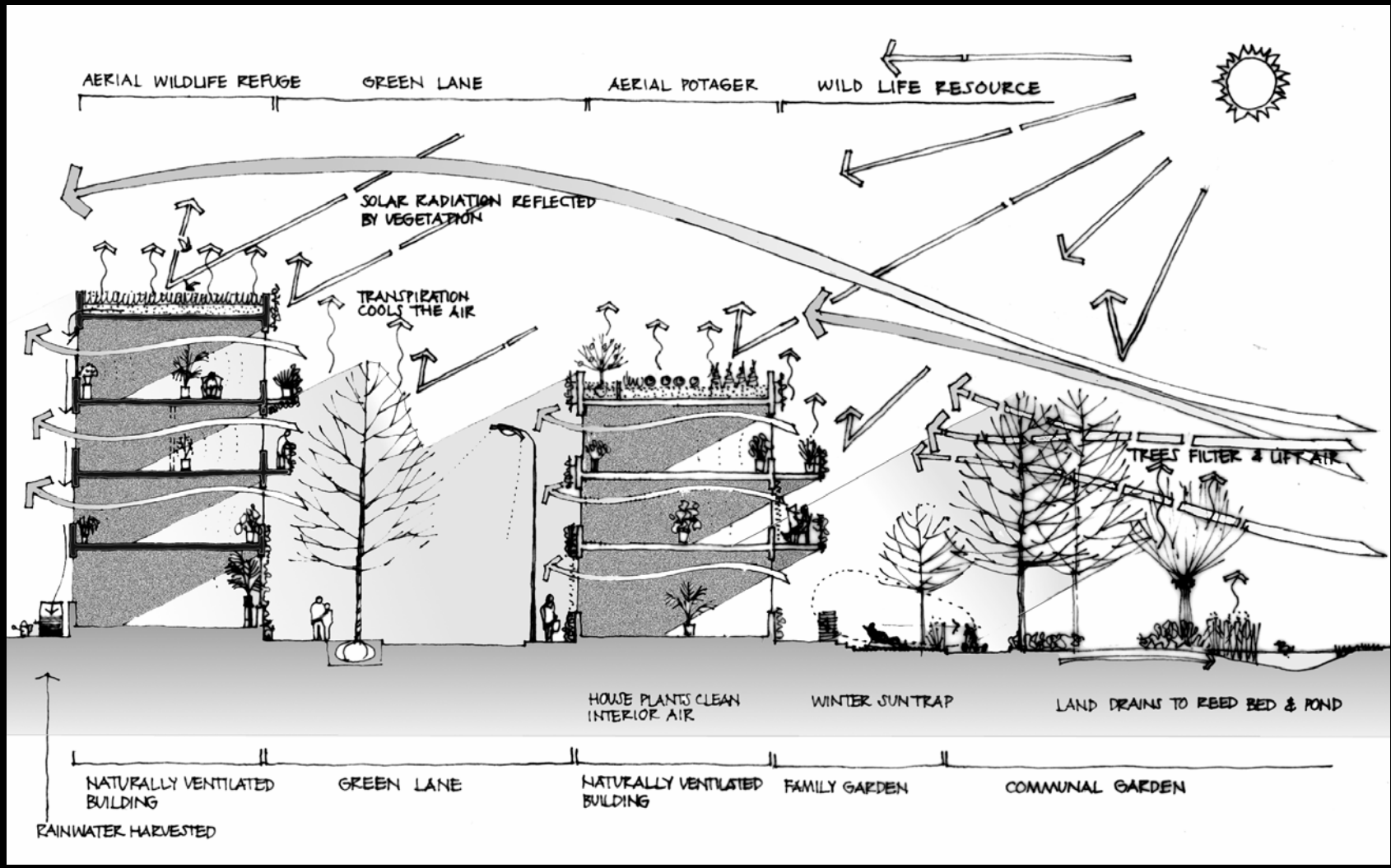
Cultural heritage can be dynamic - living

- hedges & ditches can be older than buildings
- managed woodlands effect their own rhythm on wildlife

MULTI FUNCTION

GREEN INFRASTRUCTURE :

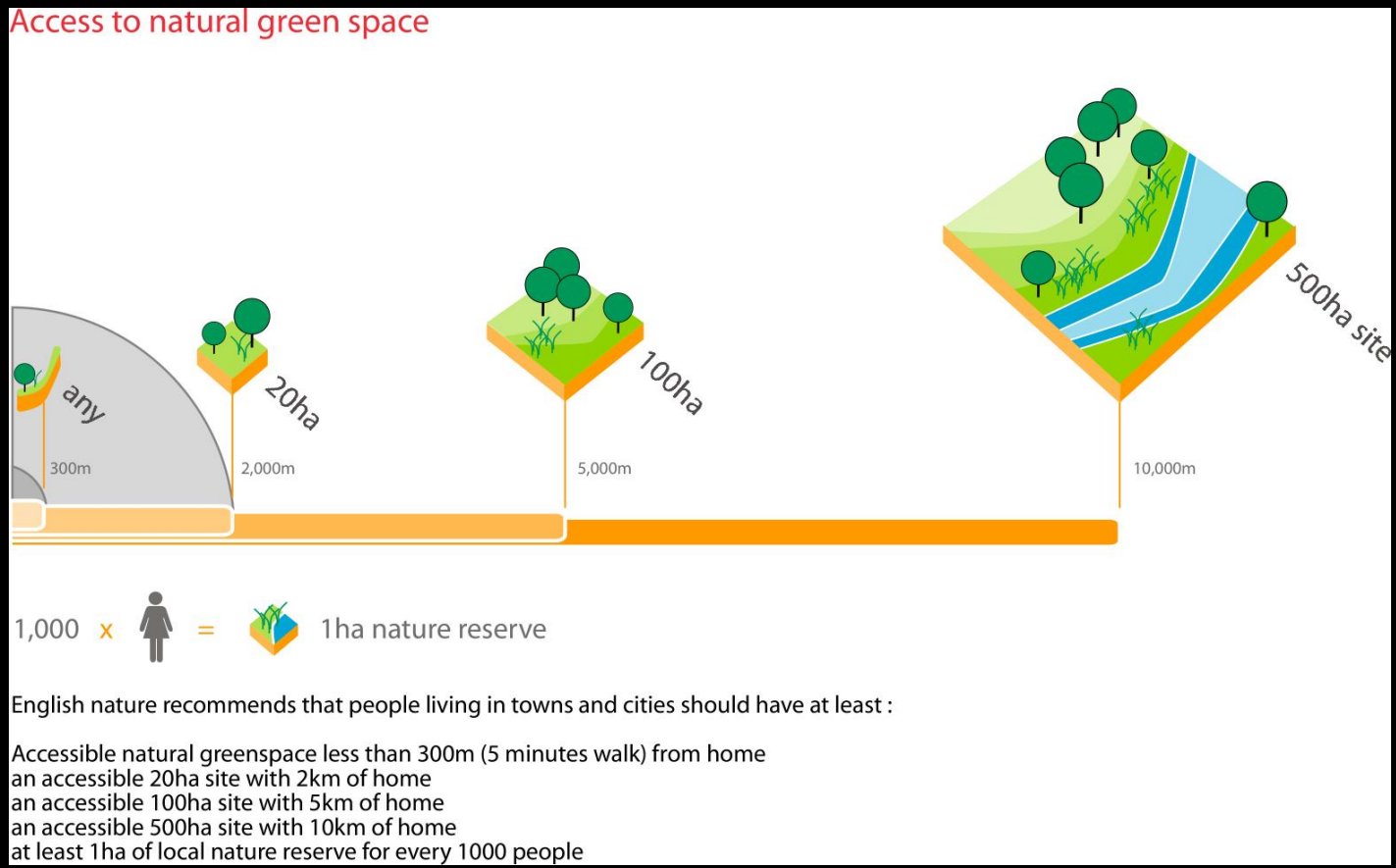
- Integrated water management
  - Sustainable Urban Drainage Systems (SUDS)
  - Treating grey and black water
  - Retaining moisture in the wider landscape
- Enhance and reinforce biodiversity
- Enhance energy saving through shelter and passive solar gain
- Enhance cooling with vegetation ‘air conditioning’
- Green Routes linking recreation areas and the wider countryside
- Bio fuel husbandry



Built form, planting & waterbodies working together

ACCESSIBLE NATURAL GREENSPACE STRATEGY

There are links between greenspace, stress reduction & better health:



SUSTAINABLE URBAN GREENSPACE

CABE Space are now advising on green infrastructure

CASE STUDY

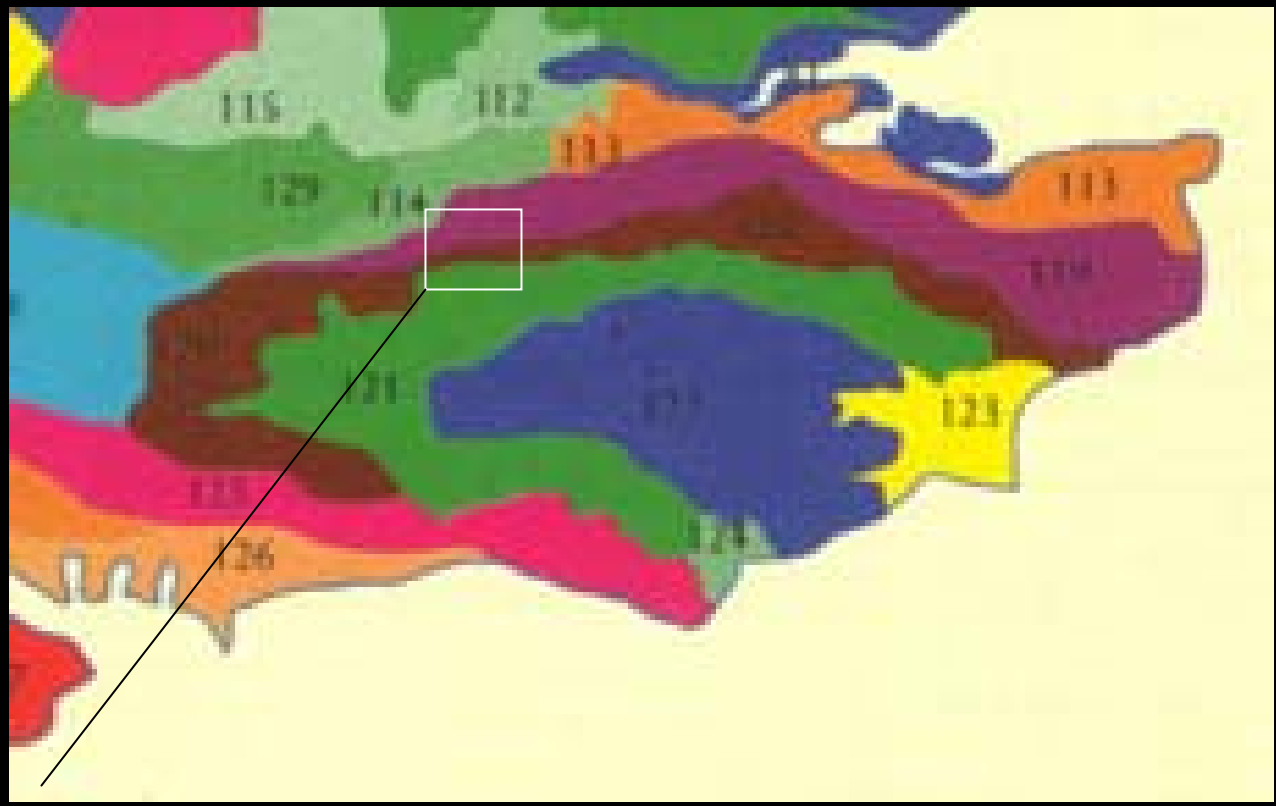
Holmethorpe, Redhill

WHAT IS LANDSCAPE ?

- Landscape as scenery
- Landscape specific to place
- Landscape as an expression of culture
- Landscape as a holistic entity
- The Rhythm of the Landscape
- Ecology

LANDSCAPE CHARACTER

There are 159 landscape character areas in England



Wealden Greensand & Wealden Clay

LANDSCAPE SIGNATURES

RURAL WHITE PAPER 2000

- a vigourous and strong policy of protecting the countryside through redirecting new house building pressure away from the greenfield sites and maintaining the quality of valued landscapes while meeting the needs of rural communities

- implementing a new direction for agricultural support which takes full account of the environmental benefits which farming provides

- a holistic approach for assessing landscape value

REINFORCE & ENHANCE BIODIVERSITY

Climate change threatens large scale extinctions due to pace of change

We need to build a ‘Noah’s Ark’ in each project

THE SITE

Holmethorpe, Redhill

HOLMETHORPE SITE

HISTORIC SITE CONDITIONS

Figure 4- Roque's map of Surrey, 1768

1768

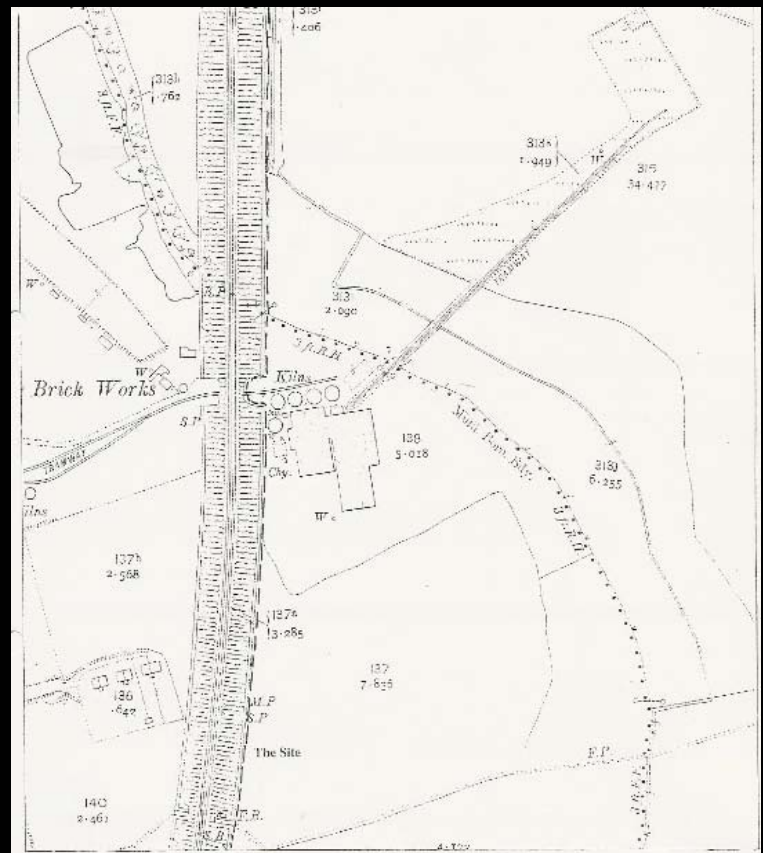


Figure 12- OS 1913 (extract) Site outline indicative only.

1913

THE SITE 50 years ago

EXISTING SITE CONDITIONS

EXISTING SITE ECOLOGY

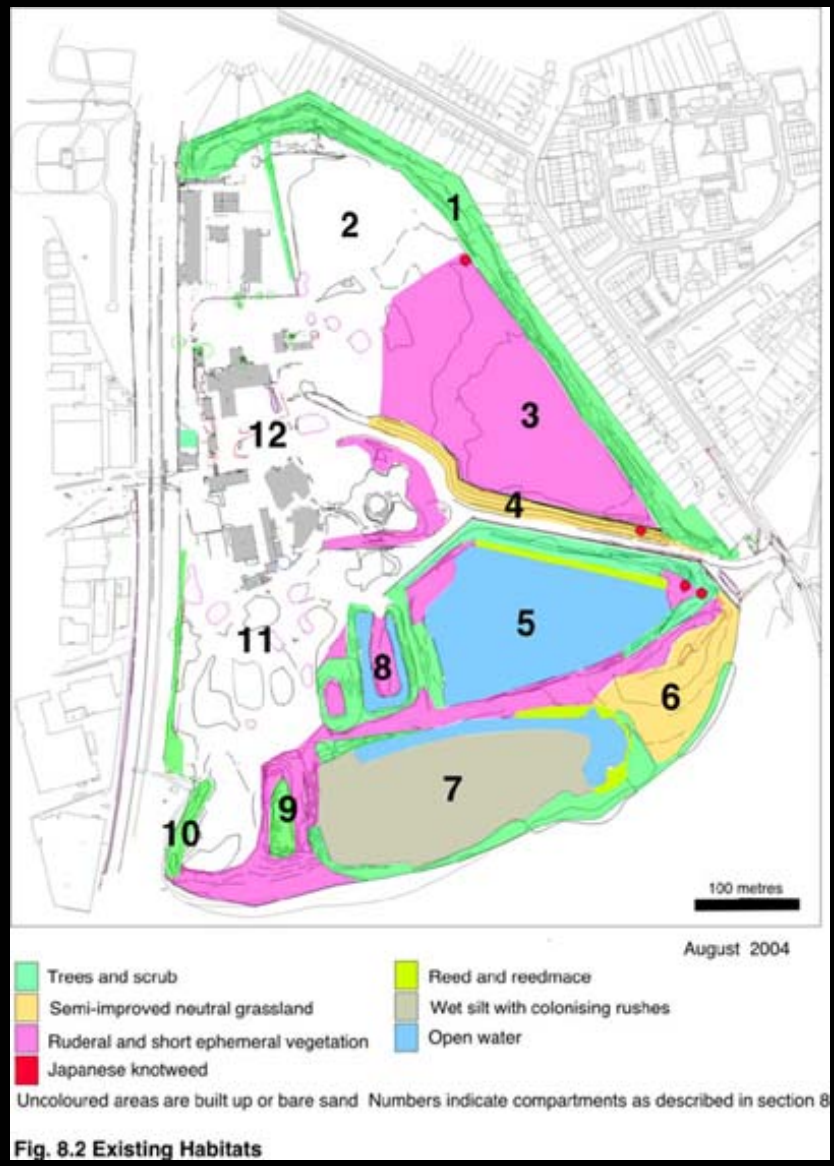


Fig. 8.2 Existing Habitats

SITE CONDITIONS

The Lower Lagoon

SITE CONDITIONS

The Upper Lagoon

SITE CONDITIONS

The Gatton Brook Outflow

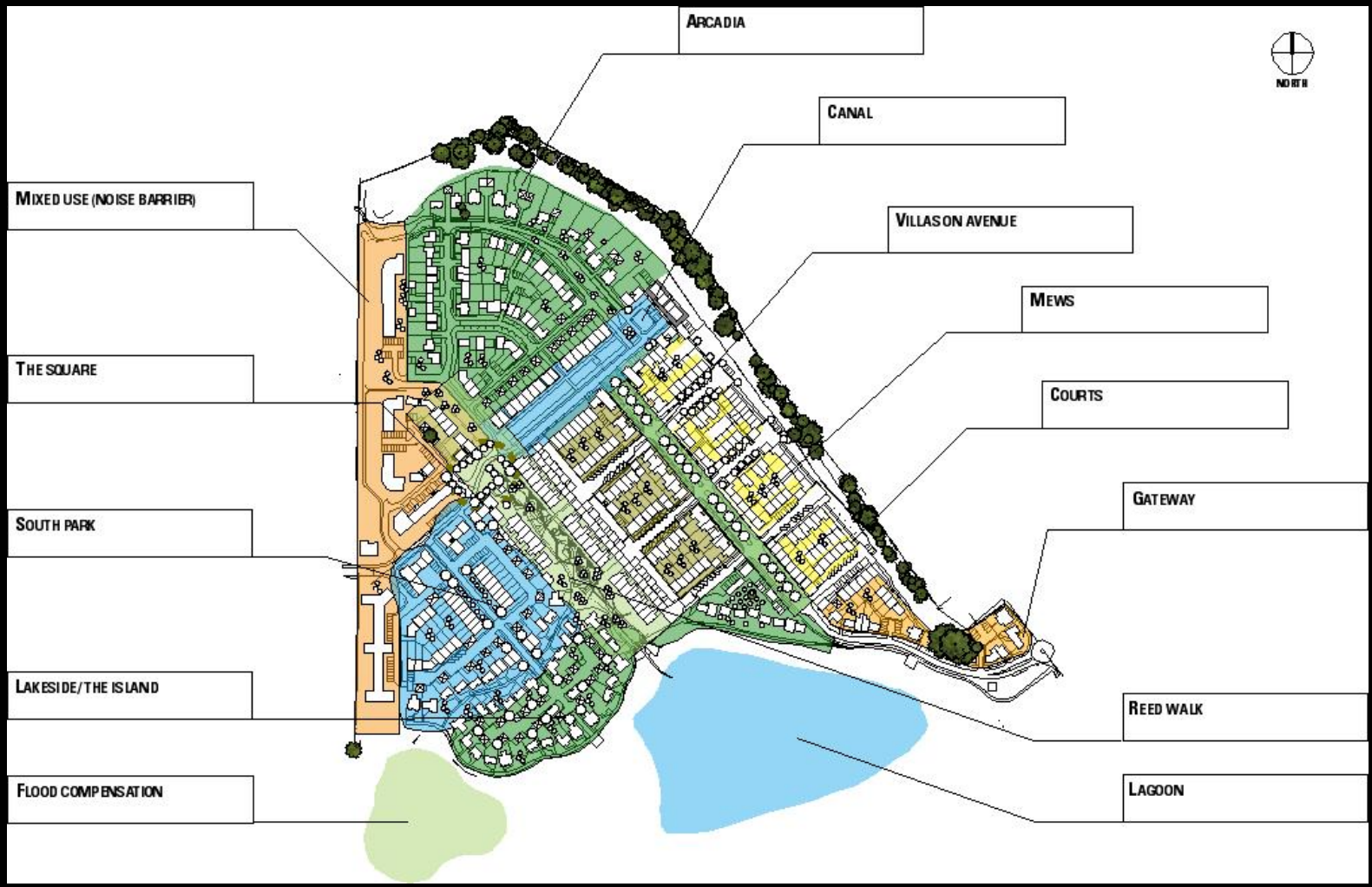
THE CONCEPT

Holmethorpe, Redhill

INITIAL CONCEPT

The Brook taken through the site

CHARACTER ZONES CONCEPT



ON LINE/ OFF LINE

Holmethorpe, Redhill

THE SITE in 2003

THE BLUE SPINE

Holmethorpe, Redhill

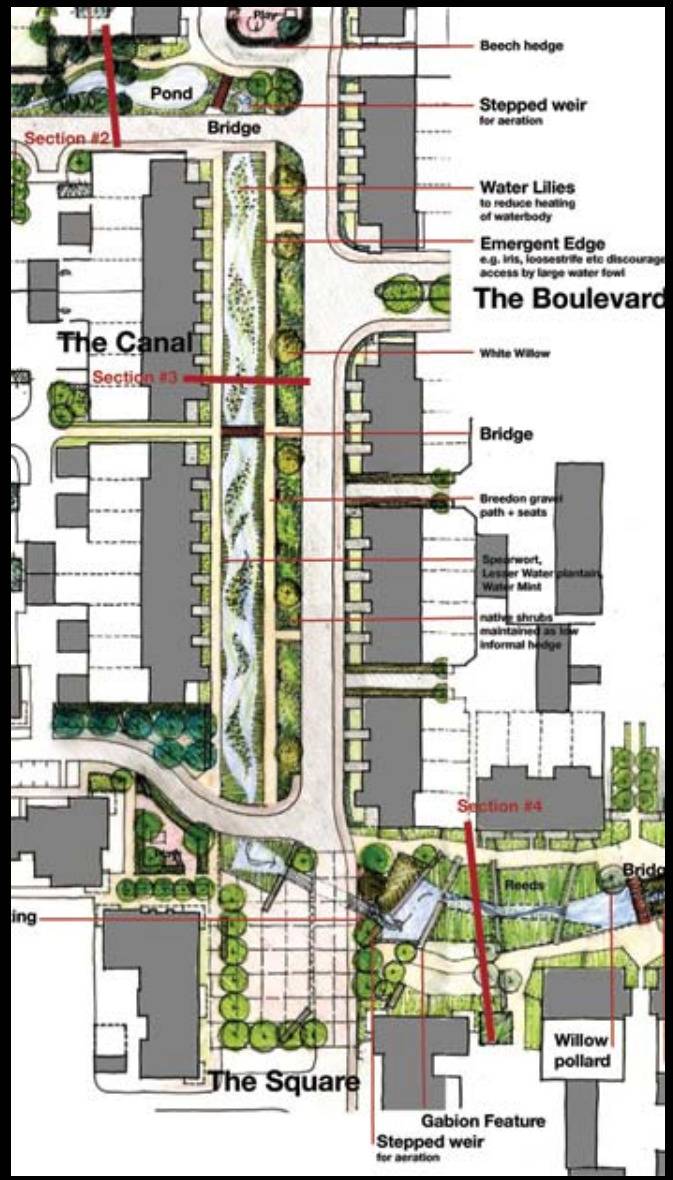
PROPOSED BROOK & LAGOON RESTORATION

THE BLUE SPINE - OFF LINE

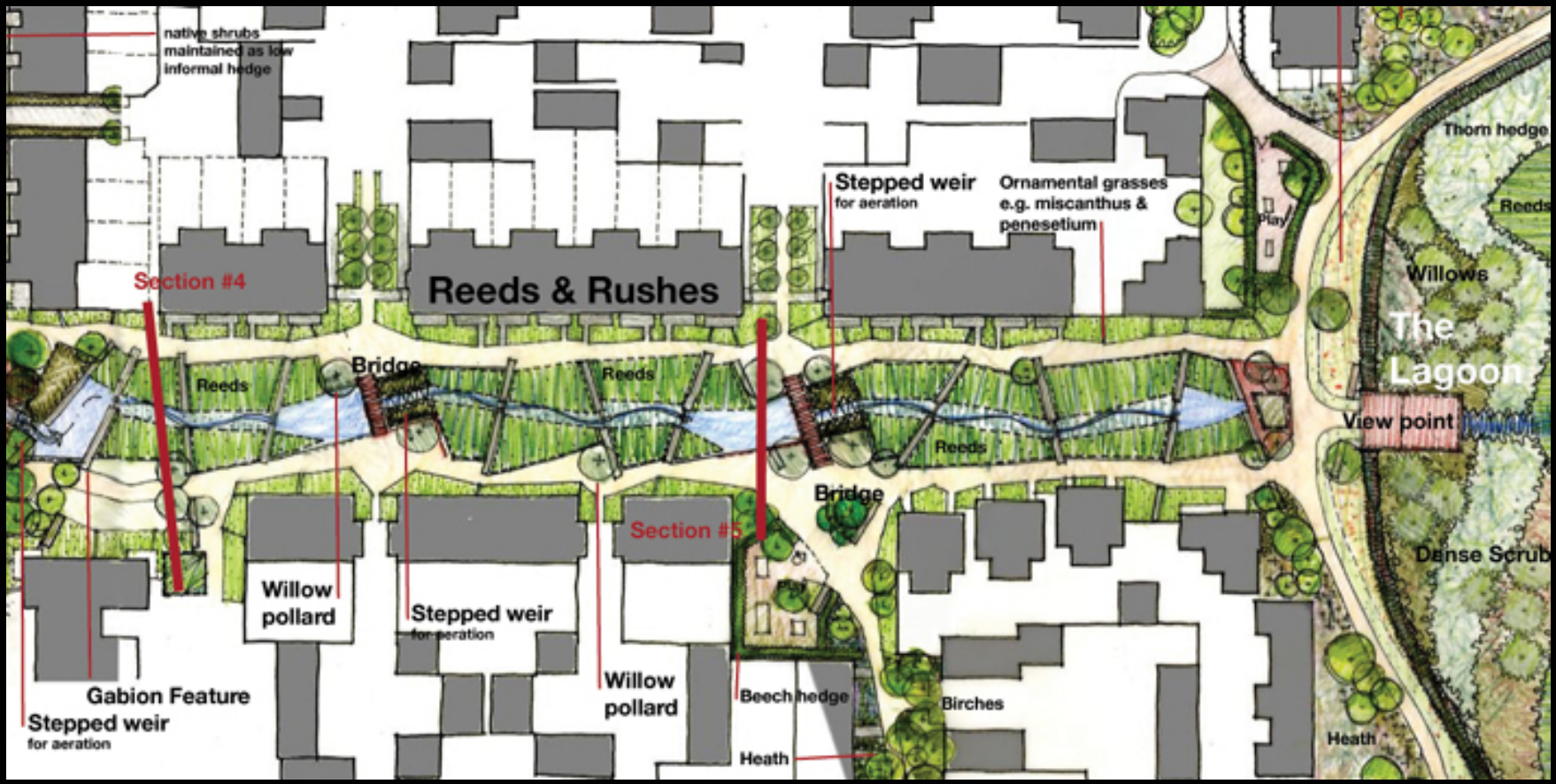
THE BLUE SPINE - ‘ARCADIA’

THE BLUE SPINE - ‘CANAL’

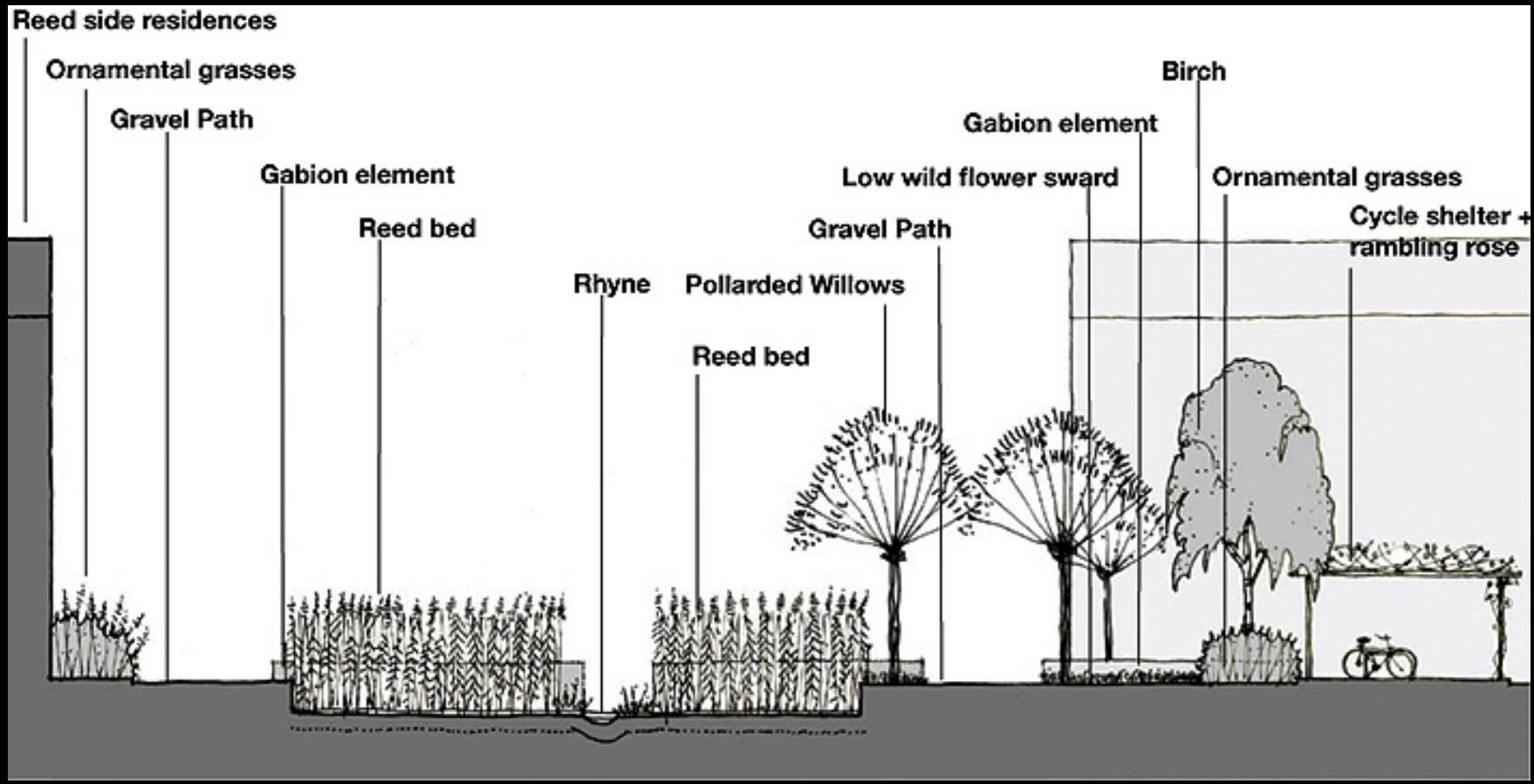
Character Zones help urban legibility



THE BLUE SPINE - REEDS



THE BLUE SPINE - CONSTRUCTED REEDBEDS



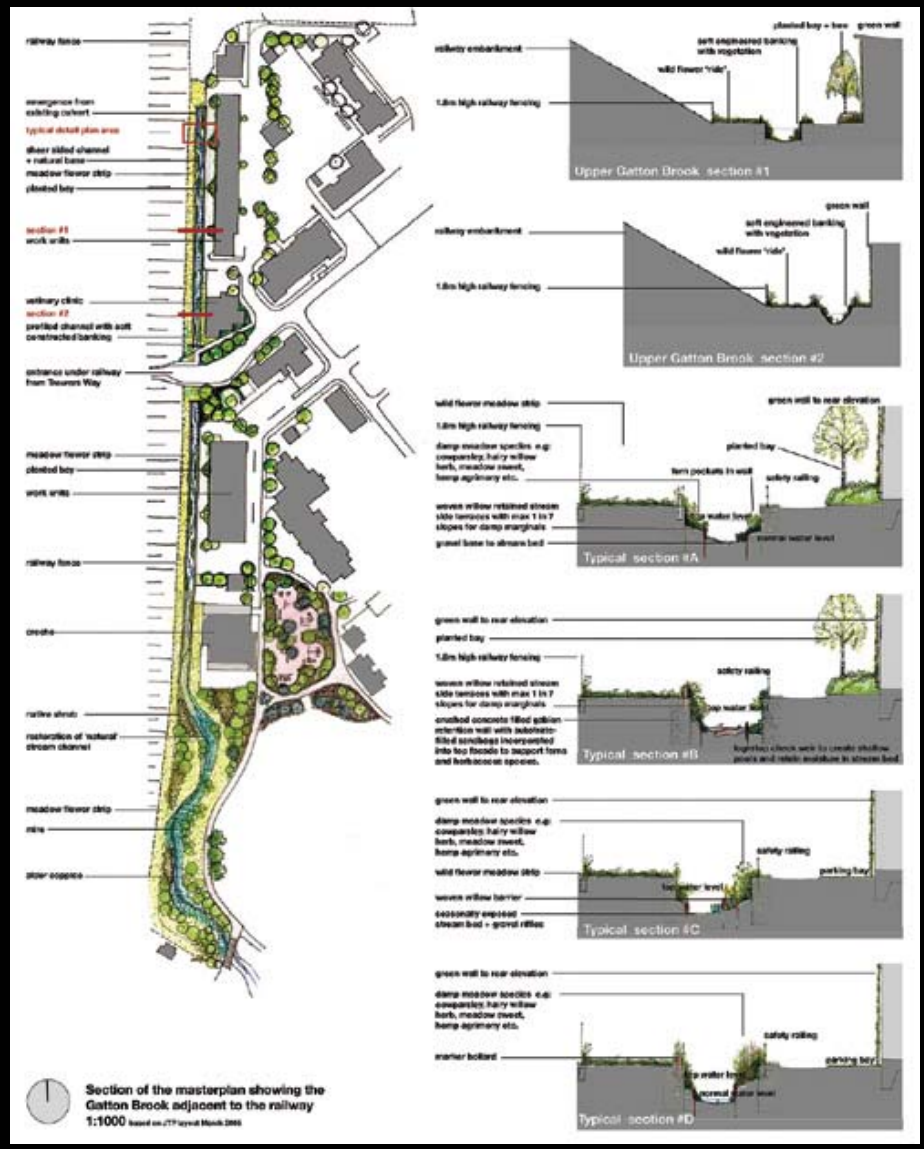
ON-LINE

HARD & SOFT

Holmethorpe, Redhill

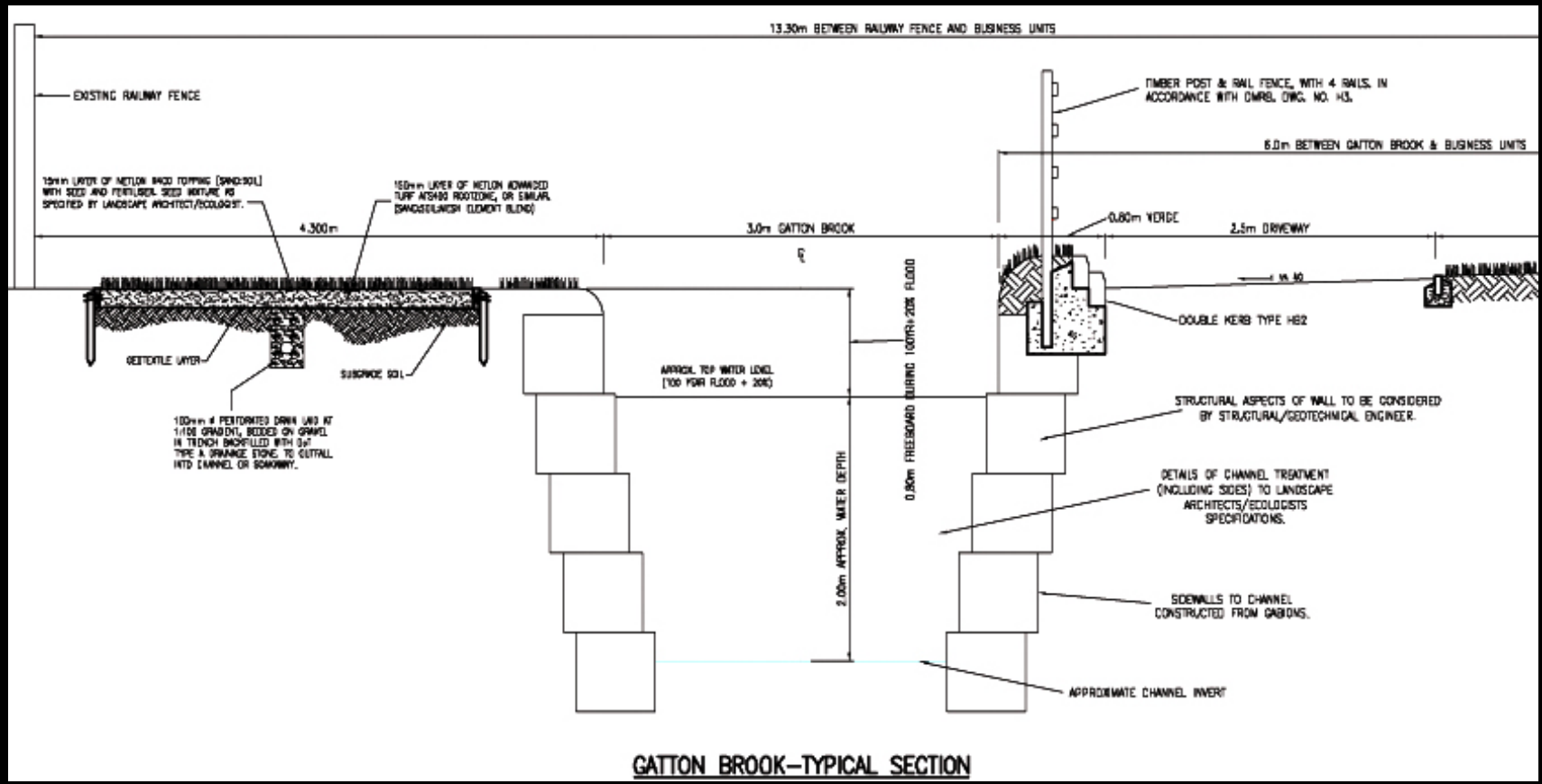
GATTON BROOK

Restored Drain



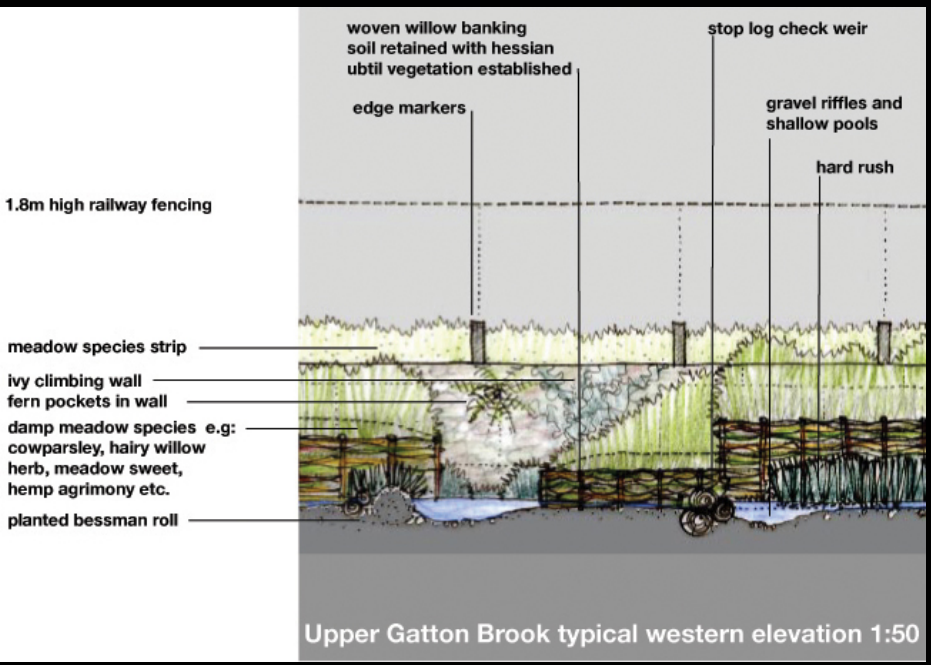
GATTON BROOK

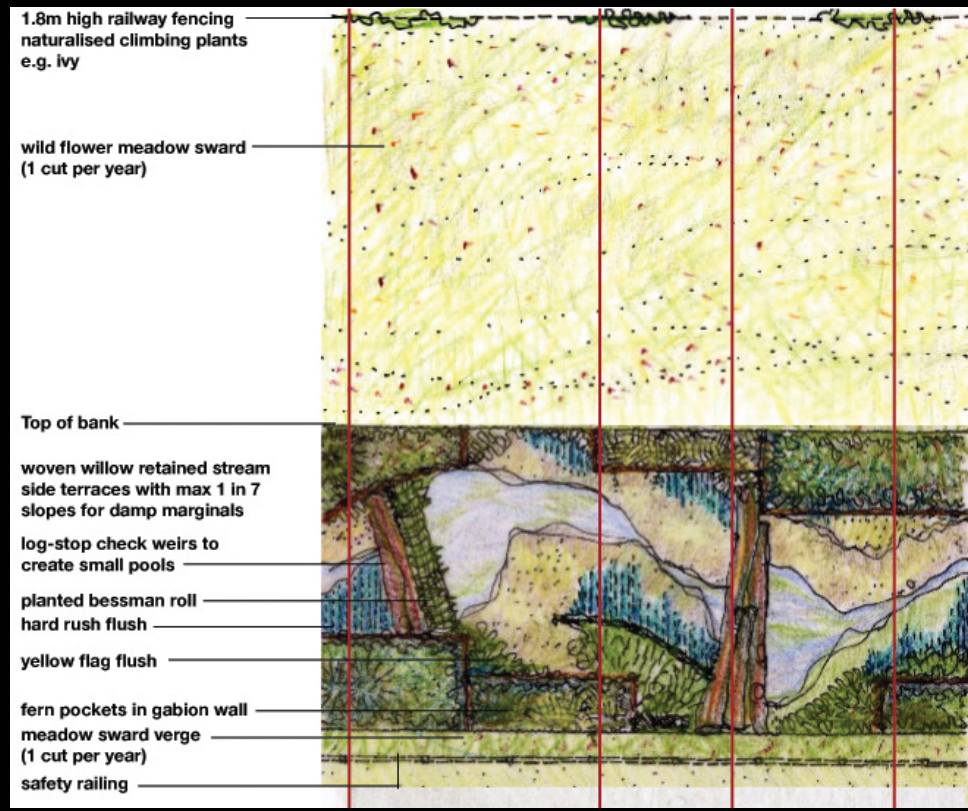
Strictly Engineering…



GATTON BROOK

Soft engineering

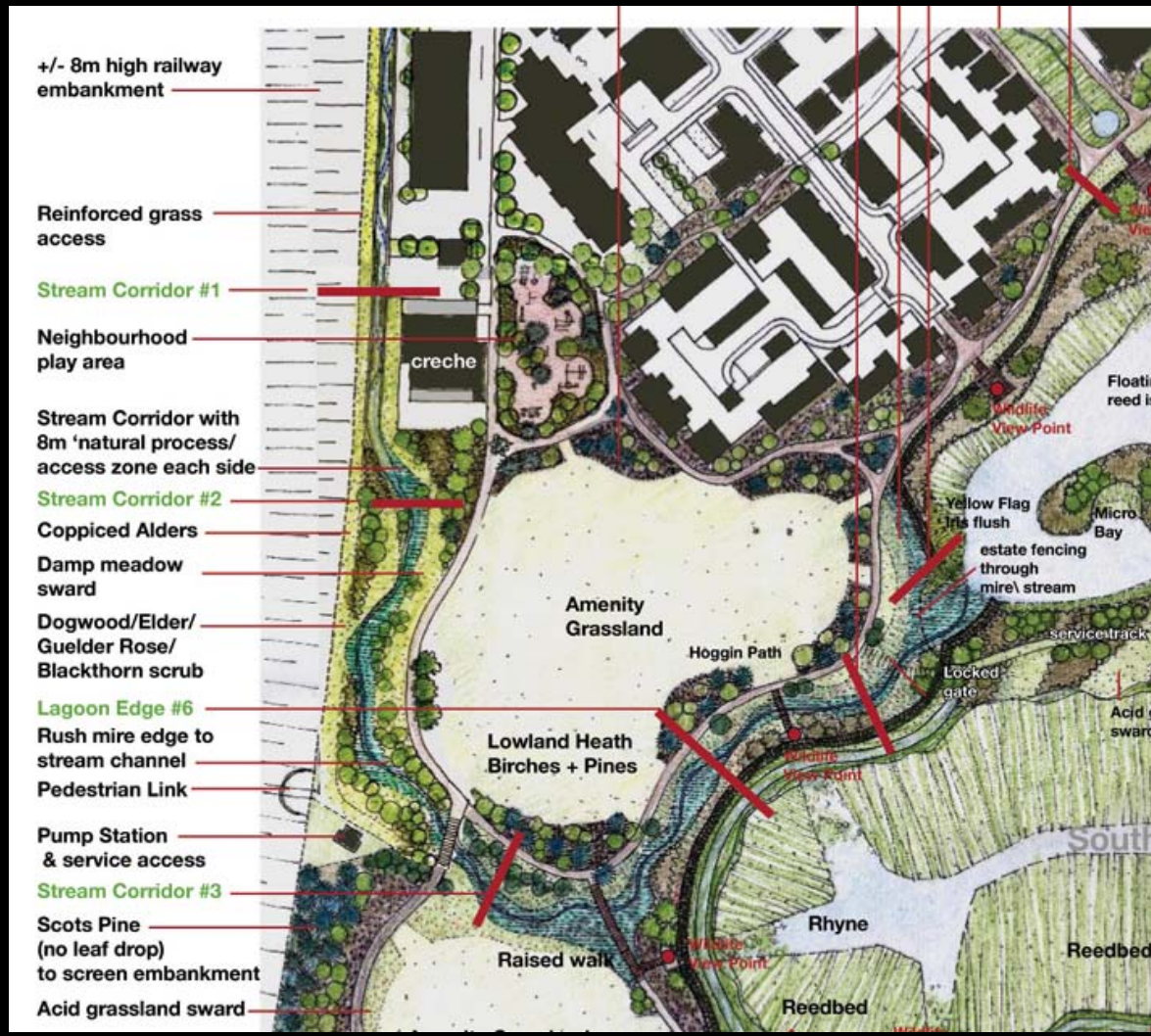




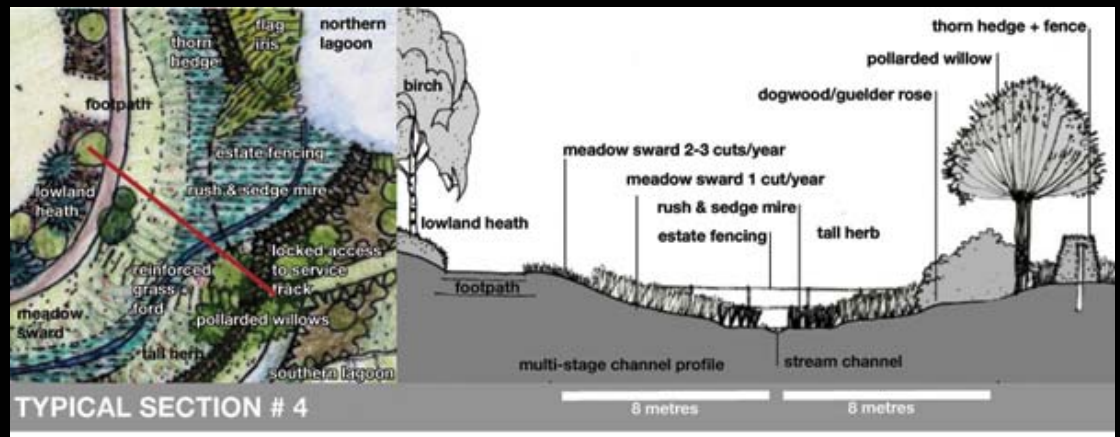
GATTON BROOK 'Restoration'

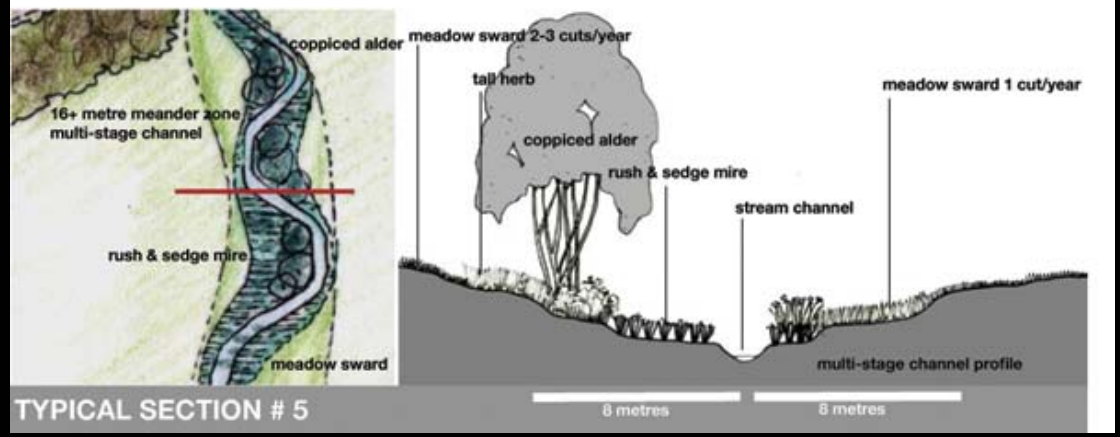
Design:

- maximises length
- accommodates football
- creates barrier to nature reserve
- reinforces character

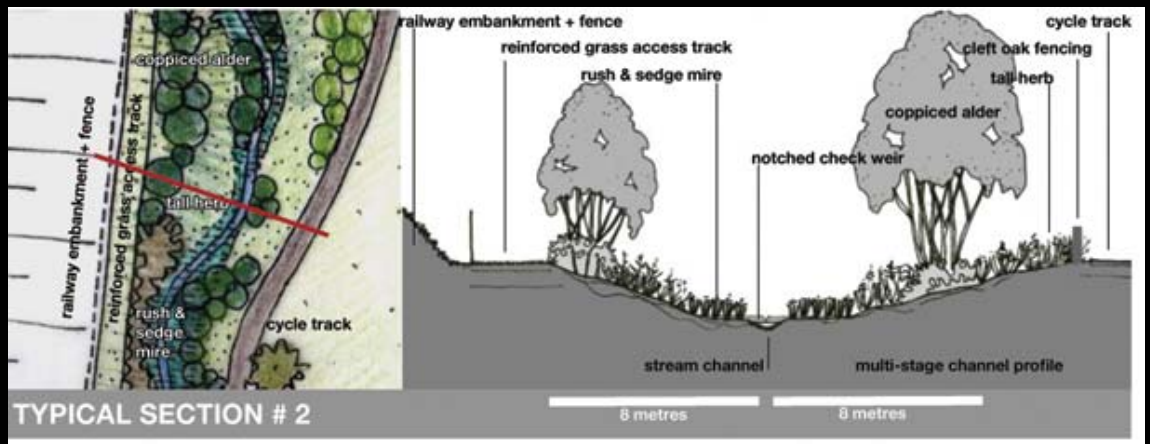


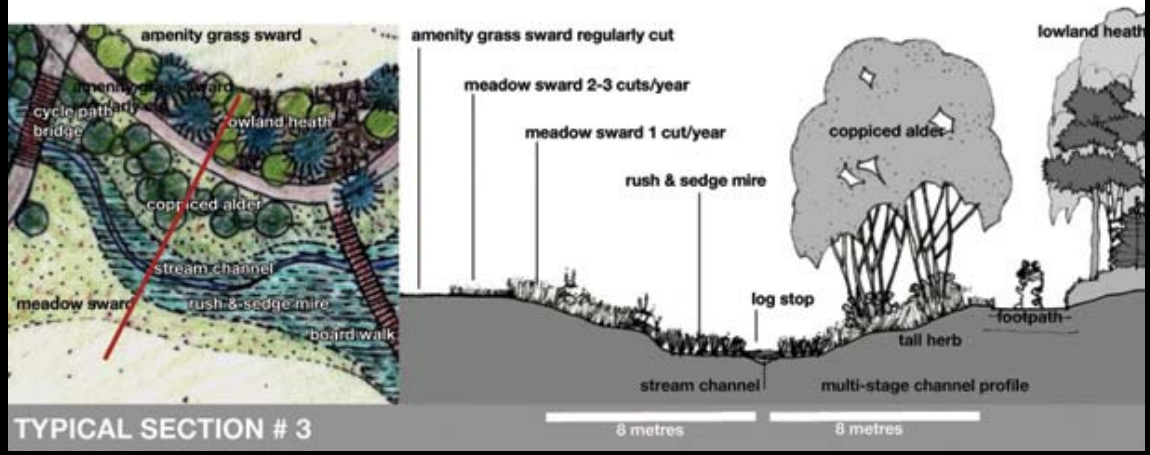
GATTON BROOK ‘Restoring’ a profile that never was





GATTON BROOK ‘Restoring’ a profile that never was





THE SITE TOMORROW

- River Creation rather than Restoration, linked to HAP Targets
- Linkage of Gatton Brook, Redhill Brook and the Moors project
- Green Infra-structure to reinforce the character of the Green Belt
- Proximity to nature, detail and delight

www.studioengleback.com **www.ecoschemes.co.uk**

Stream Naturalization in Illinois, USA: Integrating Geography, Technology and Local Communities to Improve Physical and Ecological Habitats in Illinois Streams.

Dr. Rebecca Wade

Urban Water Technology Centre

University of Abertay Dundee, UK

Prof. Bruce Rhoads

Department of Geography

UIUC, Illinois, USA


Centrella
FOODS

Geomorphology

Prof. Bruce Rhoads

Melinda Daniels

Brendan Belby

Stacey Porter

Ecology

Prof. Ed Herricks

John Schwartz

Engineering

Prof. Marcelo Garcia

Jose Rodriguez

Jorge Abad

Fabian Bombardelli

Social Analysis

David Wilson

Jared Wouters

Community Groups

Village of Northbrook

Friends of the Chicago River

Financial support (research) was provided by the STAR program of the U.S. Environmental Protection Agency (EPA 82-7148-010).

Stream Naturalization – what is it?

- Essentially ‘reverse’ engineering
  - Seeks not to simplify but to increase system complexity
- Technical Aims
  - sustainable, morphologically and hydraulically varied, yet dynamically stable fluvial systems
  - capable of supporting healthy, biologically diverse aquatic ecosystems
- Social Considerations
  - conceptions of “natural” are community-based and place-specific
  - human interaction with fluvial systems is central to the contemporary and future “natural” environment in resource-rich settings

“Healthy” Rivers

- Physically Diverse
  - Non-channelized planform
  - Meandering
  - Asymmetric cross-section
  - Variation in bed-morphology (e.g. pools and riffles)
    - Promoting mixing
    - Helical motion of flow
    - Oxidation of water cascading off riffles
  - Abundant and diverse hydraulic habitat
- Biologically Diverse
  - Abundant and diverse aquatic populations of
    - Macroinvertebrates
    - Fish Species
  - Native riparian and in-channel vegetation

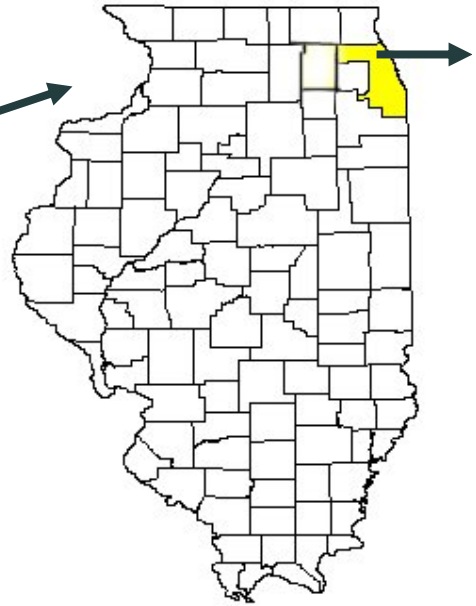
Case Study

West Fork of the North Branch of the Chicago River, Northbrook, Illinois. USA.

Location of Study Site:

A small watershed in the Chicago metropolitan area

USA



The State of Illinois

West Fork of the North Branch of the Chicago River. Northbrook, Illinois.

Broad Project Objectives - Academic

- understand the fluvial and habitat dynamics of human-modified streams
- explore how urban communities formulate and translate their environmental vision
- examine community-based environmental preferences and how they are shaped by and in turn shape science and technology

Case study objectives – Village of Northbrook

Provide an improved Streetscape for the Central Business Area including a river improvement project to improve the appearance of the whole area

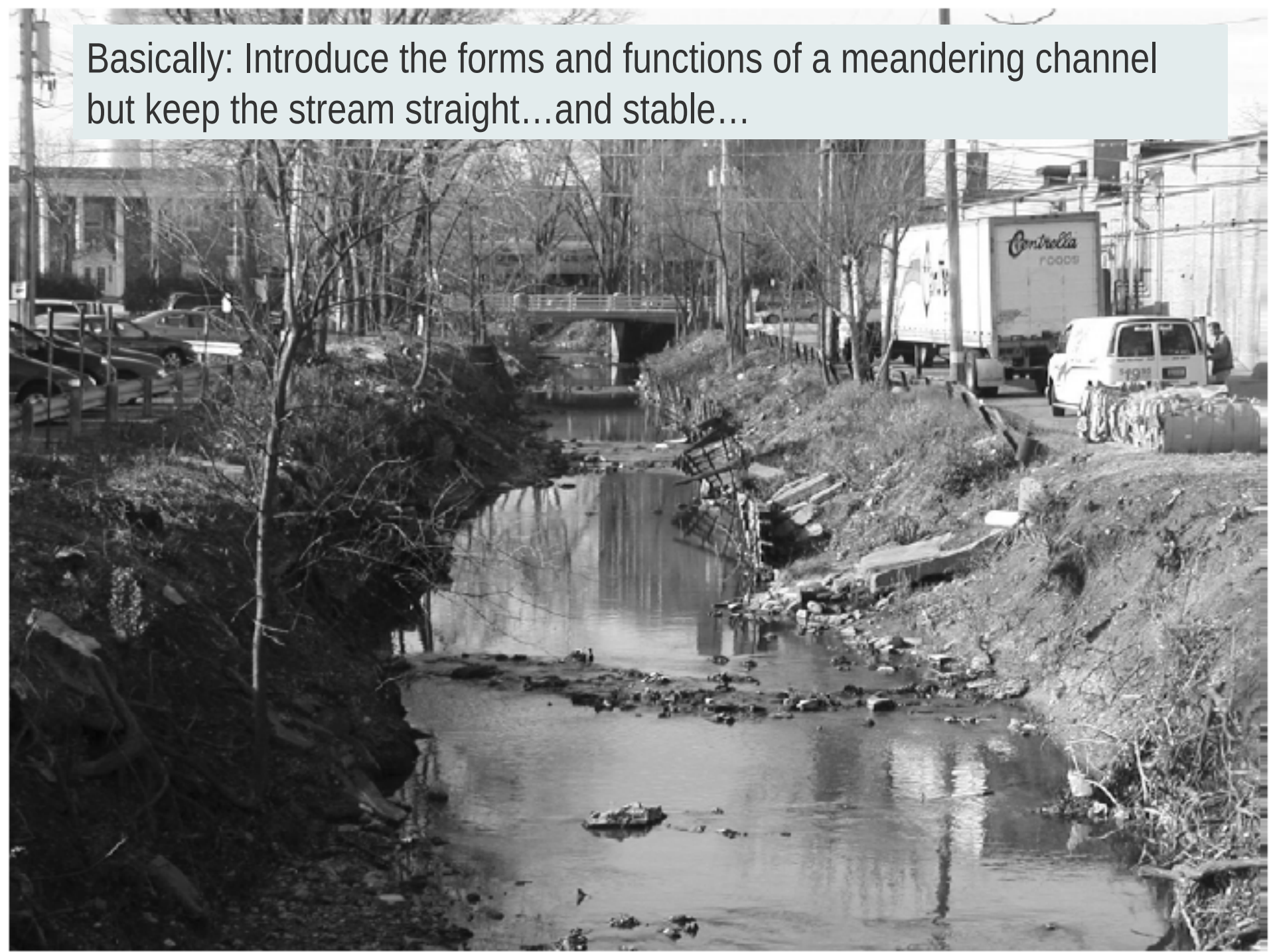
Integrating our science with their plans…

- U of I group helped to inform the stake holders and community on…
  - Historical landuse record
  - Historical channel planform
  - Stability of current channel
  - Historical and current flow regime
  - Aquatic diversity and abundance

The Scientific Challenge:
A Pool-Riffle Design for Straight Urban Streams

- mimic the spatial variations in hydraulic conditions, while avoiding deflection of flow toward the channel banks

- promote self-sustaining morphological units while providing suitable habitat


Basically: Introduce the forms and functions of a meandering channel but keep the stream straight…and stable…

Pre-implementation evaluation…

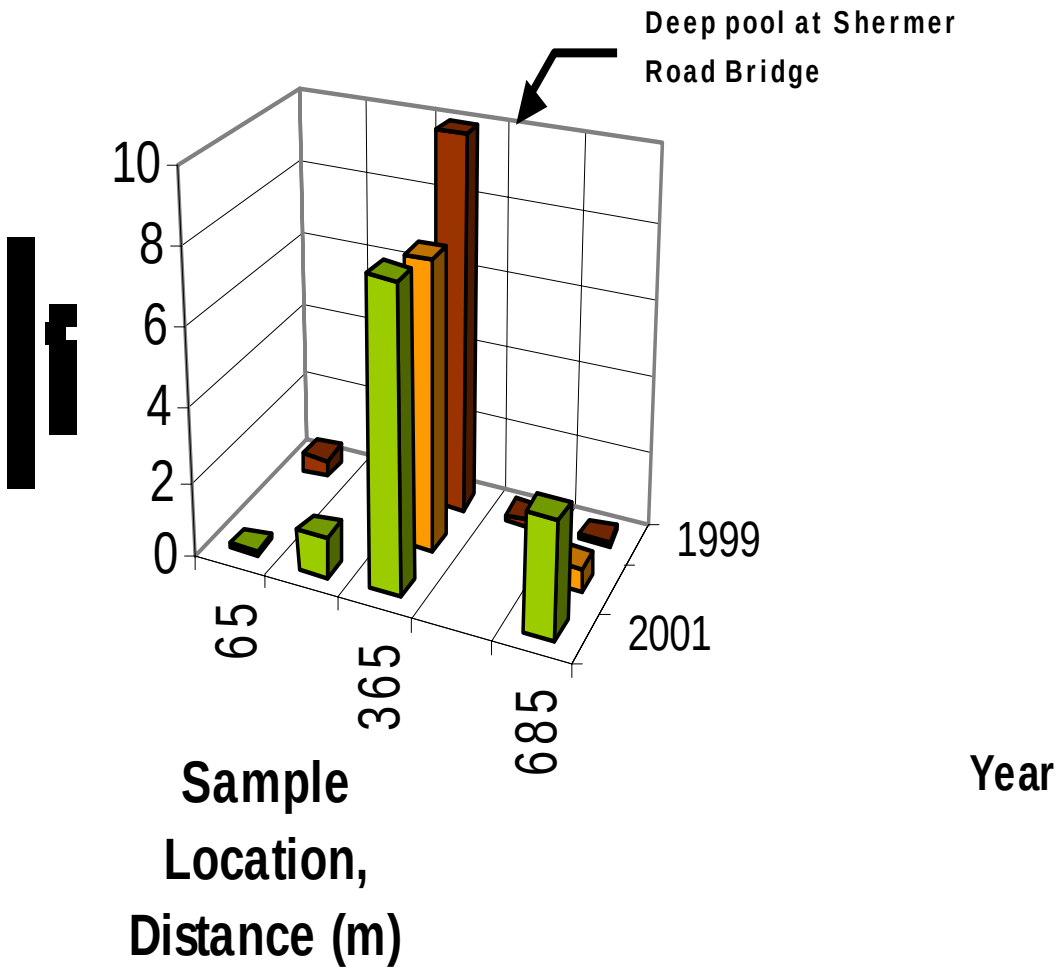
- Helps reduce uncertainty
- Indicates potential responses of stream

Information gathering…

- Office-based historical analysis and air-photo interpretation
- Fieldwork
- Collaboration with local stake holders
- Numerical modeling
- Physical modeling


1938

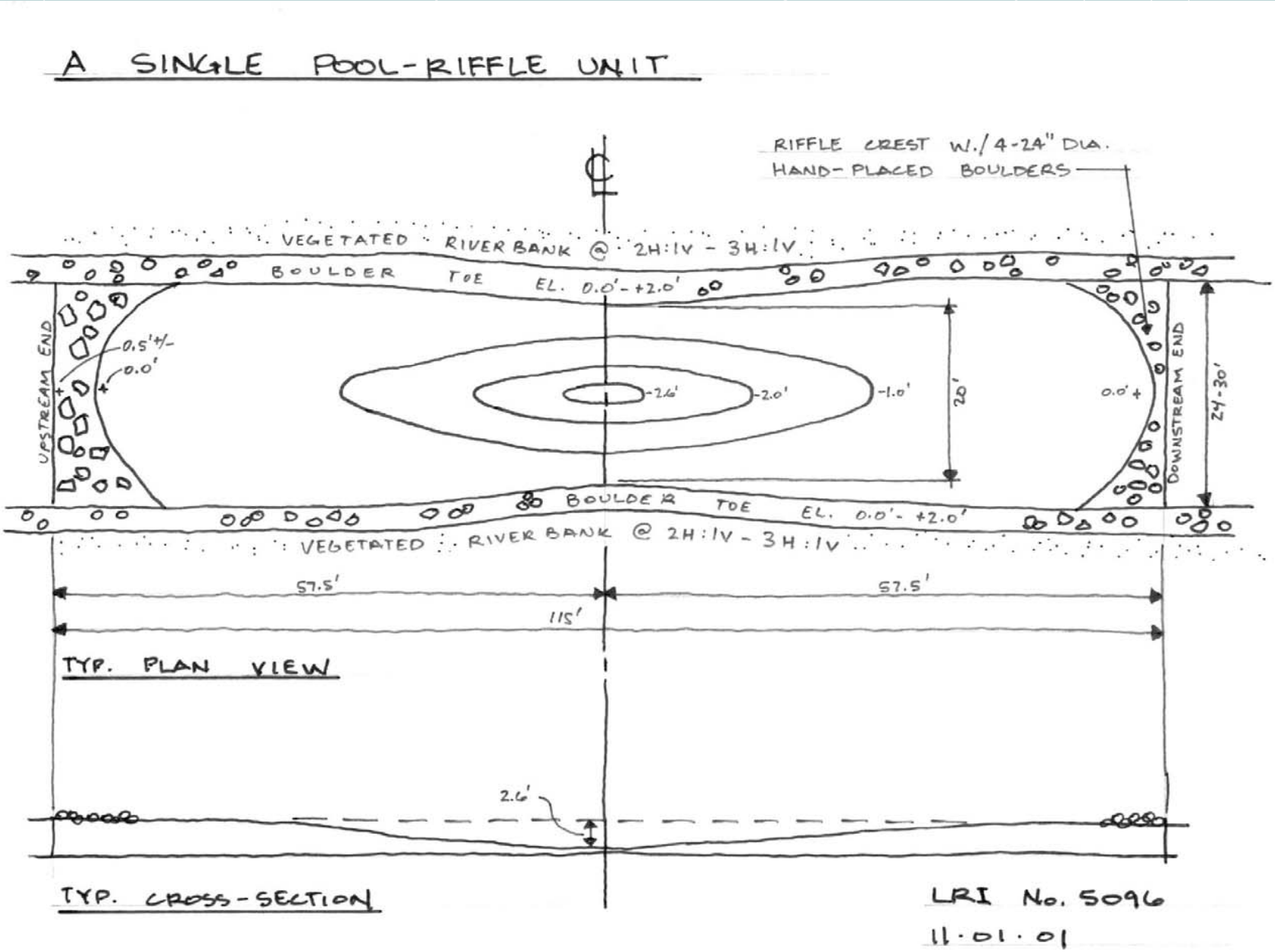

Study reach
1998



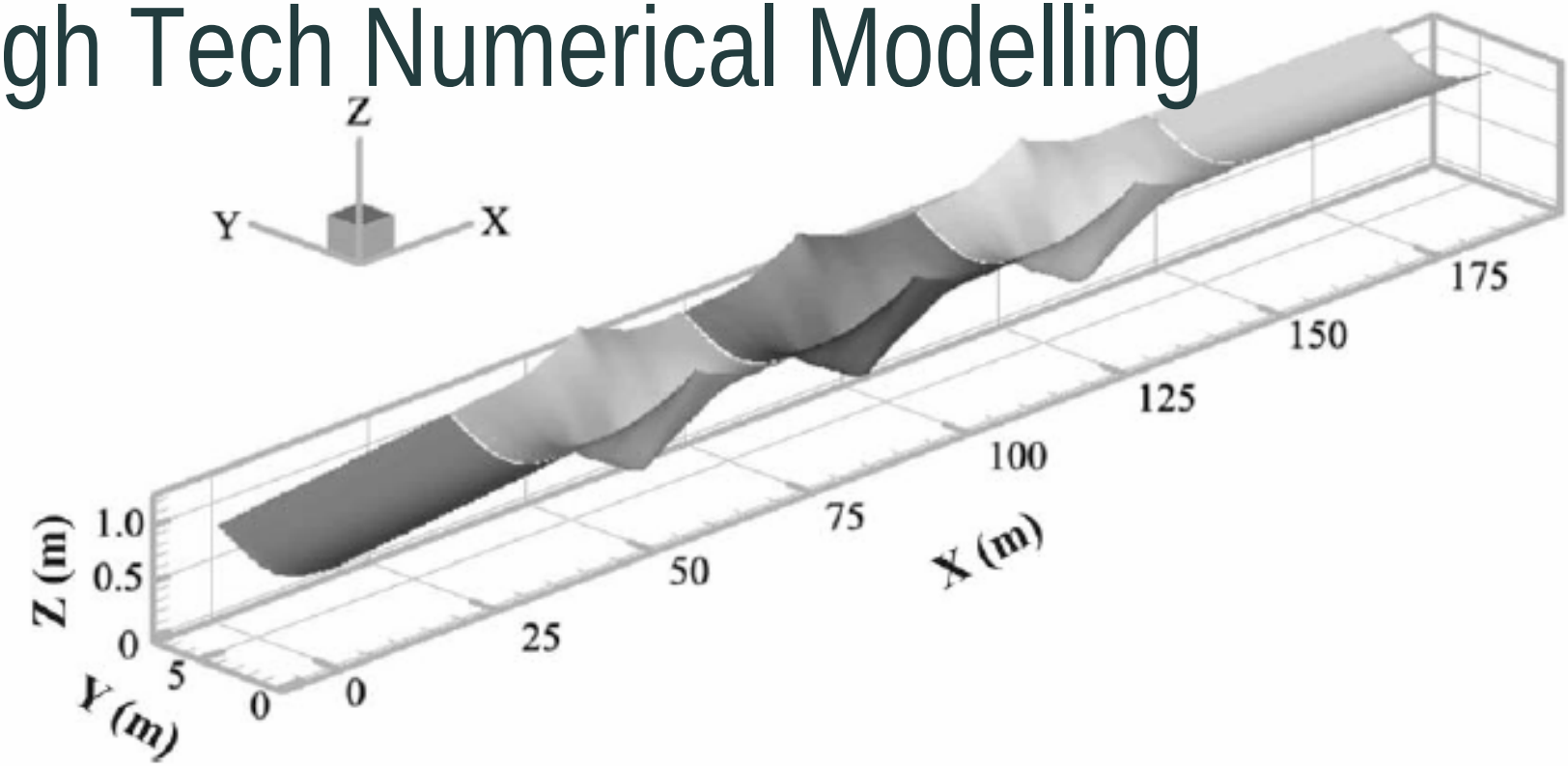
Fish biomass in g/m^2 for five sample locations along longitudinal profile of the North Branch of the Chicago River at Northbrook, Illinois. Fish were found mainly in pool locations prior to naturalization. These data support the use of pool structures in the naturalization effort.

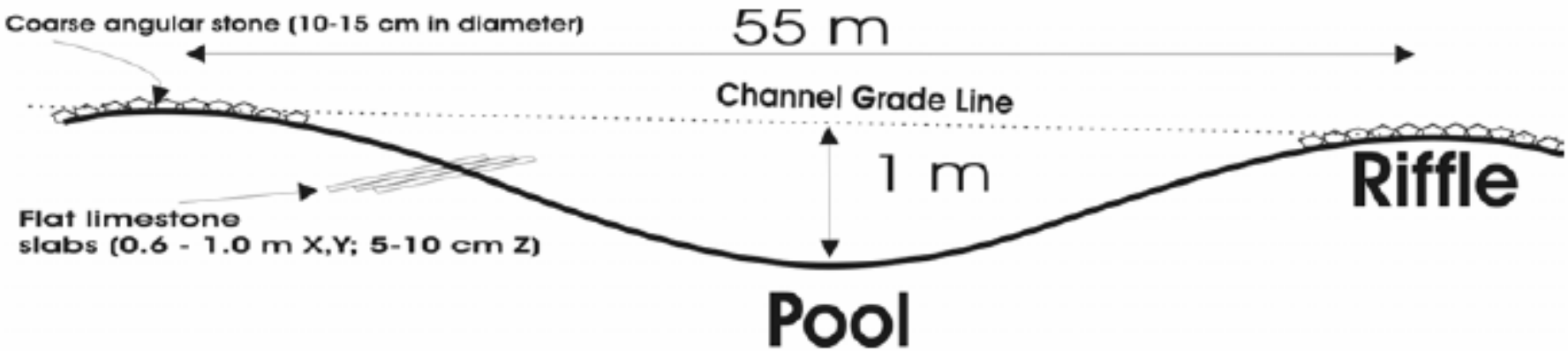
Modelling…
Lab testing…

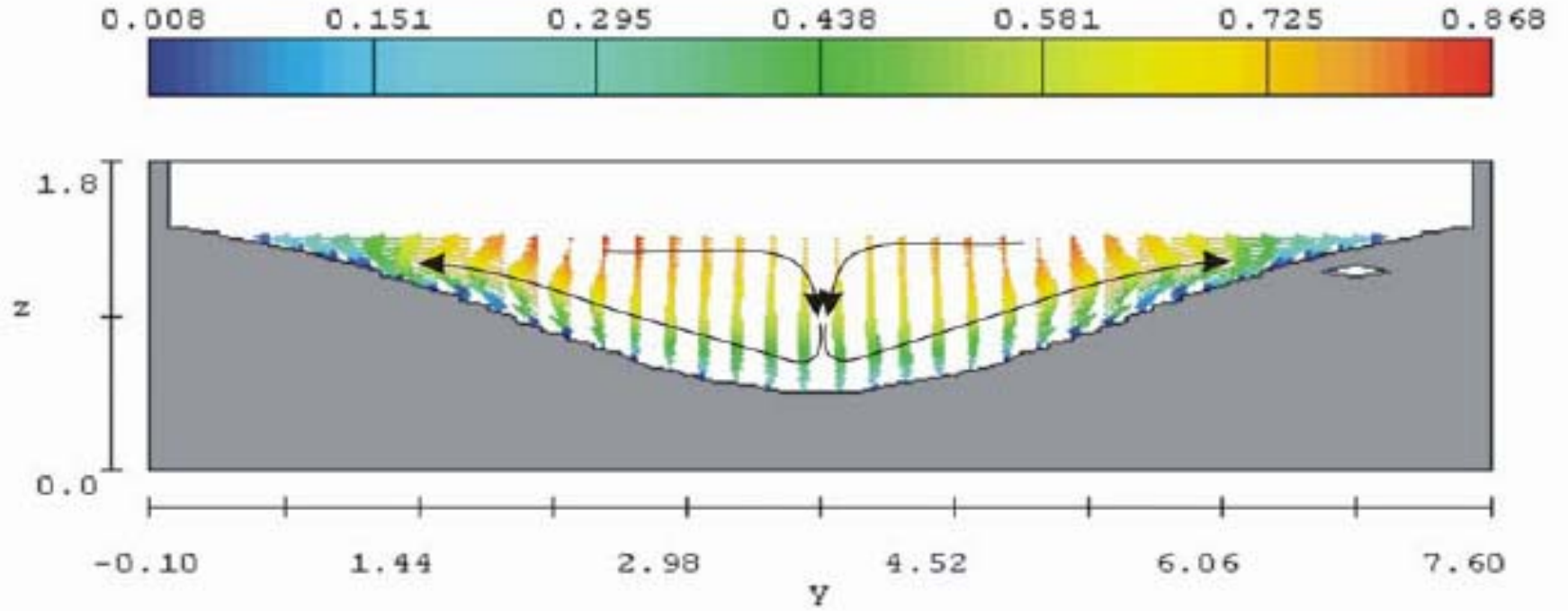
Rough Sketch Design Plans



High Tech Numerical Modelling



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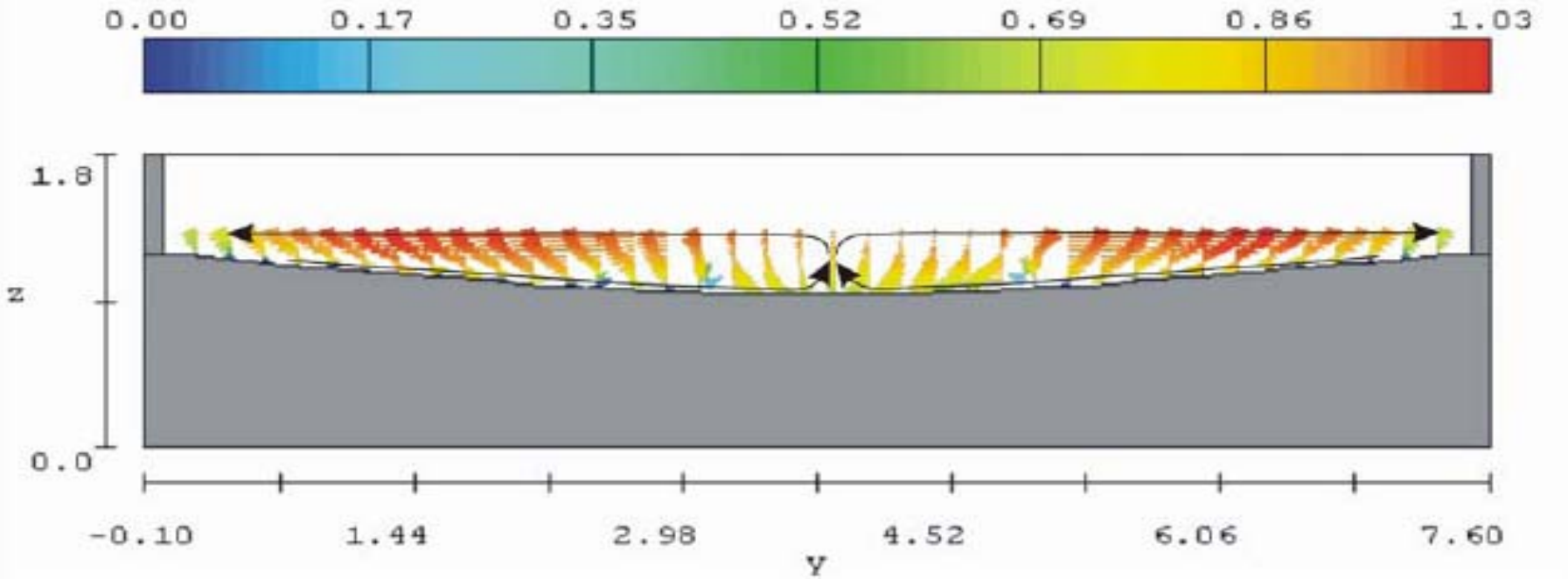
4.52
6.06
7.60
y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-0.10
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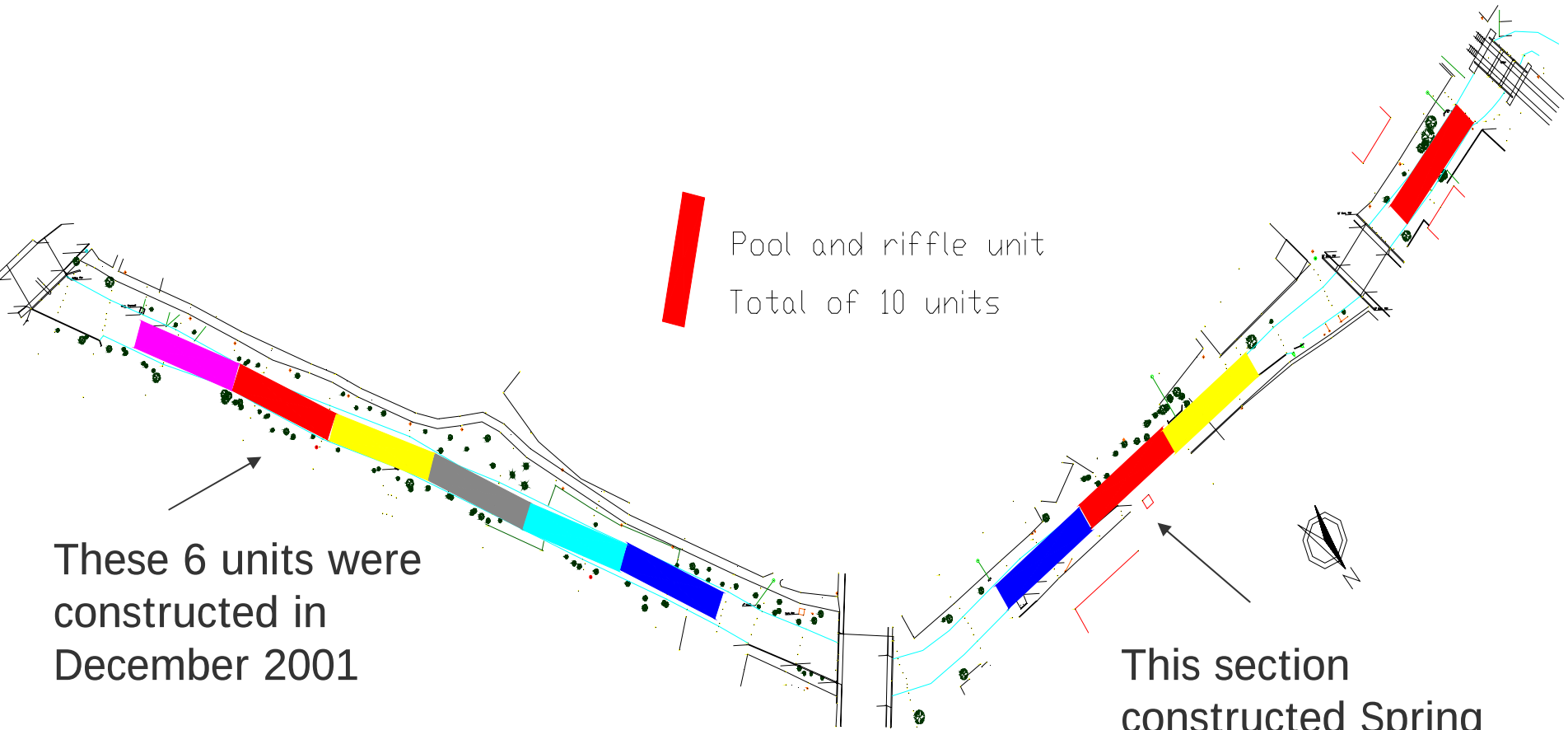
2.98
4.52
6.06
7.60
y

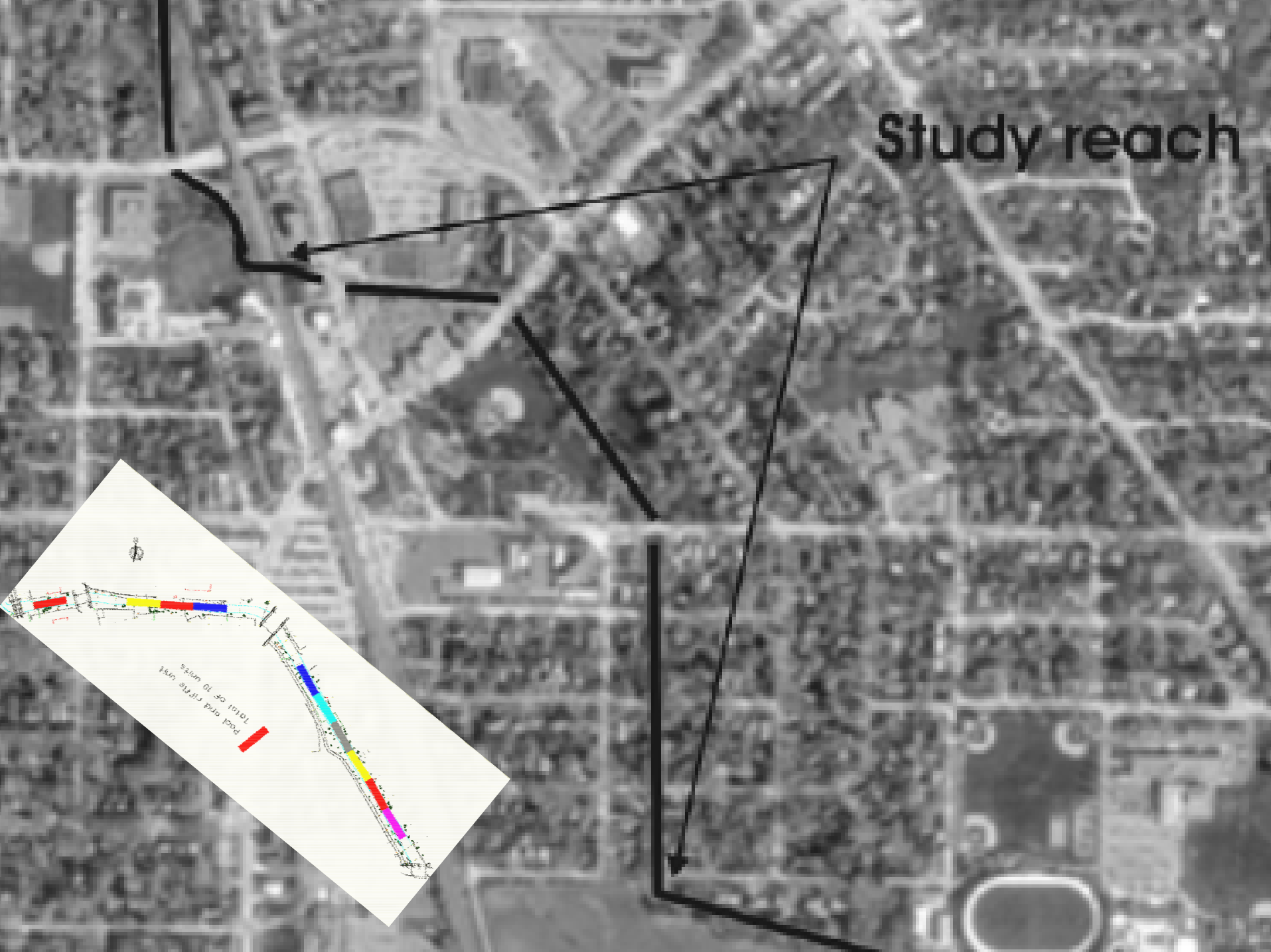
Physical Modeling of Pool-Riffle Structure

- Measurements of 3-D velocities in a flume model
- Evaluations of morphological stability

Installation…



Northbrook – stream constrained within urban corridor


Study reach

Because the stream planform is constrained by local development contractors worked from within the stream and had the time and machinery to achieve more accurate results.

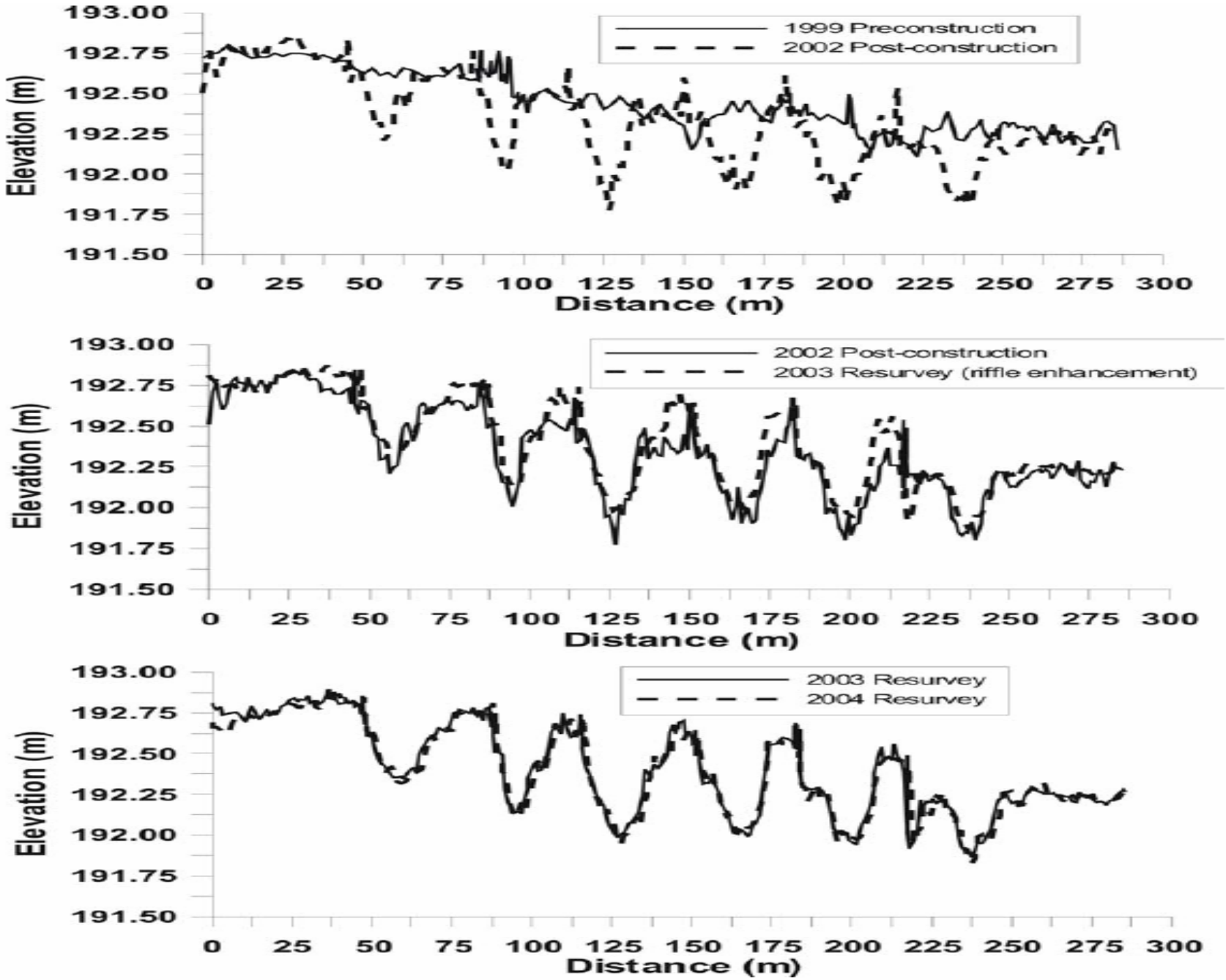
Northbrook pool-riffle units after construction. Imbricated rock-riffles (placed on the downslope into the pools) are visible when looking upstream.

Success story?

Post-implementation Evaluation… The results…

- Are the objectives being achieved?
- Are there negative outcomes?
  - What are the possible solutions?

Post-installation Longitudinal profile surveys



VILLAGE PRESIDENT'S ANNUAL MESSAGE - 2003

"… we continue to show progress in the improved Streetscape of our Central Business Area... The river improvement project which included **riffles and pools** have had a demonstrable impact on the health of our river (as verified by the University of Illinois).

- AWARDS:
- in March 2003 **"Project of the Year Award"** from the American Public Works Association for the central business district streambank stabilization and river corridor restoration."
- in May 2003 The Friends of the Chicago River recognized Northbrook as **"River Champions"**.

http://www.northbrook.il.us/files/document/ANNUAL%20MESSAGE%201-13-04.htm

Northbrook!

April 2006

River Rescue Day - May 13, 2006

The Environmental Quality Commission invites you to join forces with the Friends of the Chicago River in cleaning up along the North Branch of the Chicago River. Several sites are available in the Northbrook area. In addition, there will be an opportunity to learn more about native plants and planting along the river banks. Contact Mary Bernier at 847 272-5050, ext. 247, for further information or sign up April 29 at Earth Day at the Environmental Quality Commission Booth.

Public Engagement?

Downtown Chicago

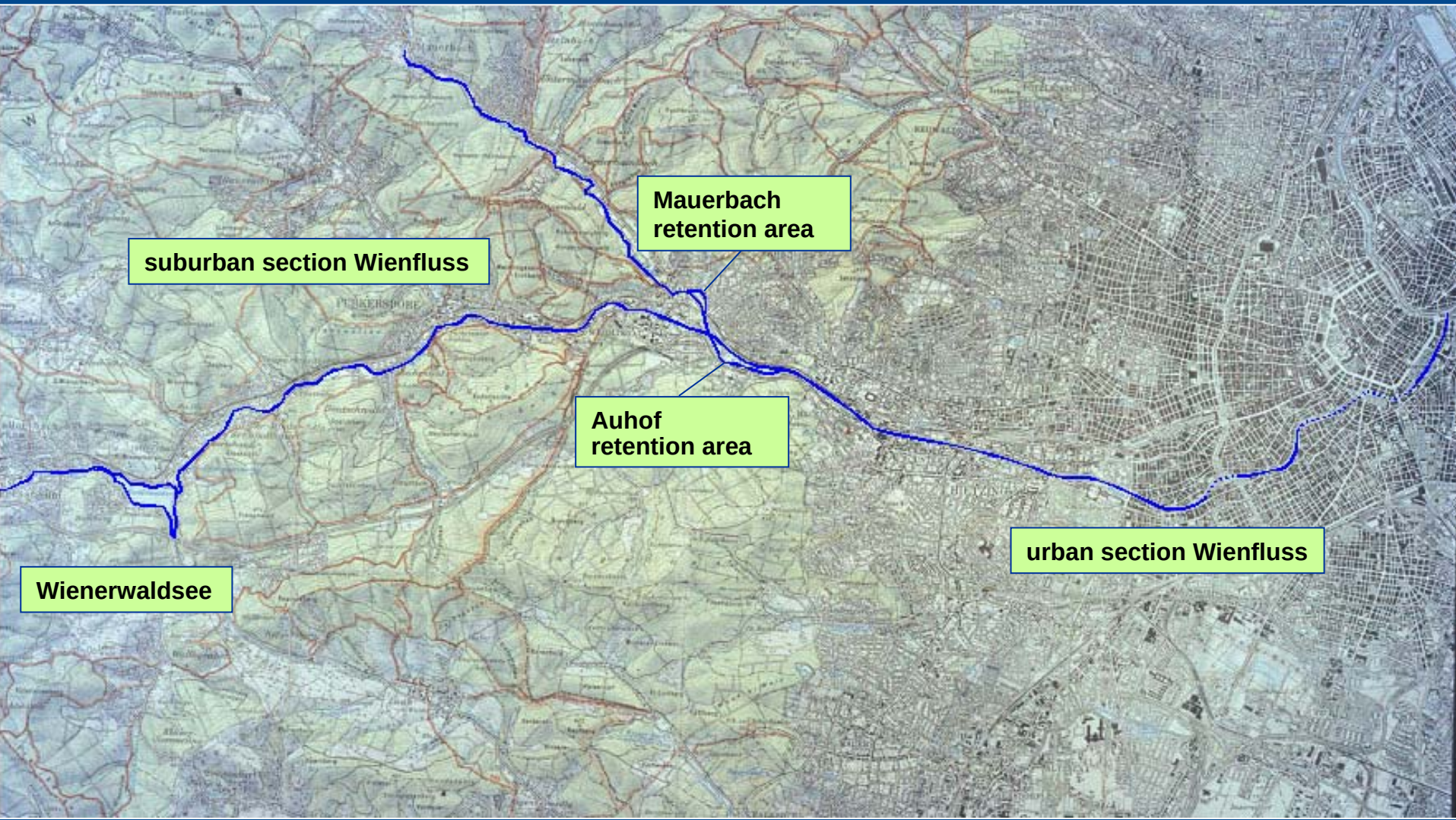
Downstream Chicago River

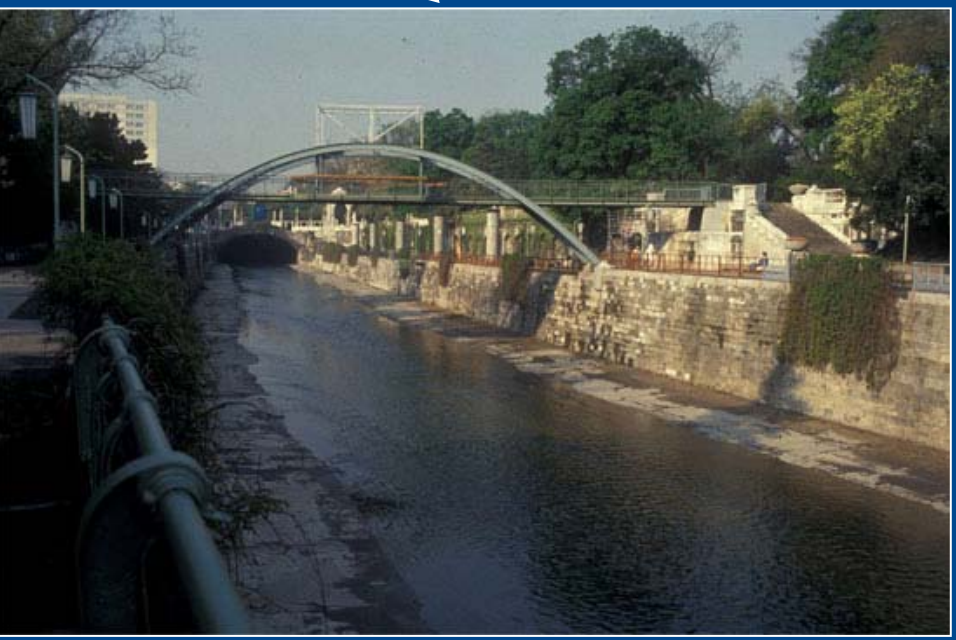
THANK YOU

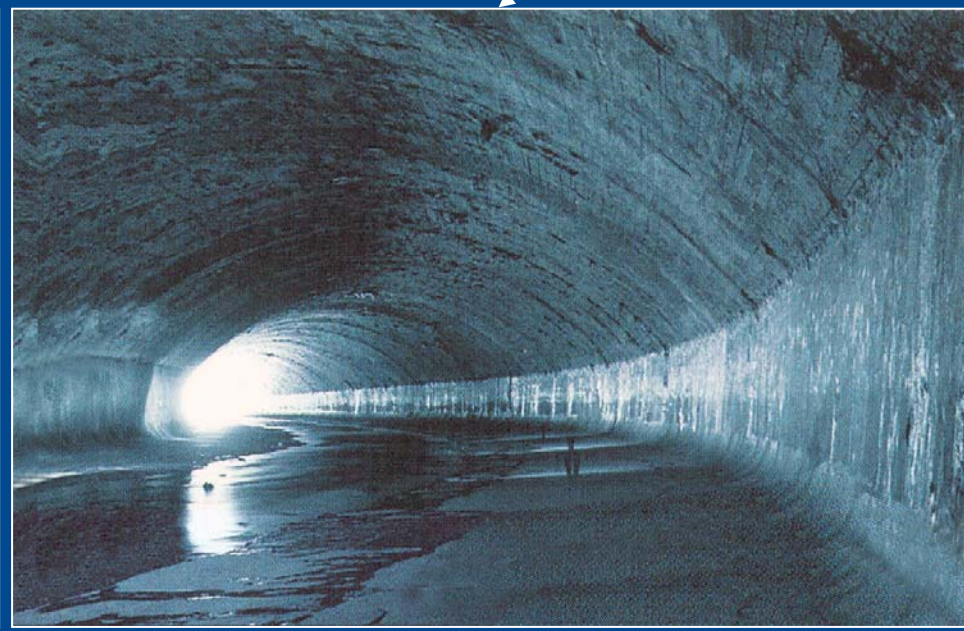
THE NEW WIEN RIVER

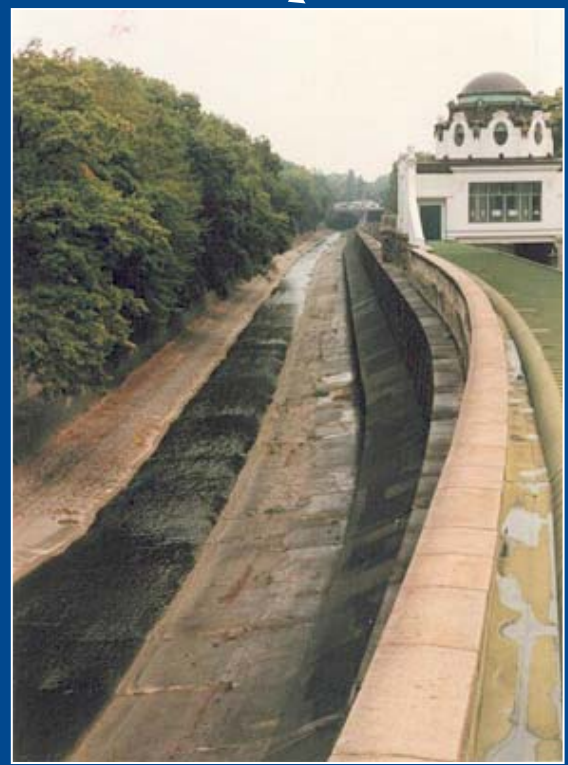
content

- introduction
- problems
- flood control – retention areas
- river bed restoration


Mauerbach
retention area
suburban section Wienfluss
Auhof
retention area
urban section Wienfluss
Wienerwaldsee





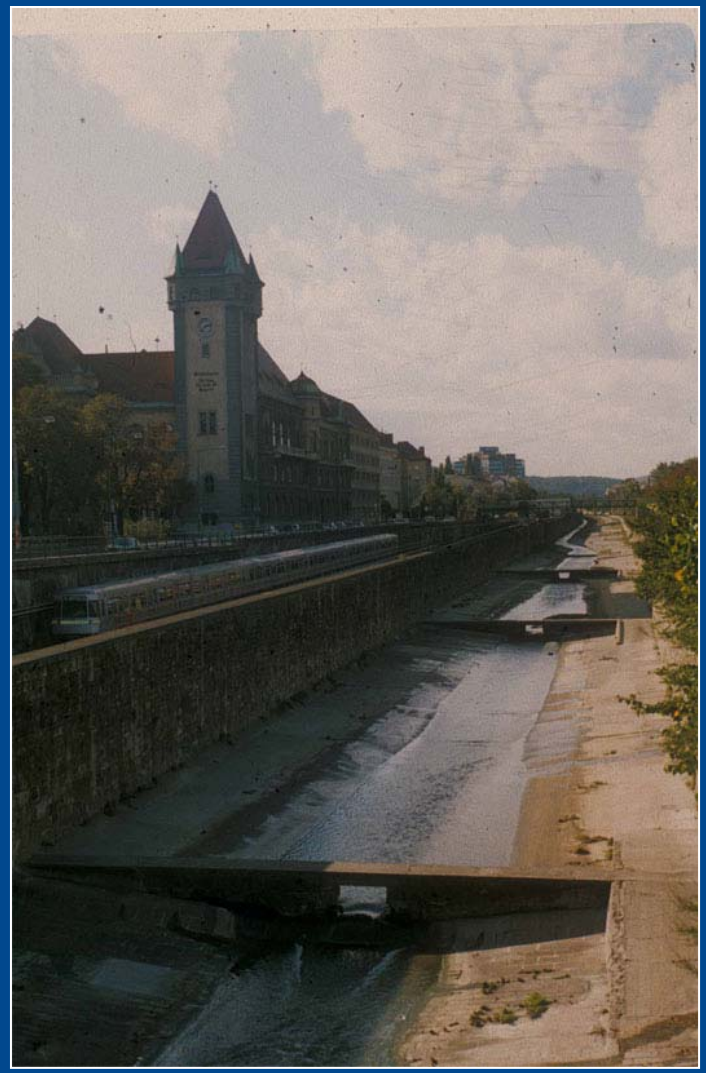


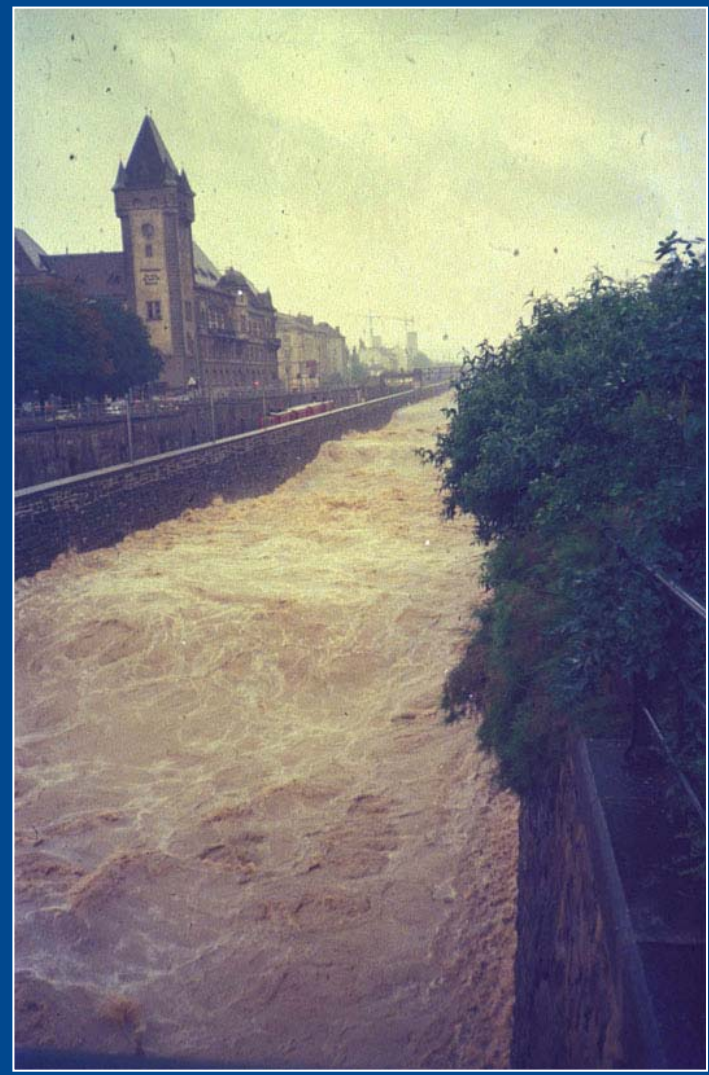
history

Wienfluss – data

catchment area	230 km²
within the city of Vienna	57 km²
total length of river course	34 km²
within the city of Vienna	14 km²
height of origin	620 m
total drop in height	470 m
slope of river course within the city of Vienna	2 – 8 ‰
mean water	250 l/sec
1000 year flood before restoration	635 m³/sec
1000 year flood after improvement in flood retention	540 m³/sec
1000 year flood after completion of WSEK	380 m³/sec

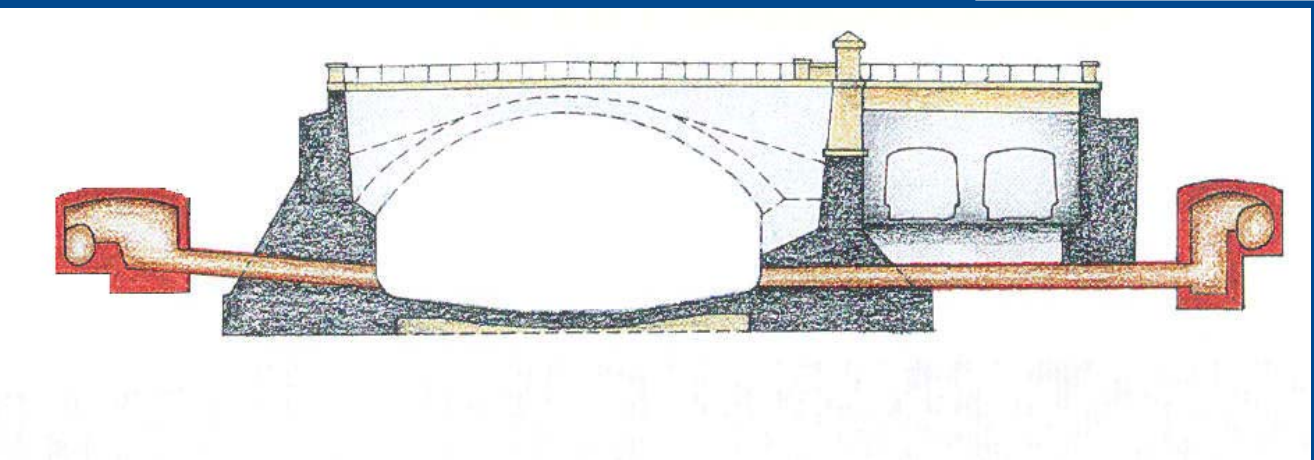
floods





flood retention

water quality



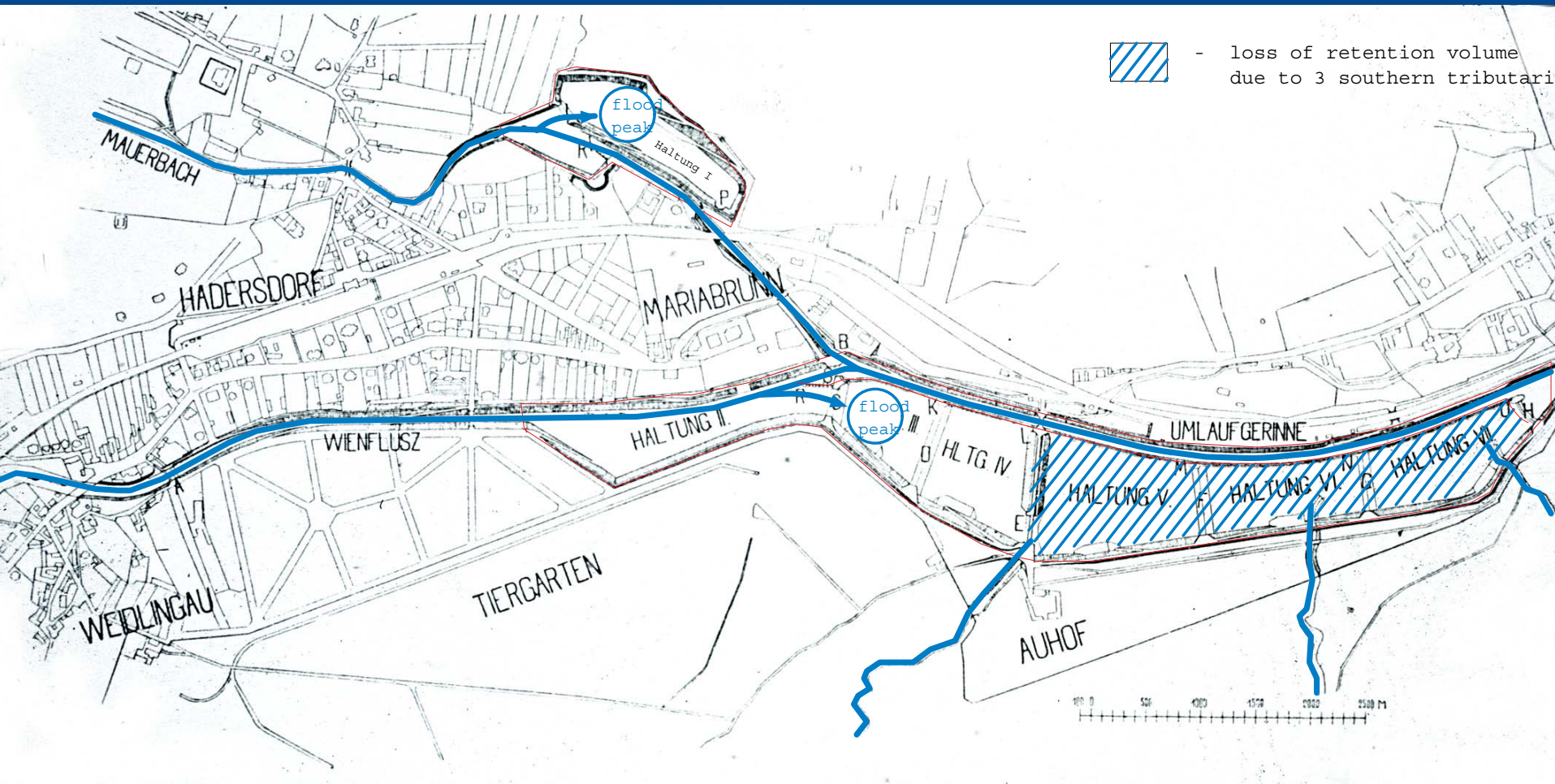
river bed development

questions to be solved

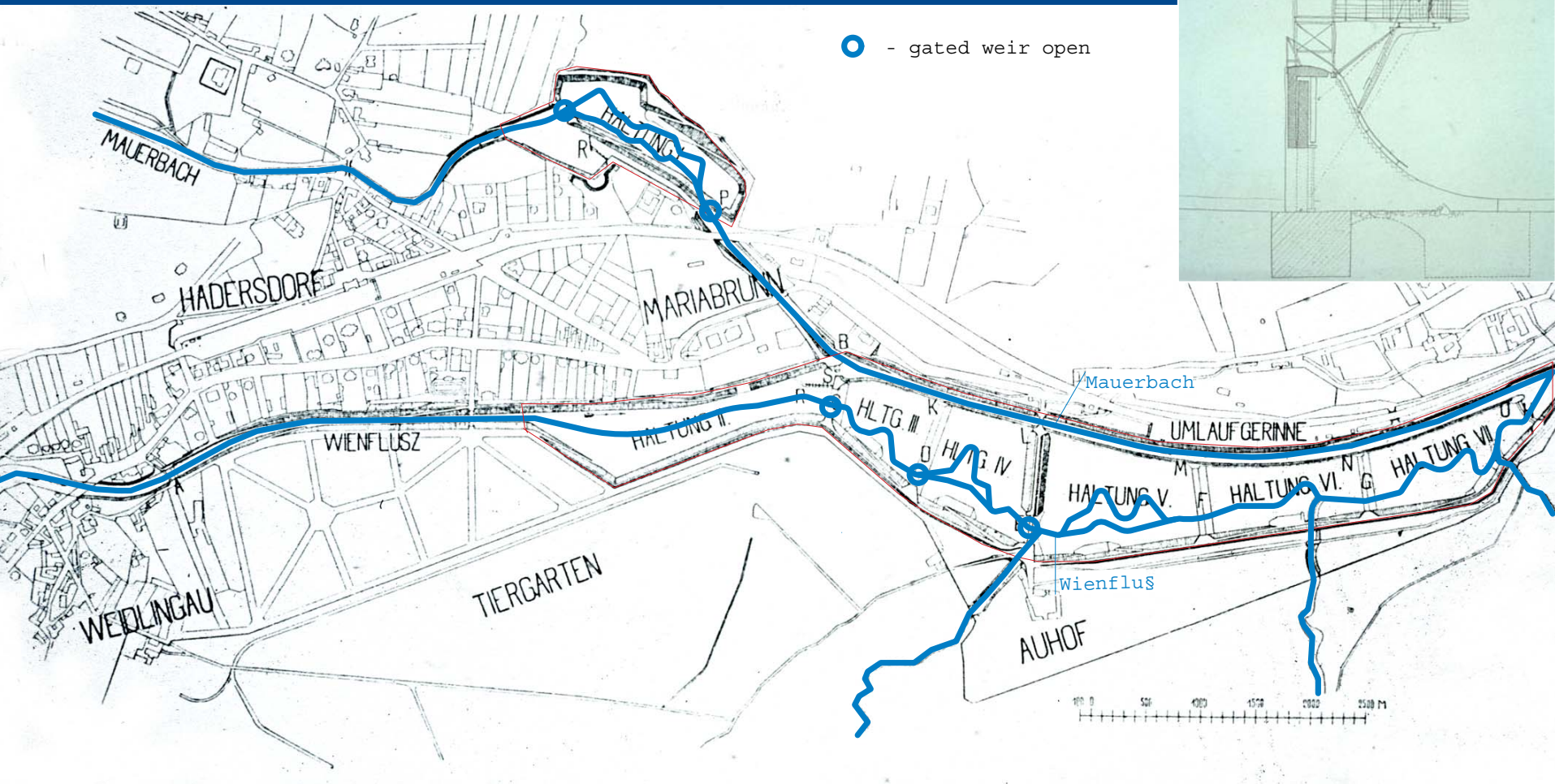
1. How can the retention capacity of the reservoirs be increased and respectively the flooding of the reservoirs by southern tributaries be avoided

2. To create a setting of appropriate measures for a development towards a nature – orientated river system for the urban sections of the Wien river and the Mauerbach

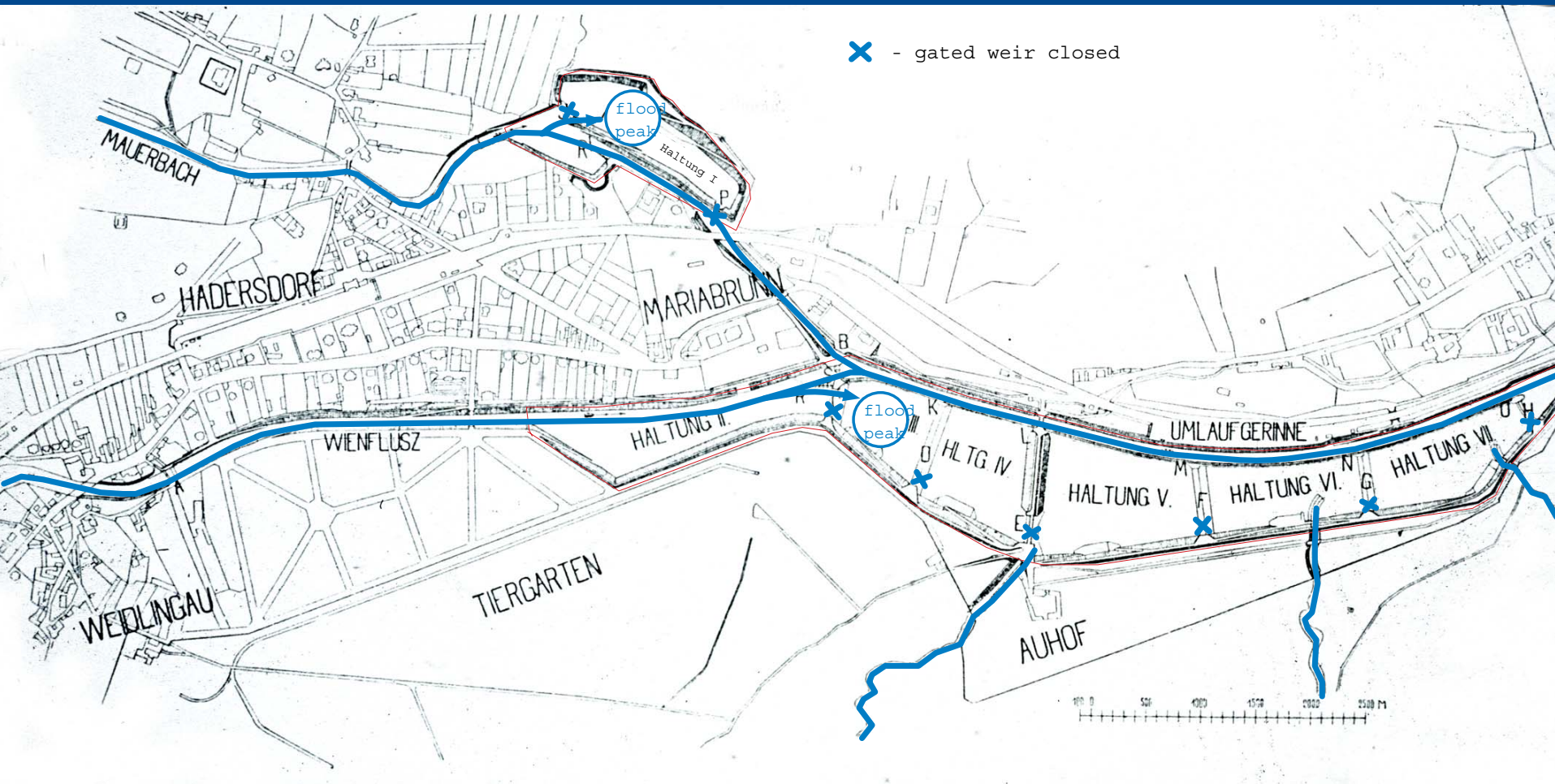
retention management before restoration



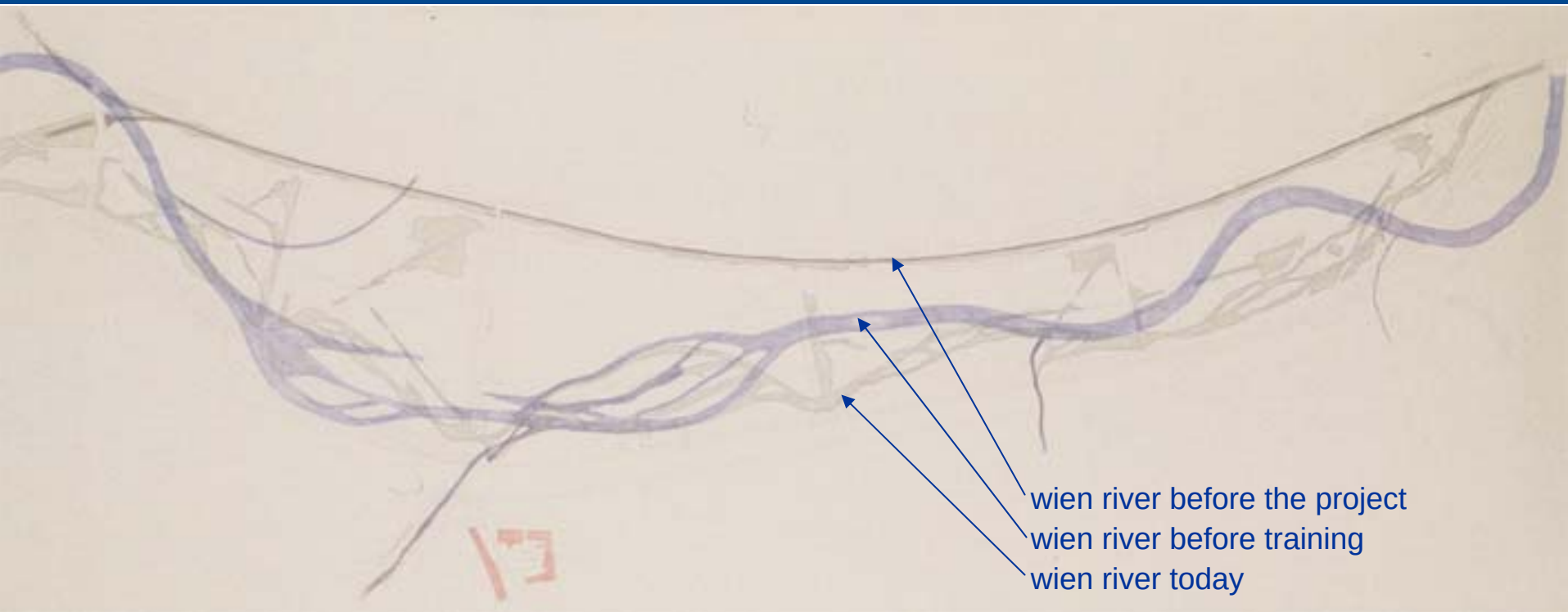
improvements of retention capacity and retention management



> 2 year floods



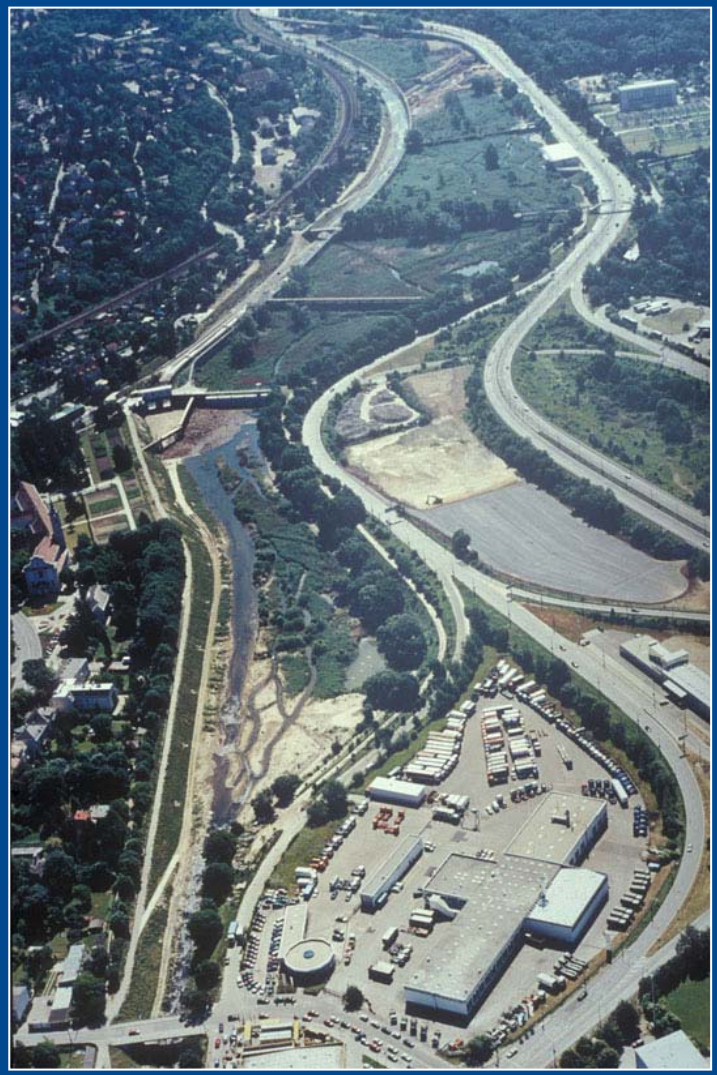

retention area
Mauerbach
N
bypass
channel
retention area
Wienfluss
retention area
Wienfluss


wien river before the project
wien river before training
wien river today

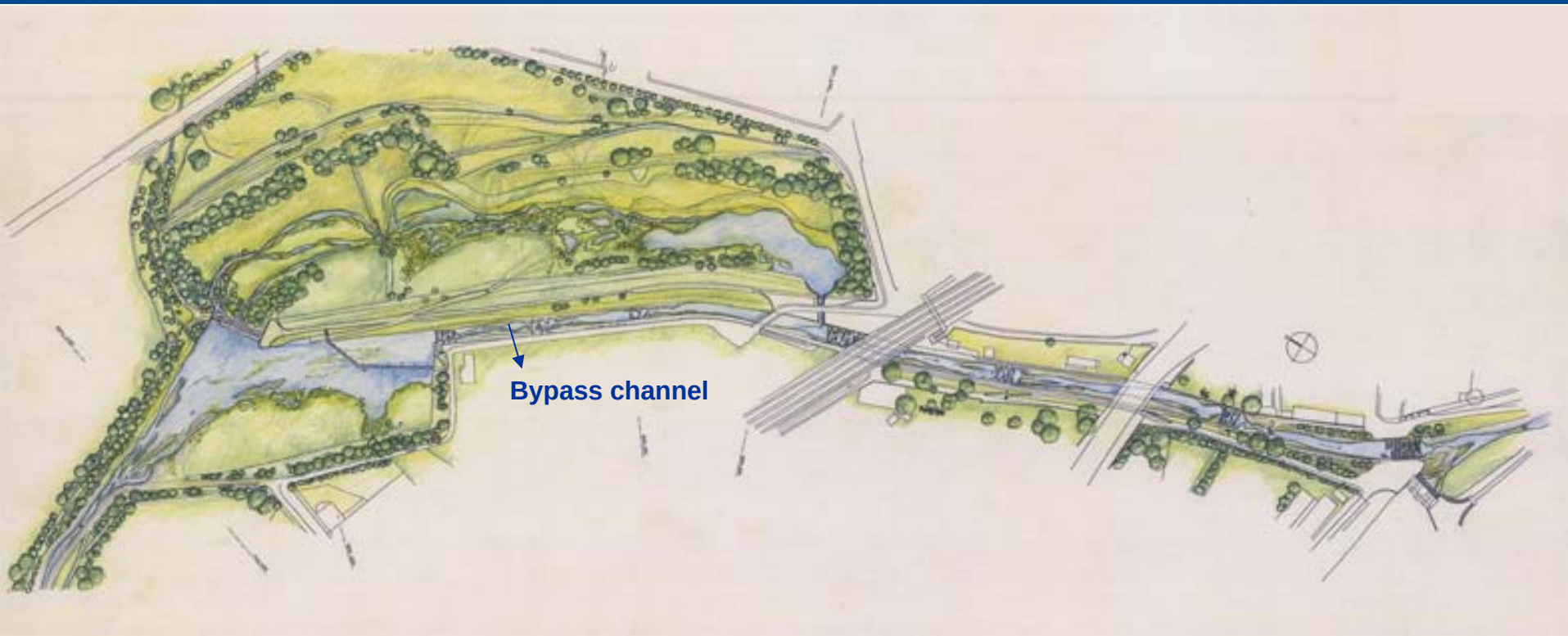
Wienfluss – retention area Auhof, after restoration

Wienfluss – retention area Auhof, after restoration

Wienfluss – retention area Auhof



Mauerbach retention area, after restoration

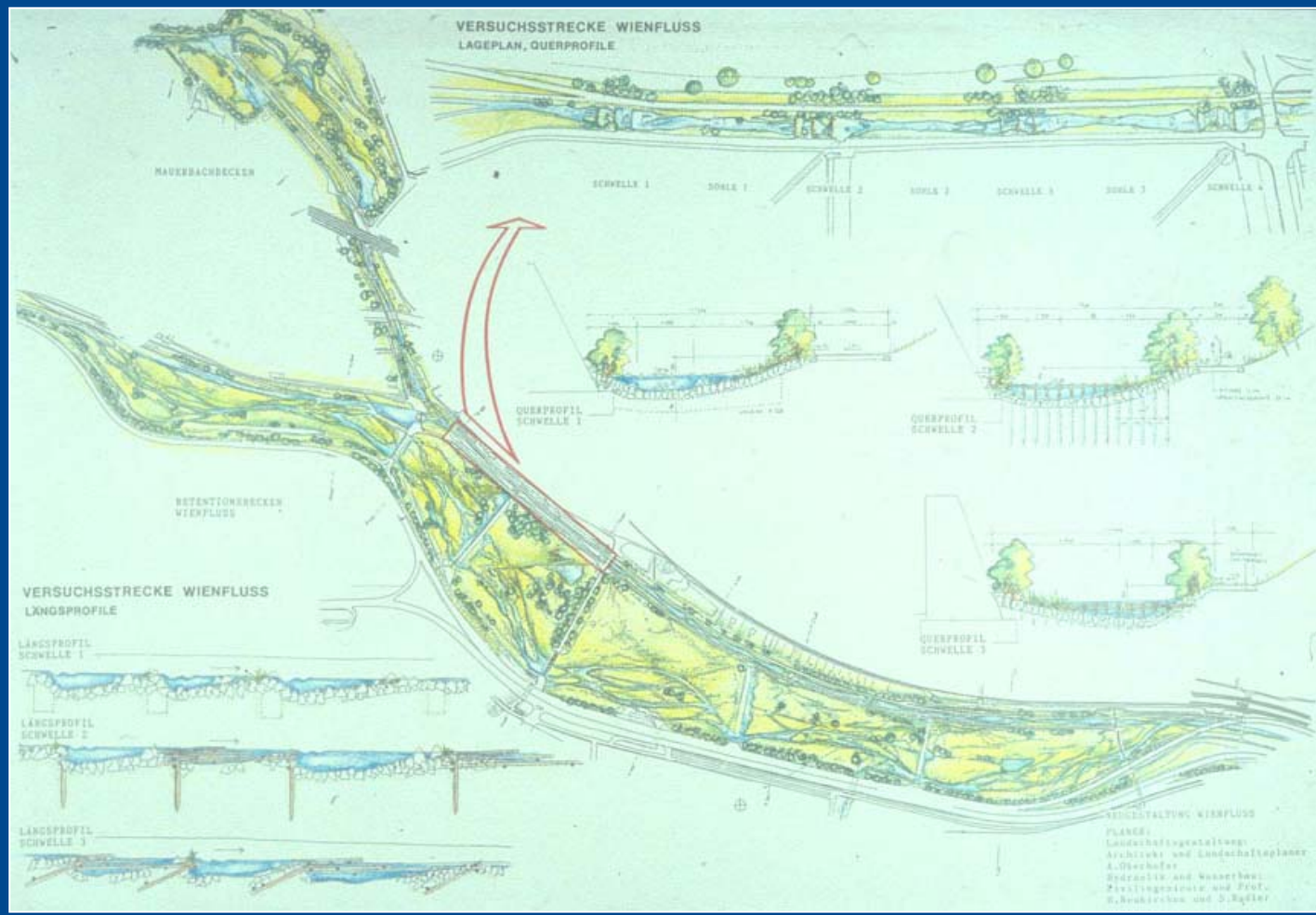


Mauerbach retention area, after restoration

Mauerbach retention area, after restoration

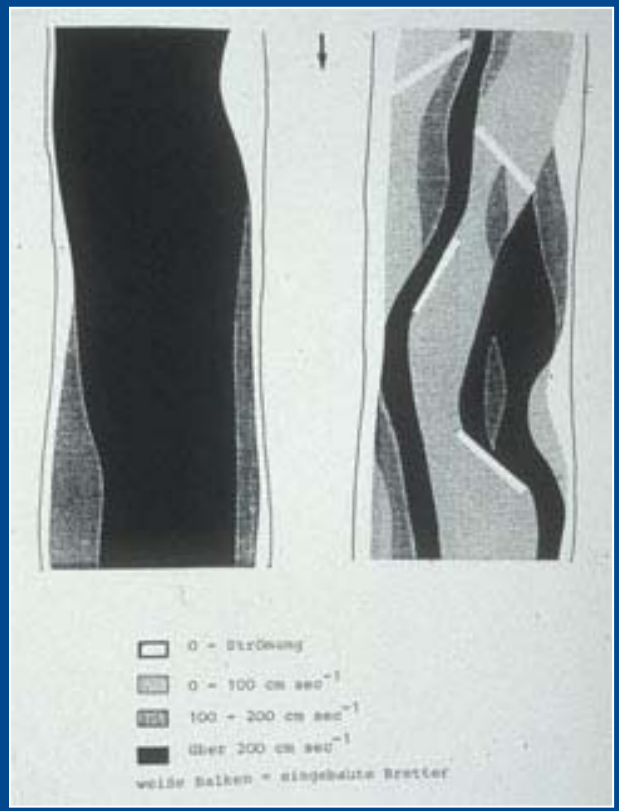
Mauerbach retention area, after restoration

1. pilot project – river course, bypass channel



ecological monitoring before river restoration

experiment on steepest slope
(university of vienna, Dr. H. Kekeis)



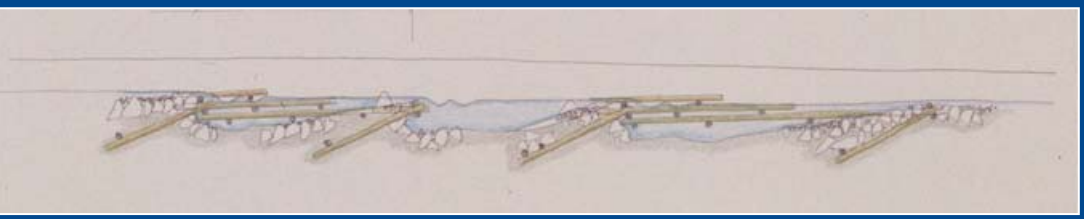
1. pilot project - river course, bypass channel

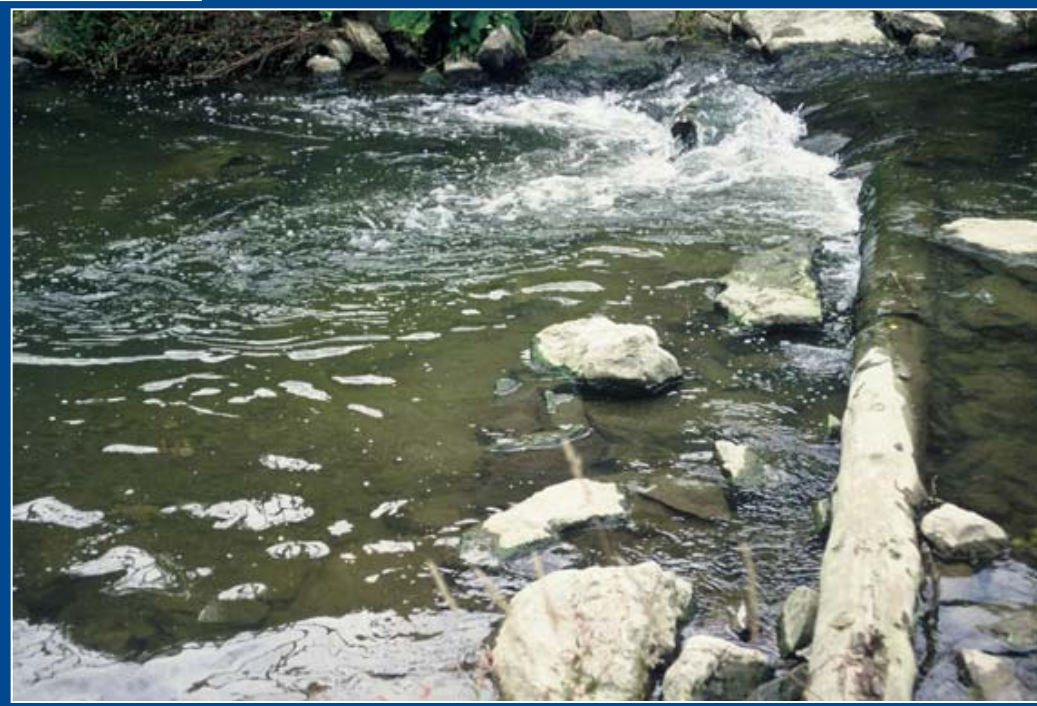
before

after

1. pilot project - river course, bypass channel stone structures

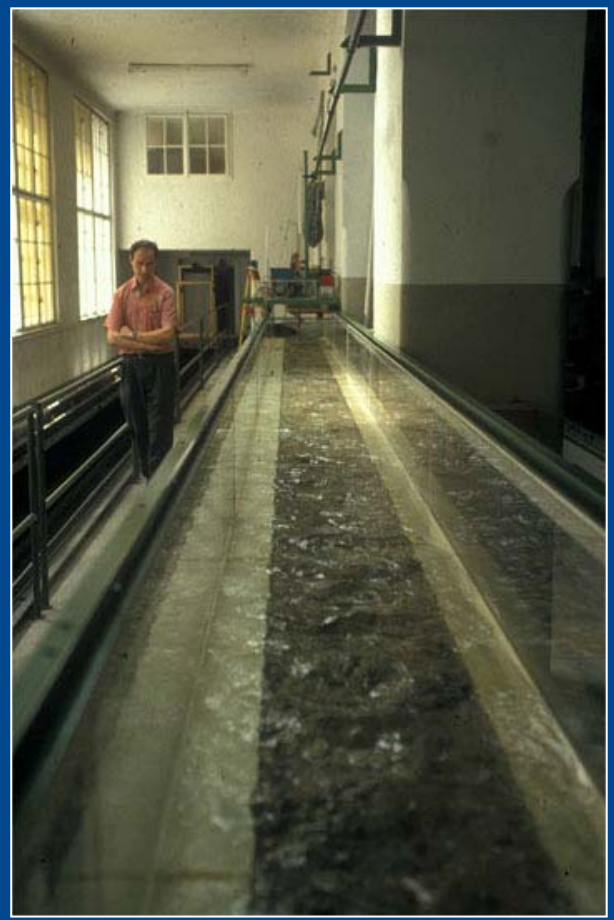
1. pilot project - river course, bypass channel combined stone – timber structures



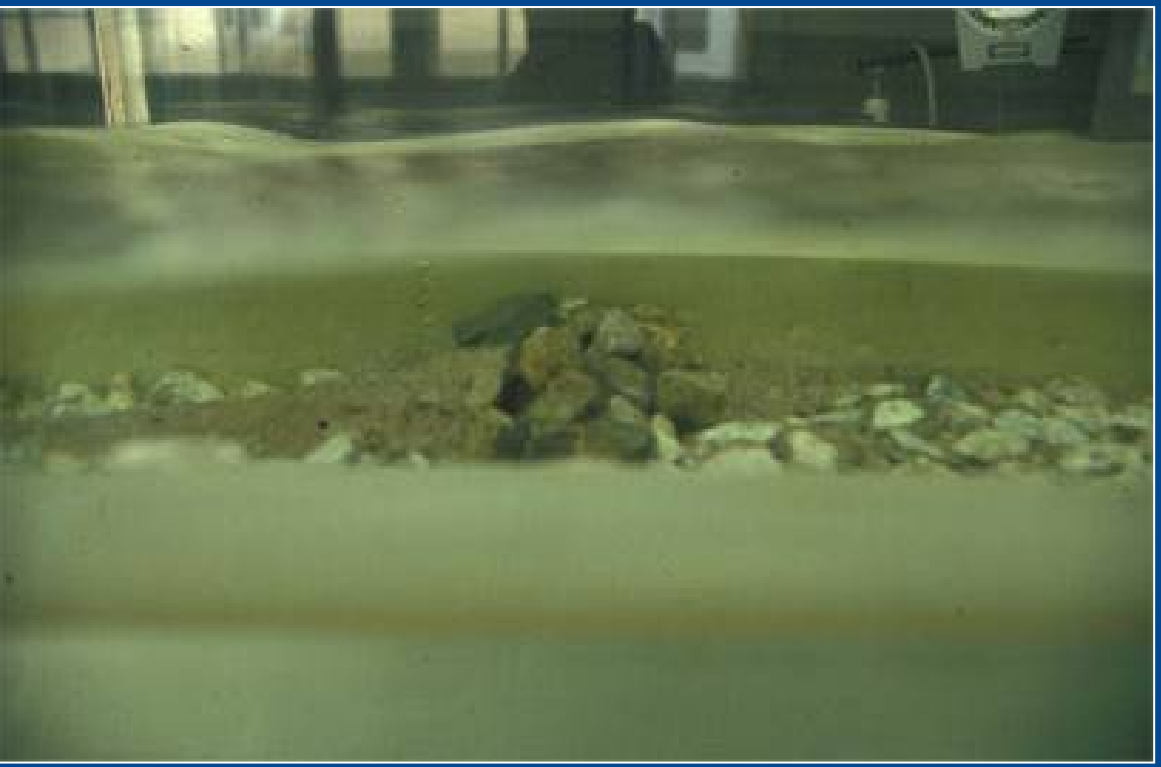


1. pilot project - river course, bypass channel
2. monitoring incorporating 1. pilot project

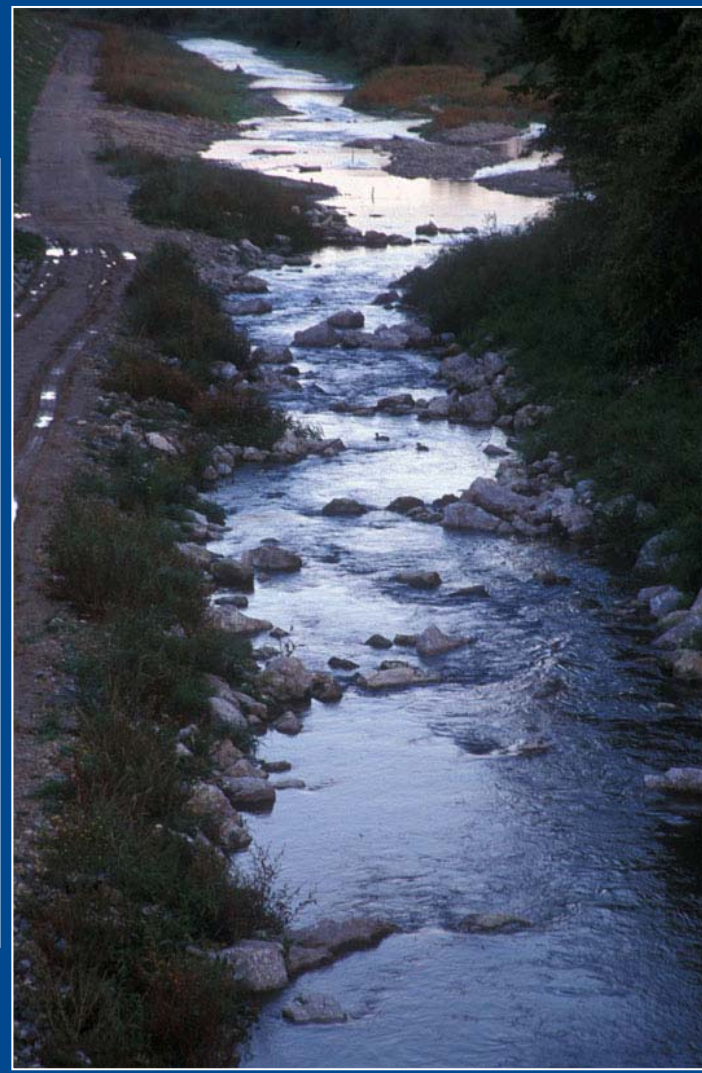
urban section – river restoration
1. laboratory tests on the physical modell



urban section – river restoration
1. laboratory tests on the physical modell

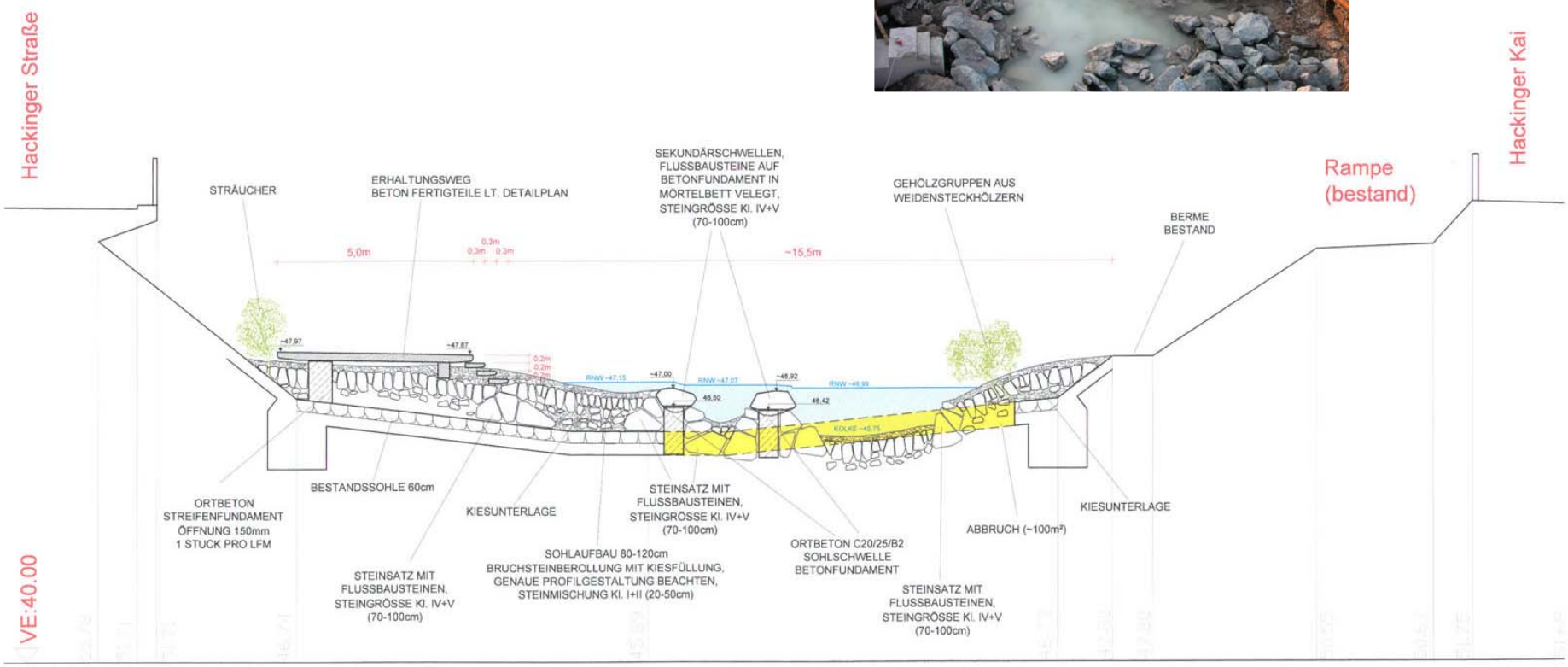


Wienfluss river restoration – Auhof area



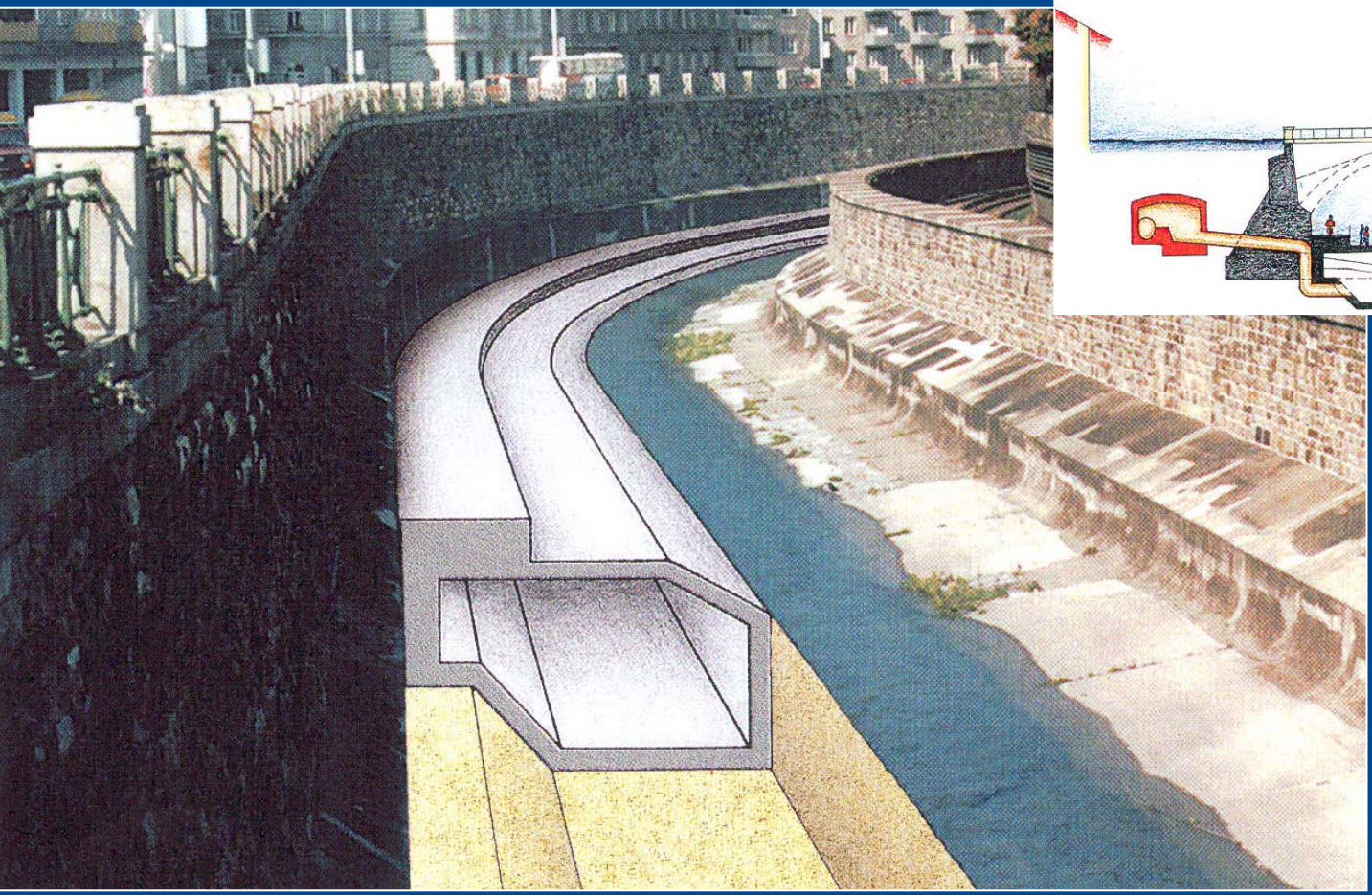
Wienfluss river restoration – Auhof area

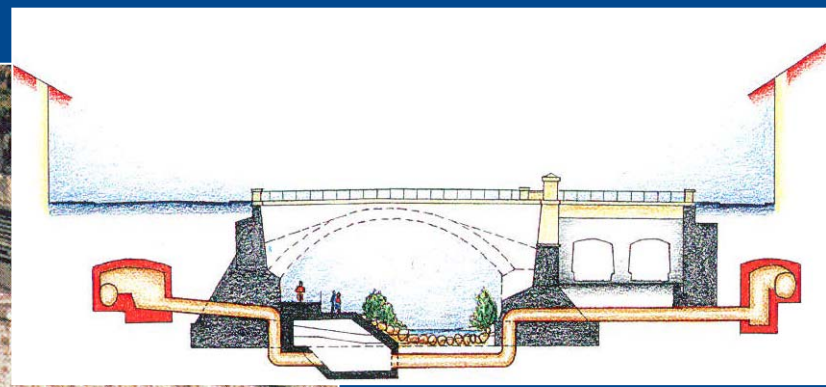
2. pilot project – urban section Hackingersteg



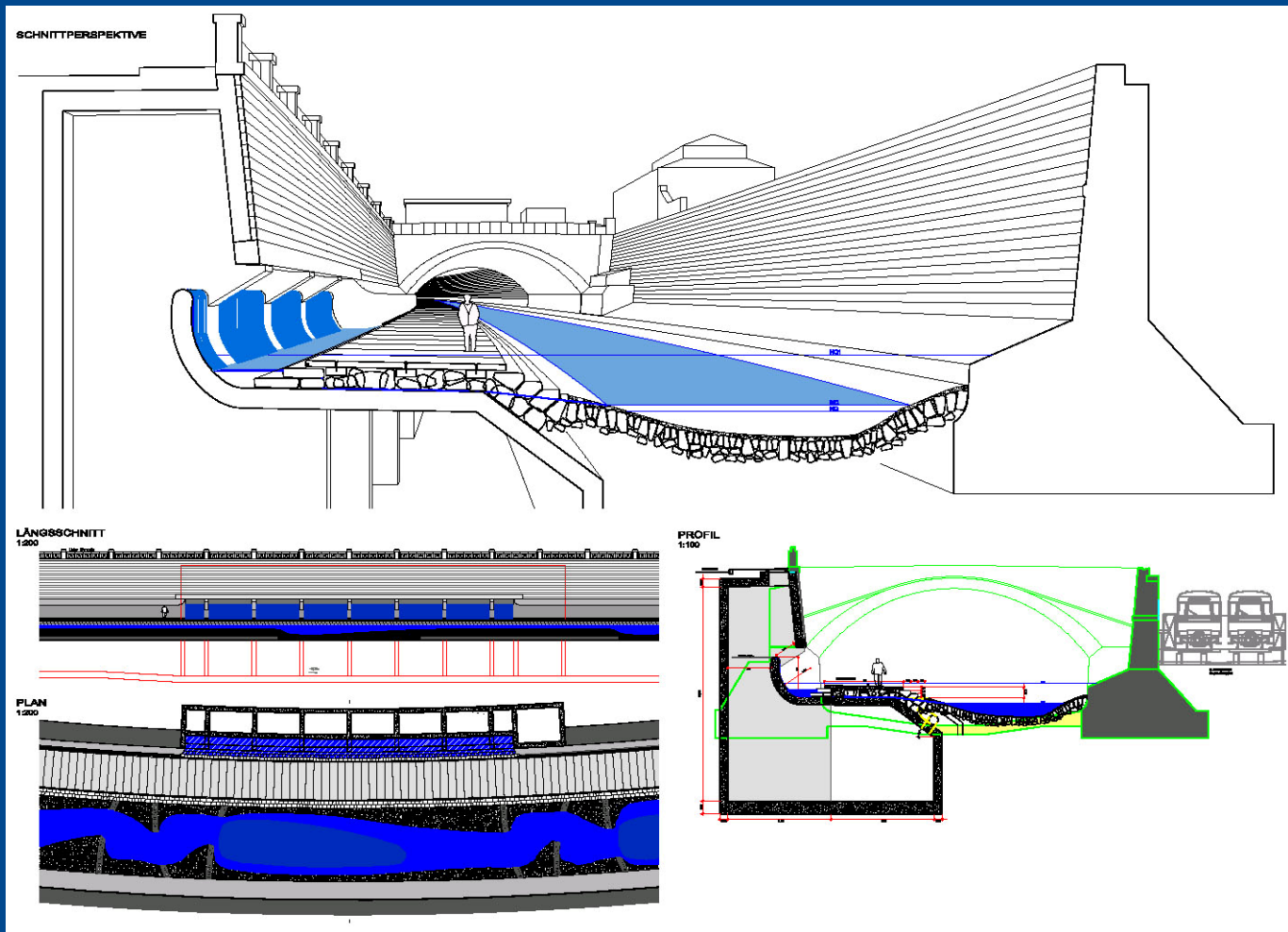
2. pilot project – urban section Hackingersteg

2. pilot project – urban section water quality

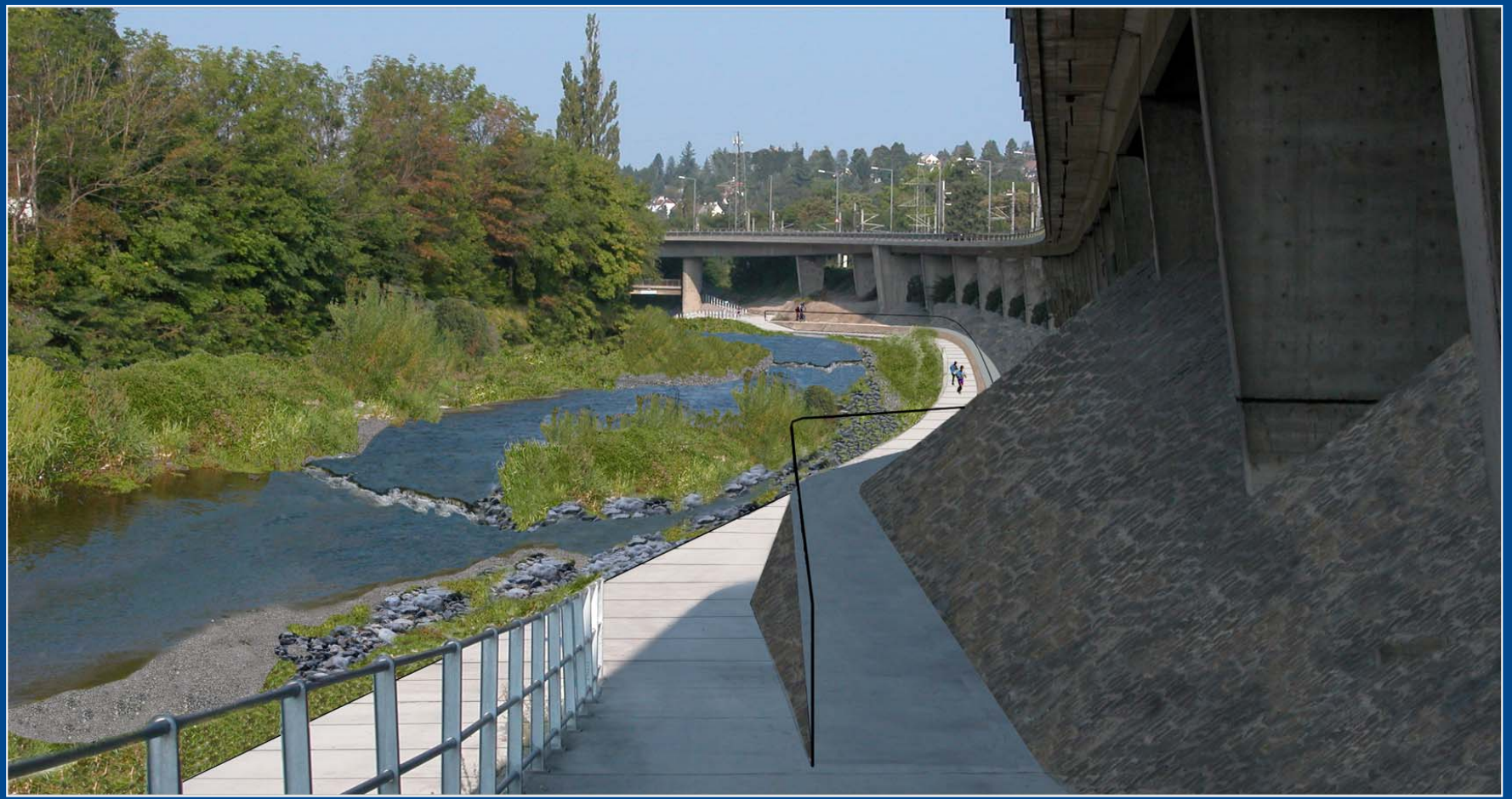




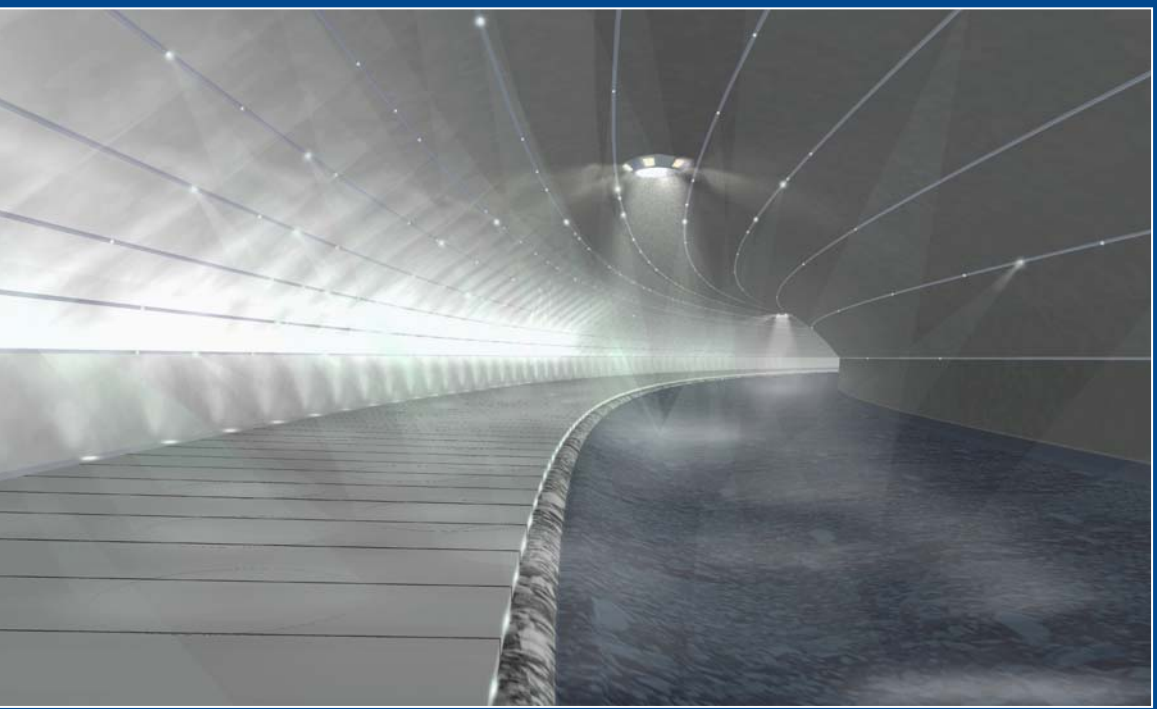
2. pilot project – urban section
water quality
competition entry

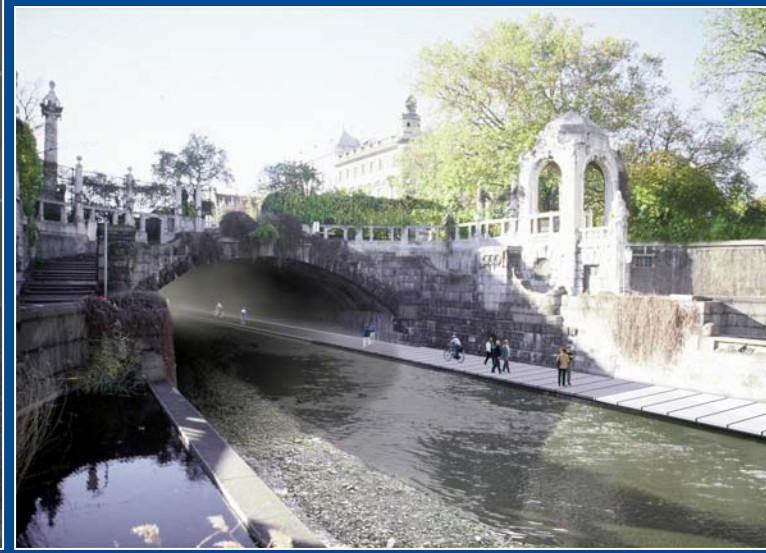


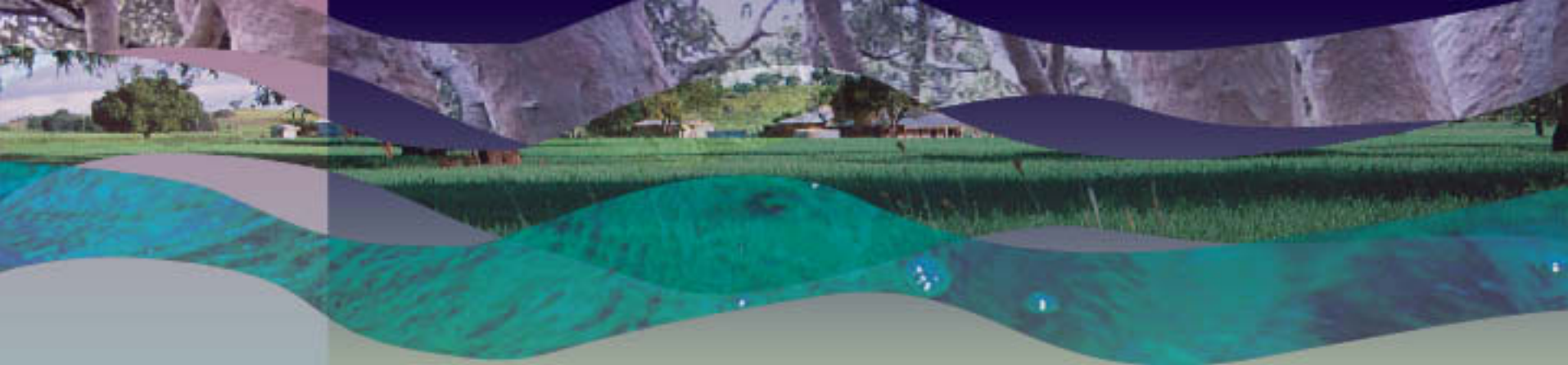
2. pilot project
continuation of urban stretch



future projects





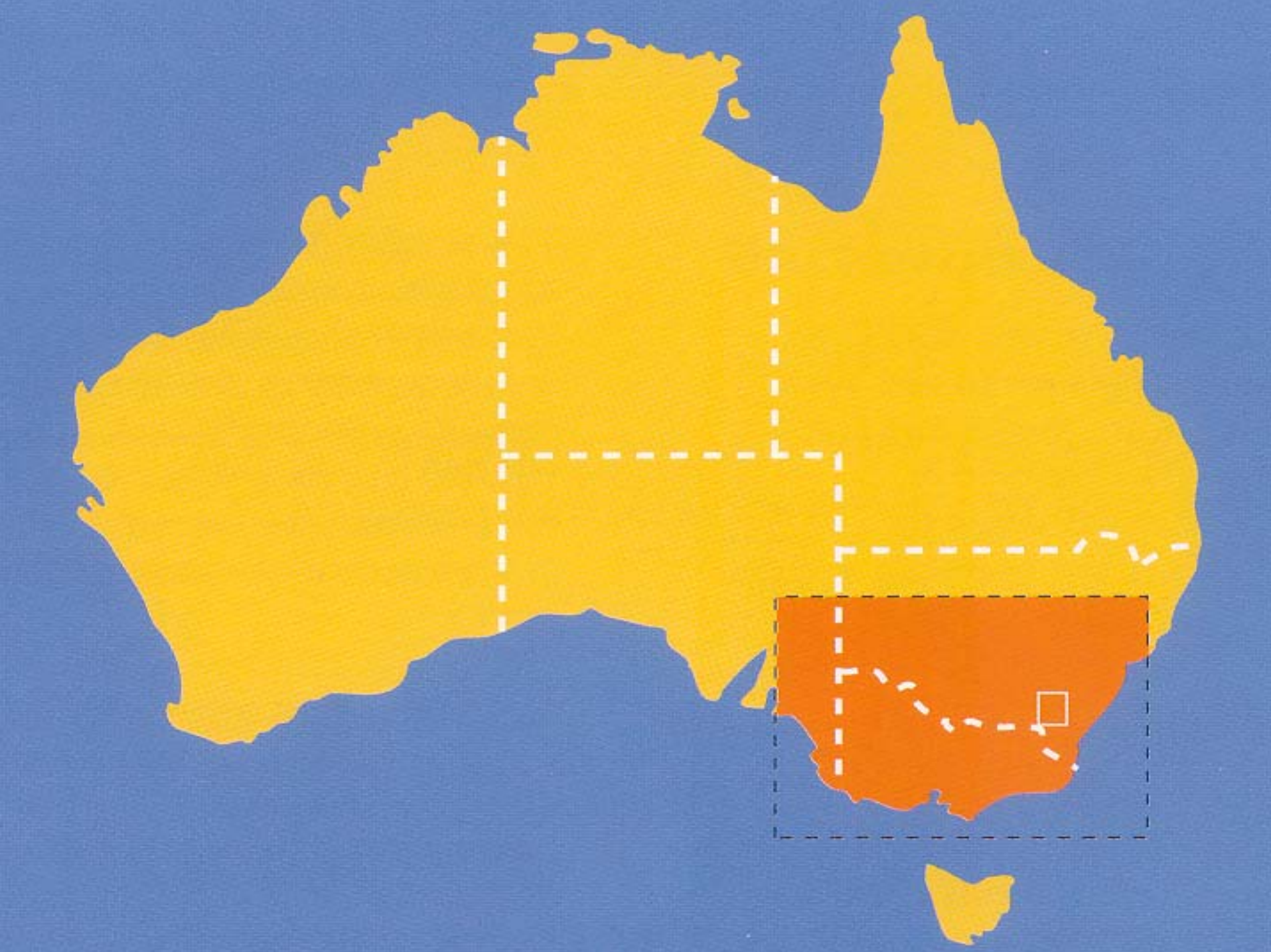


The Tumut River: An Australian Approach To Regulated River Management

April 2006

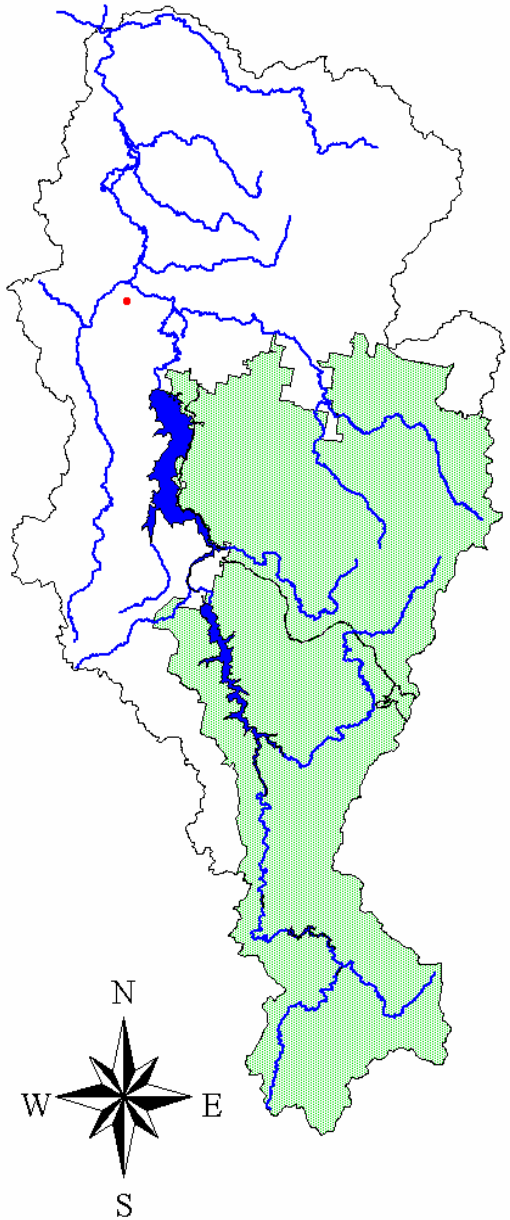
NSW Government

DEPARTMENT OF NATURAL RESOURCES




LEGEND
IRRIGATION AREAS
MAIN TRANSMISSION LINES
STATE BOUNDARIES
100 km 0 100 200 km
N
S.A.
N.S.W.
VIC.
RENMARK
MILDURA
Murray River
Murrumbidgee
HAY
GRIFFITH
COLEAMBALLY
NARRANDERRA
River
YASS
WAGGA WAGGA
TUMUT
Tumut River
CANBERRA
SYDNEY
ADELAIDE
Murray
ALBURY
River
SHEPPARTON
COOMA
SNOWY MOUNTAINS SCHEME
DEDERANG
Loddon River
Goulburn River
Great Dividing Range
Snowy River
ORBOST
MELBOURNE
PORTLAND
SOUTHERN OCEAN
SOUTH PACIFIC OCEAN

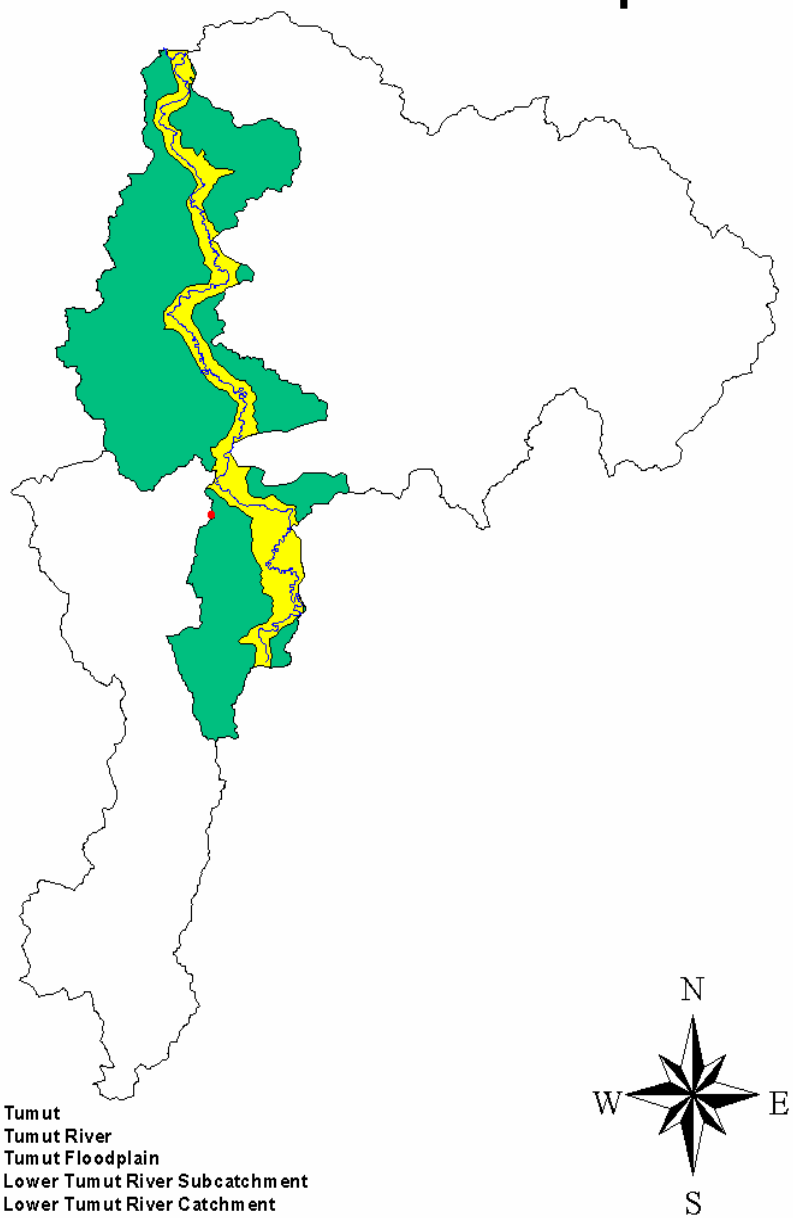
Location of the Tumut River Catchment



Tumut Catchment Storages
Tumut River and Main Tributaries
Kosciuszko National Park
Tumut River Catchment
Tumut

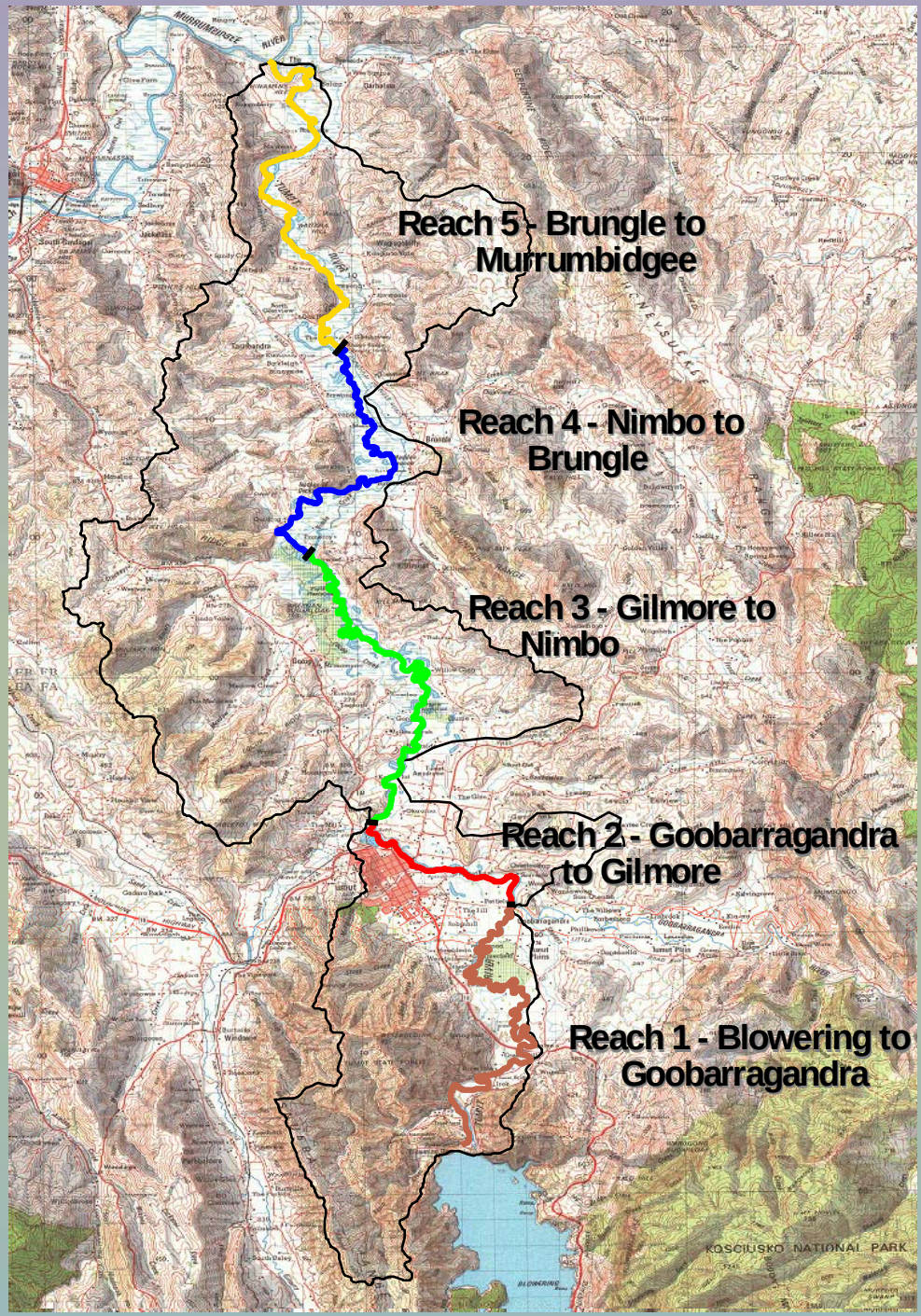
10 0 10 20 Kilometres

Tumut River Floodplain



Tumut
Tumut River
Tumut Floodplain
Lower Tumut River Subcatchment
Lower Tumut River Catchment

10 0 10 Kilometres



NSW Government
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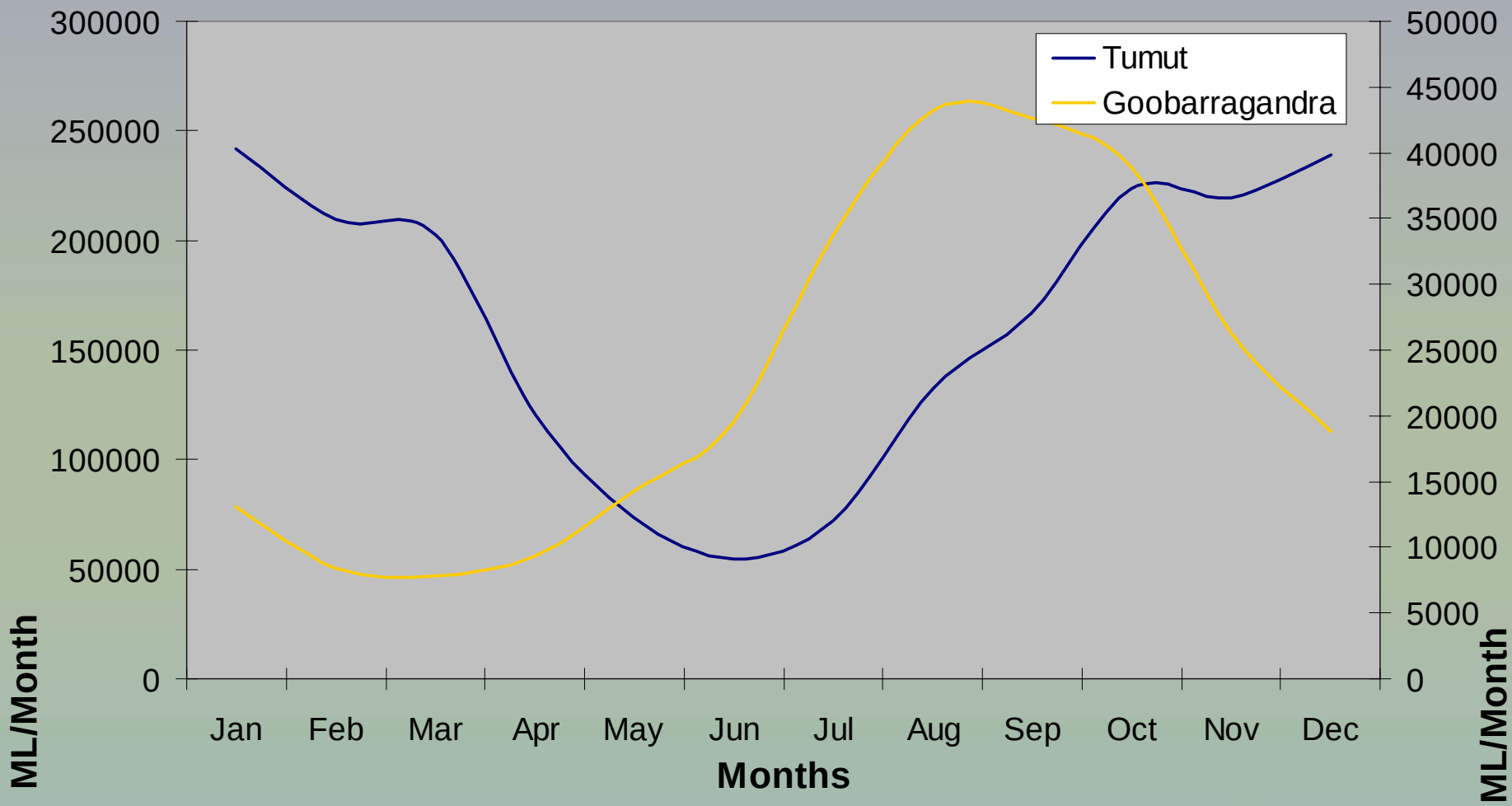
Discharge Comparisons



NSW Government
DEPARTMENT OF NATURAL RESOURCES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5 12 '02


27 10:38 AM

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Centro Italiano per la Riqualificazione Fluviale
Italian Center for River Restoration
Viale Garibaldi 44/a 30173 – MESTRE (VE)
Tel +39-041-615410
Website: www.cirf.org
Email: info@cirf.org; i.schipani@cirf.org

The restoration of the channelized Sangro river (Abruzzo, Italy): tackling the challenge of providing "less hydraulic risk, more environment"

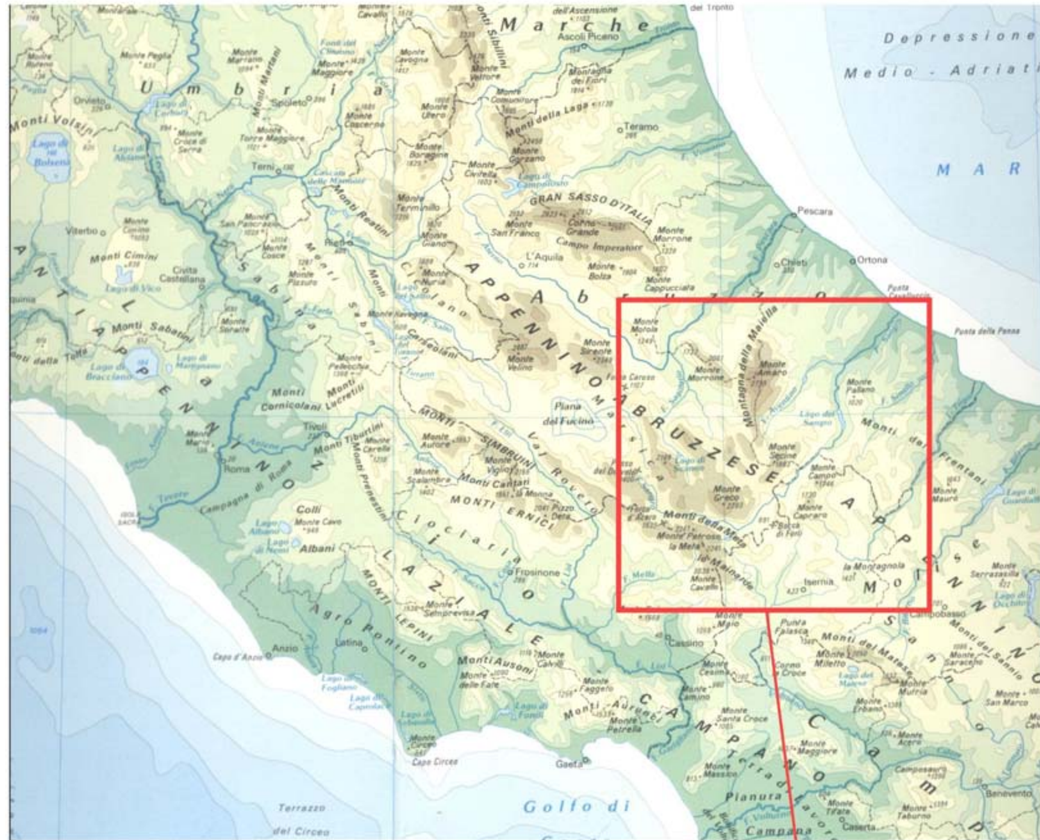
Ileana Schipani
River Ecologist, Technical Board CIRF
Bruno Maiolini
Natural Science Museum of Trento

The **RIVER RESTORATION CENTRE 7th ANNUAL NETWORK CONFERENCE**
Ecological River Restoration:
Combining Ecology and Engineering
Edinburgh, 26th-28th April 2006

301,341 km^2, mountains (51%) and hills (29 %), 20 % lowlands. Population is 57,680,900 with a density of 190 inhabitants per km^2

Due to the variety of geographical and climate conditions, many kind of stream typologies coexist, with insufficient knowledge about their reference condition

Main problems are flood protection, hydropower, land reclamation, overbuilding in floodplains


Marche
Umbria
Depressione Medio - Adriatica
MAR
GRAN SASSO D'ITALIA
APPENNINO ABRUZZESE
Monti Simbruini
MONTI ERNICI
Ciociaria
LAZIALE
ANTIAPPENNINO
Roma
Pescara
Teramo
L'Aquila
Chieti
Ortona
Frosinone
Isernia
Cassino
Gaeta
Anzio
Latina
Agro Pontino
Golfo di
CAMPANO
Pianura Campana
Molise
Montagna della Maiella
Monti dei Frentani
Monti del Matese
Campobasso
Benevento
Caserta

Study area


Monte Cappucciata
Punta Cavalluccio
Monte Motola 1249
Monte Morrone
Montagna della Maiella
Forca Caruso 1107
F. Sagittario
F. Sinello
ABRUZZESE
Monti dei Fre
Passo Diavolo 1400
Lago di Barrea
Monte Greco
la Meta
N

THE CHANNEL STRAGHTENING OF THE SANGRO RIVER

VIEW OF THE CHANNELIZATION, YEAR 1984

Setting of the channel with a double bank protection system

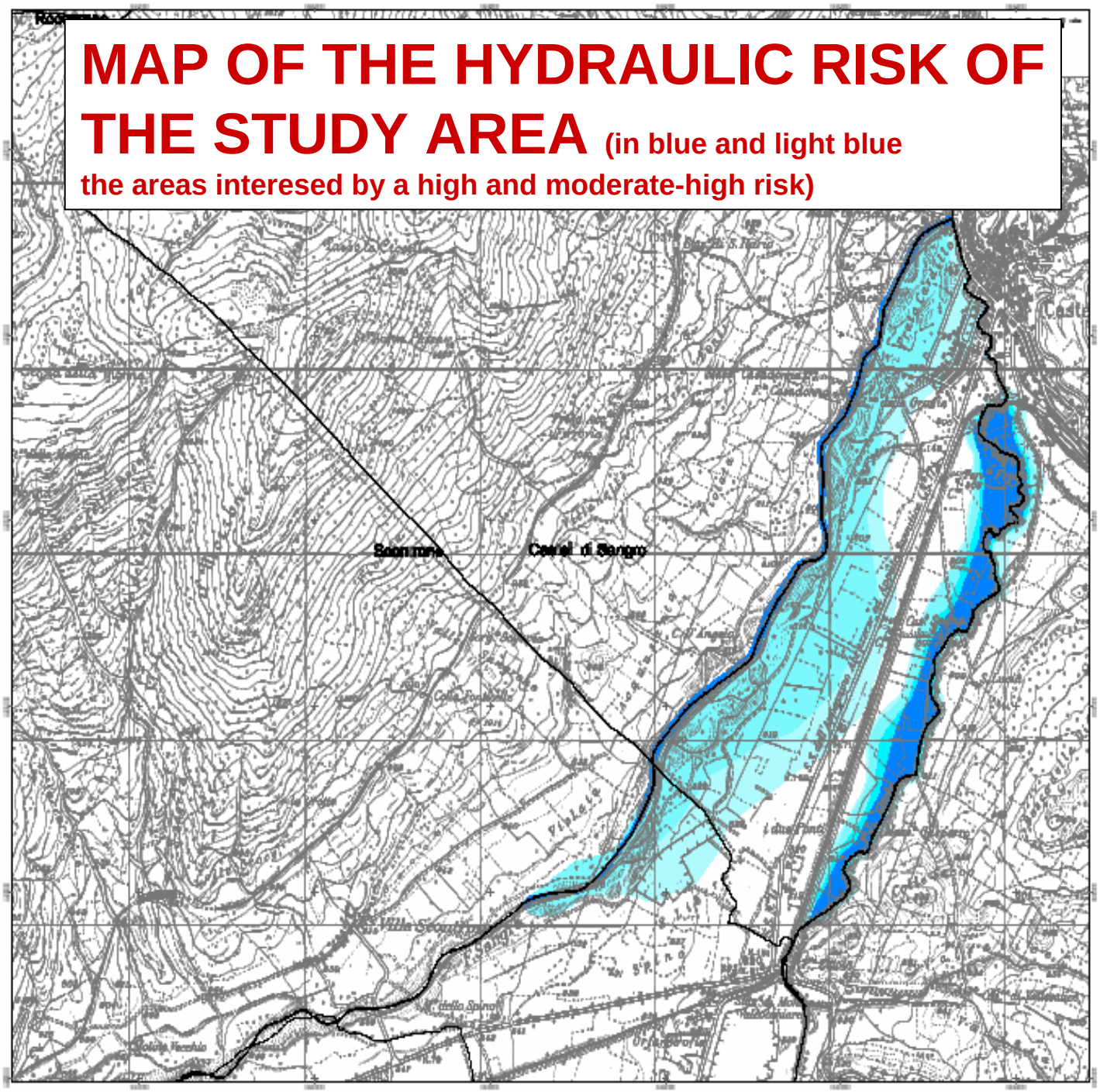
Flood after flood…

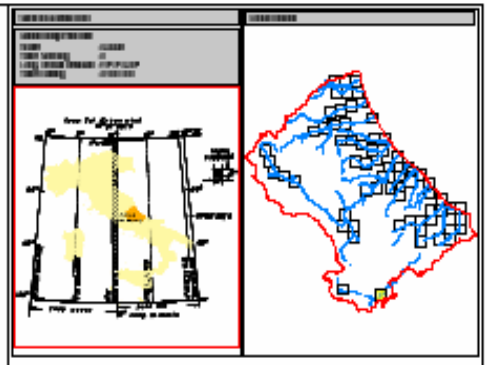
The river gets space, sinuosity and “comes back to life” spontaneously as a consequence of the new dynamic

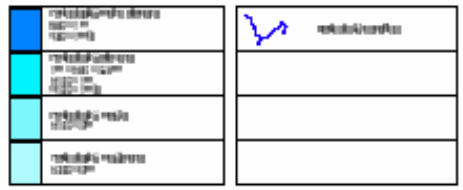
TYPICAL PROBLEMS OF THE STRAIGHTNENED STRETCH OF THE SANGRO RIVER

- PARTIAL DESTRUCTION (FLOODS) OF THE ARTIFICIAL SETTING:RESTORATION OR SELF-EVOLUTION?
- INCISION (VERTICAL EROSION) OF THE CHANNEL
- ENVIRONMENTAL DEGRADATION AND LOSS OF RECREATIONAL-TURISTIC AND CONSERVANCY OPPORTUNITIES
- INCREASE OF THE HYDRAULIC RISK

MAP OF THE HYDRAULIC RISK OF THE STUDY AREA (in blue and light blue the areas interesed by a high and moderate-high risk)







BIOLOGICAL AND PHYSICAL IMPACTS

ABSENCE OF RIPARIAN VEGETATION LOSS OF HABITATS

CHANNEL INCISION

Centro Italiano per la Riqualificazione Fluviale

Italian Center for River Restoration

Viale Garibaldi 44/a 30173 – MESTRE (VE)

Tel +39-041-615410

Website: www.cirf.org

Email: info@cirf.org; i.schipani@cirf.org

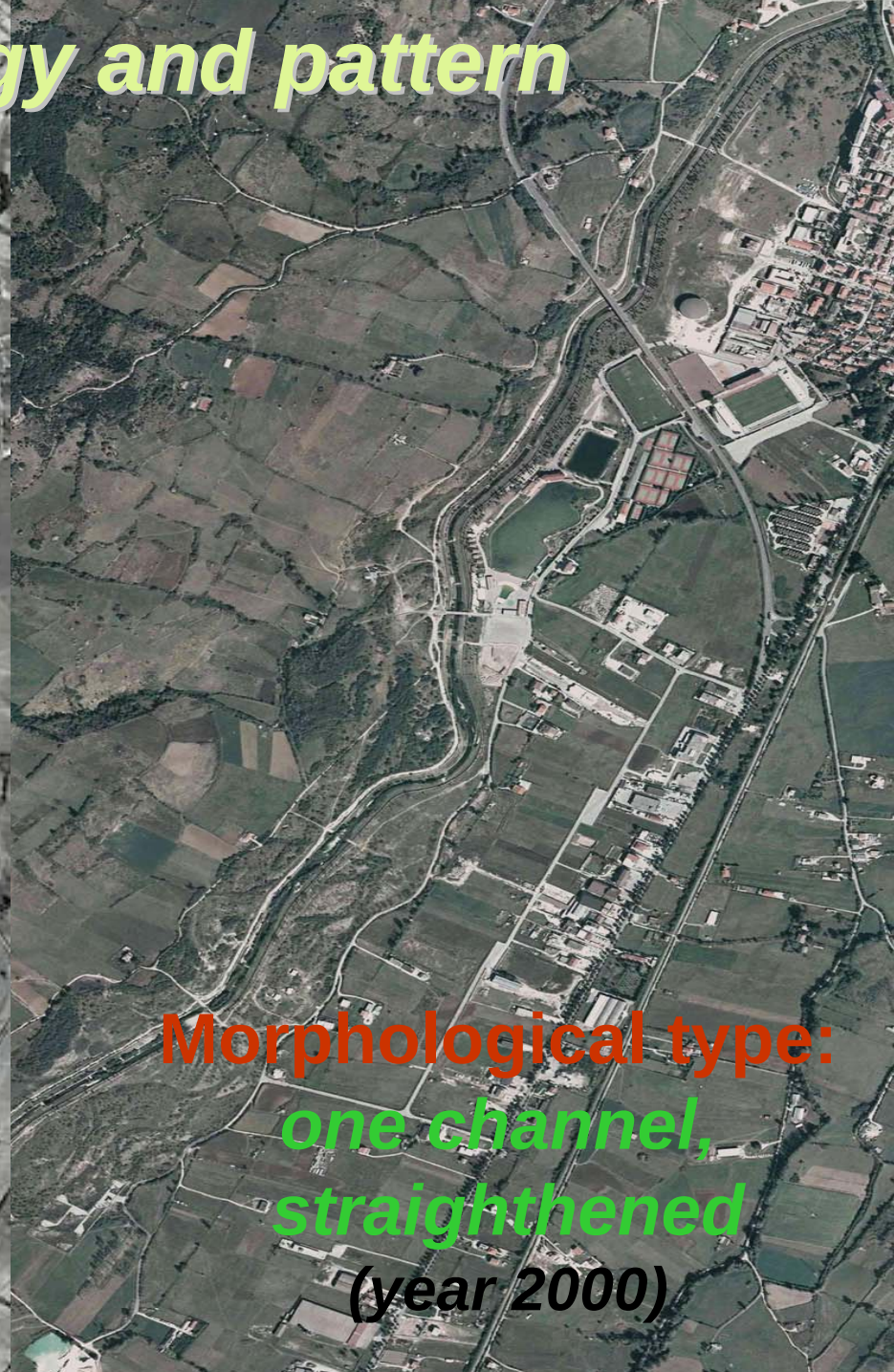
The *"Nature Alternative"*

THE “NATURE ALTERNATIVE”

- ***Assesment of the present state***
- ***Vision***
- ***Type of actions to implement***

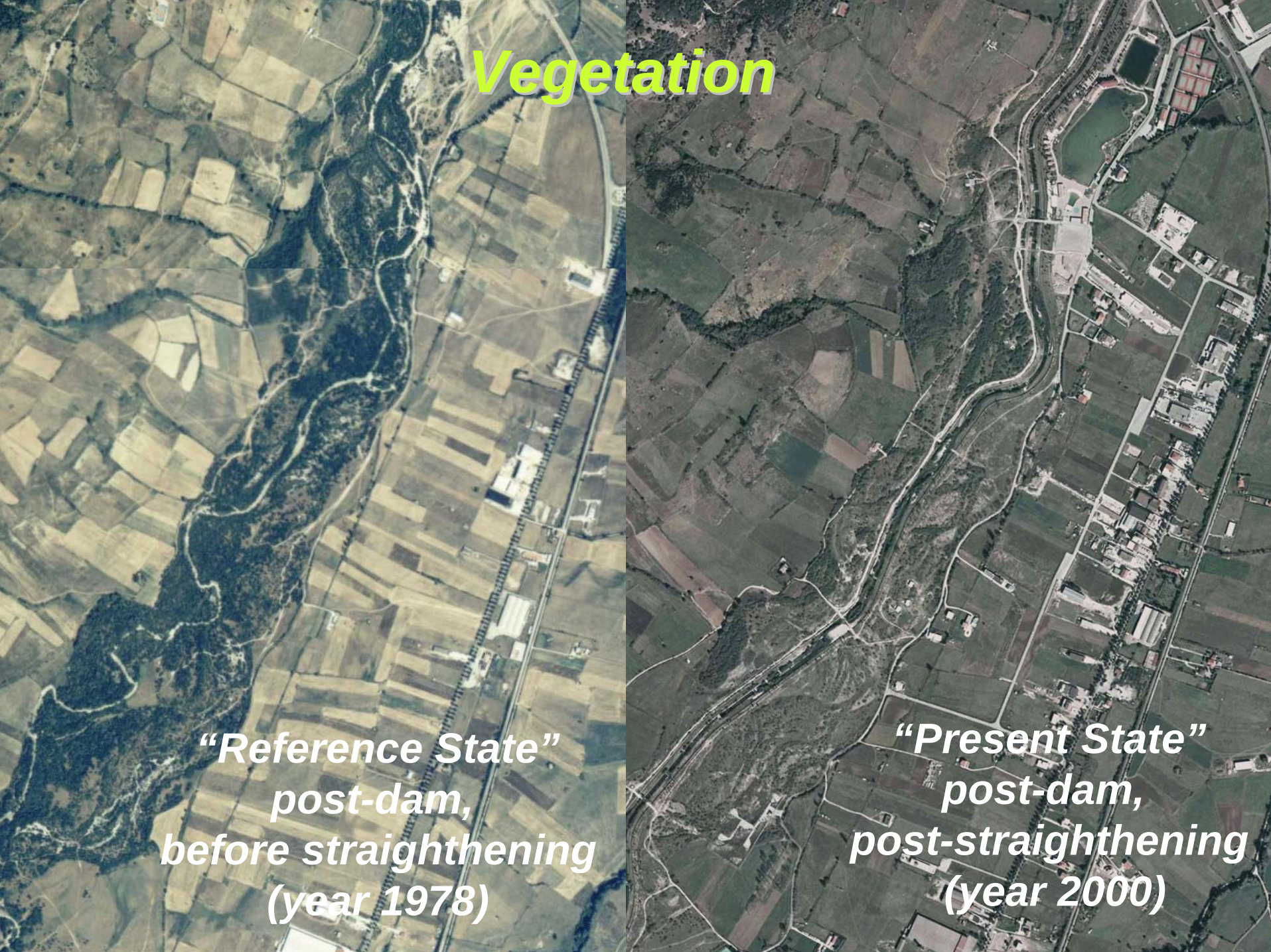
Morpholgy and pattern

Morphological type:
braided
(year 1954)

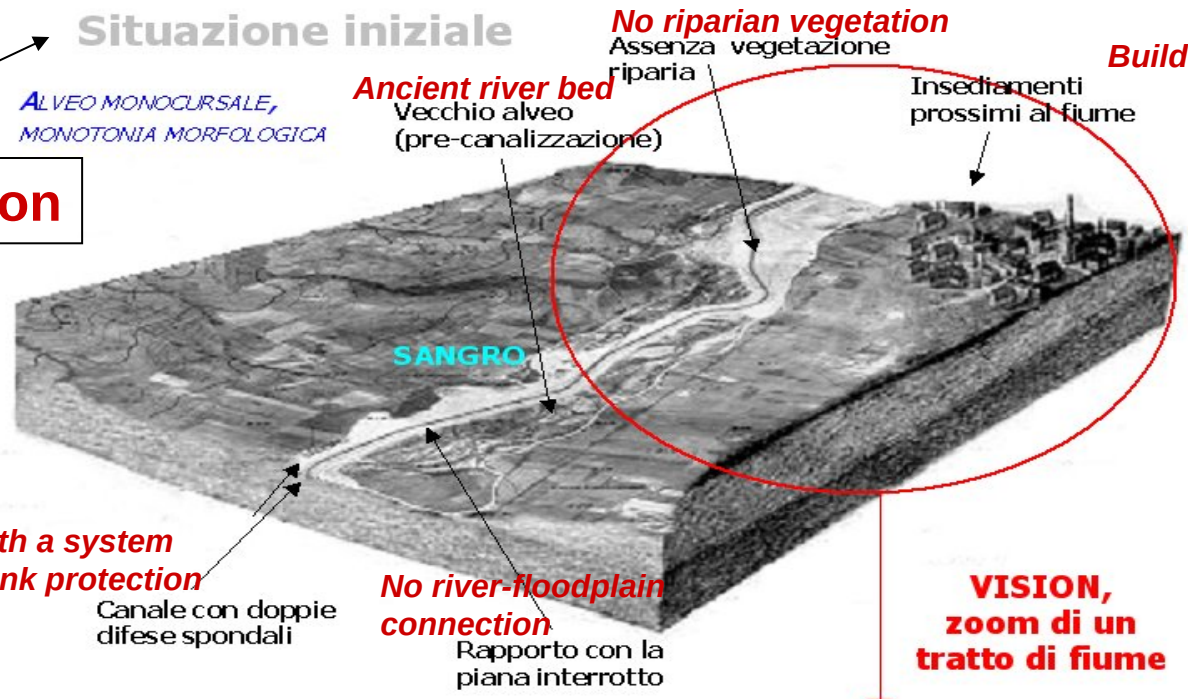


Morphological type:
one channel, straighthened
(year 2000)

Vegetation

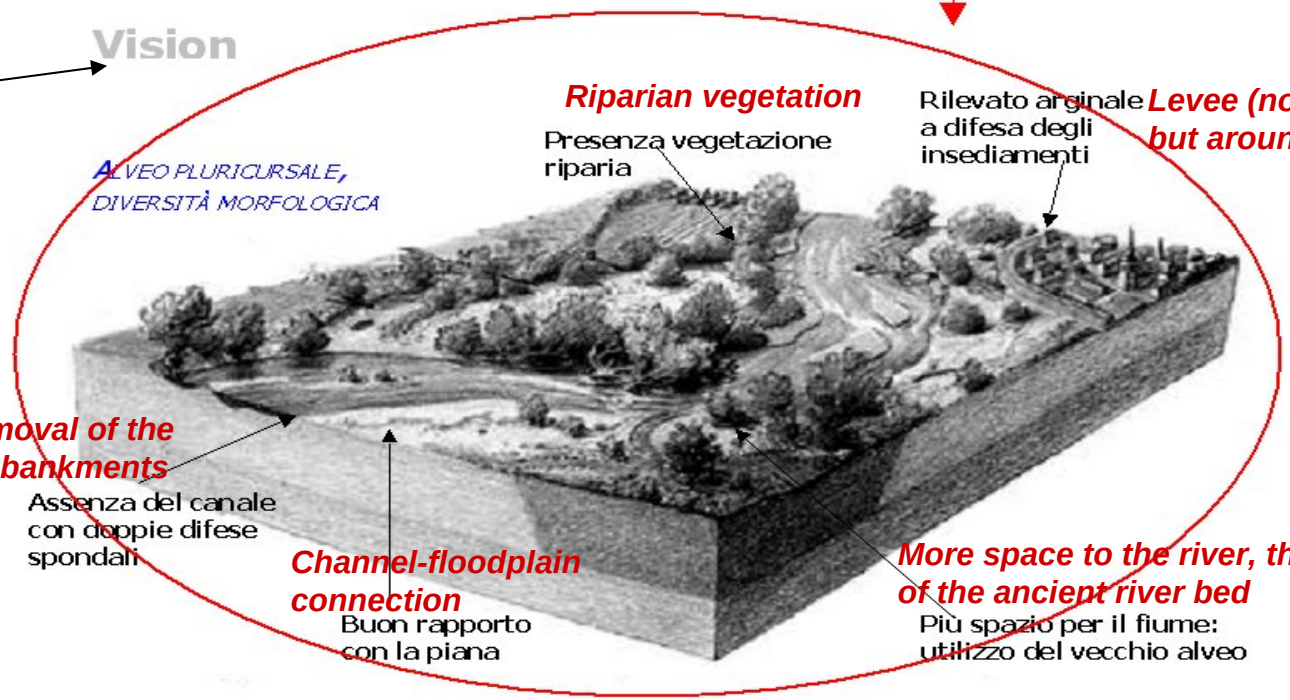

"Reference State"
post-dam,
before straighthening
(year 1978)
"Present State"
post-dam,
post-straighthening
(year 2000)

Starting situation



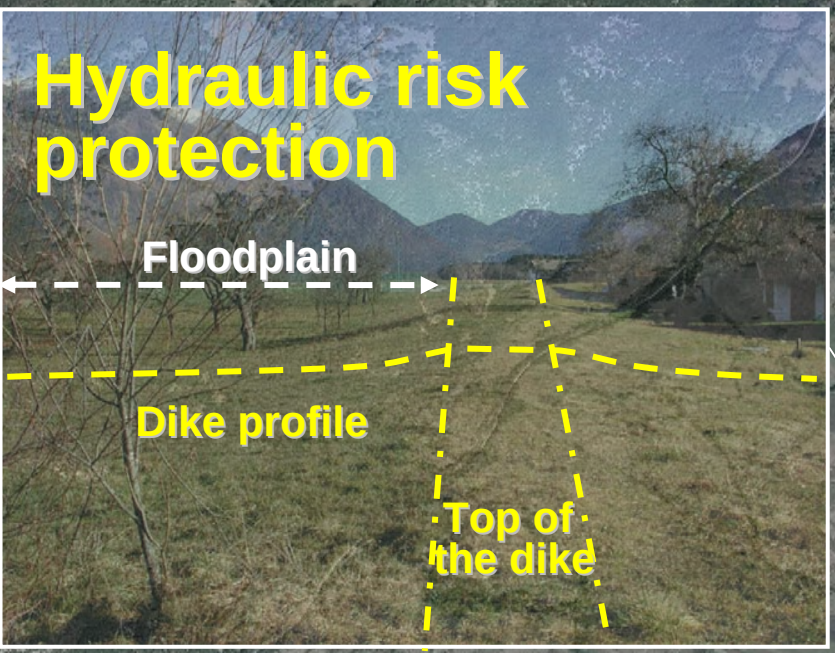
VISION, zoom di un tratto di fiume

Vision

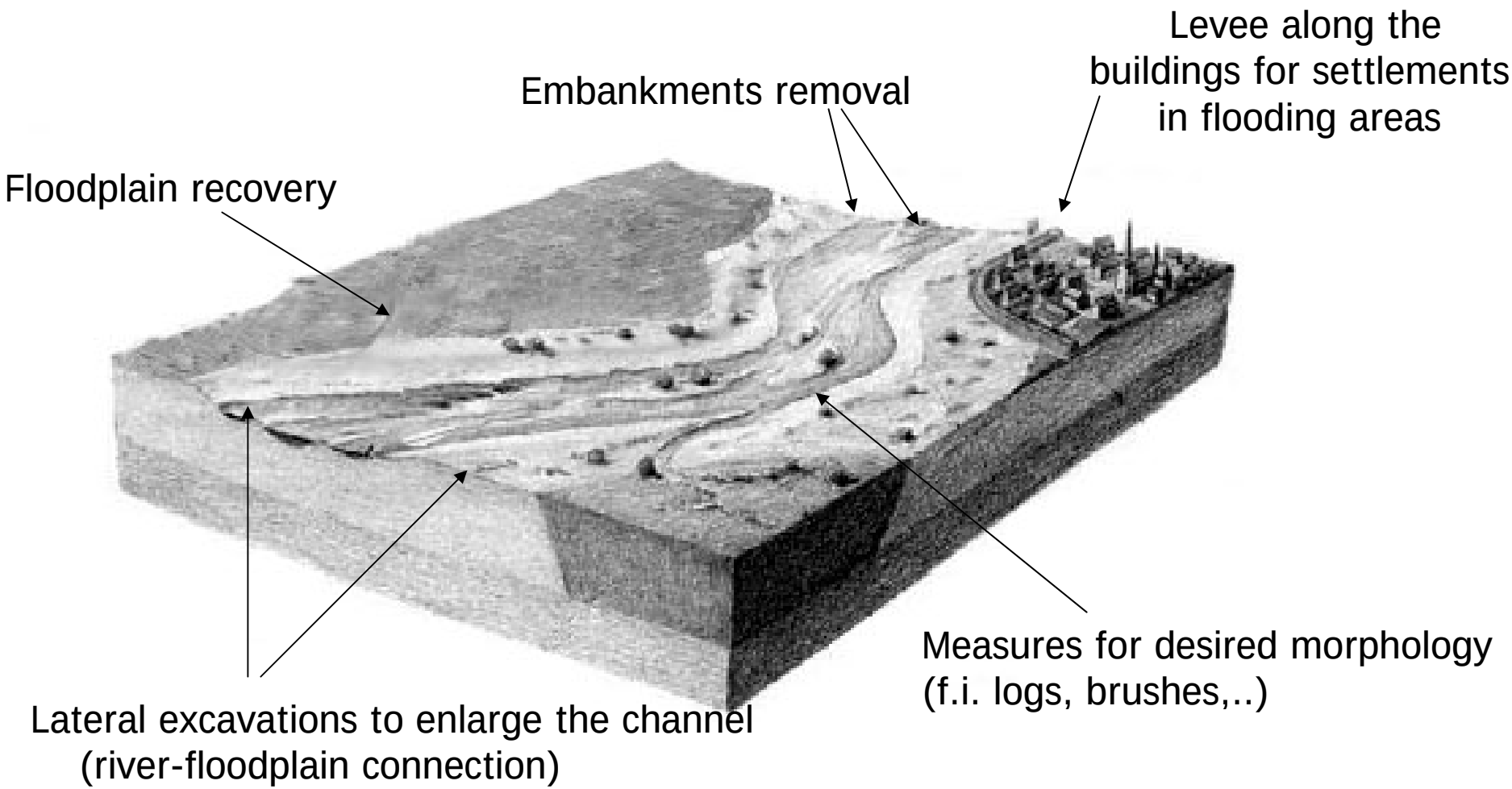



VISION:
A river free to move within its mobility strip

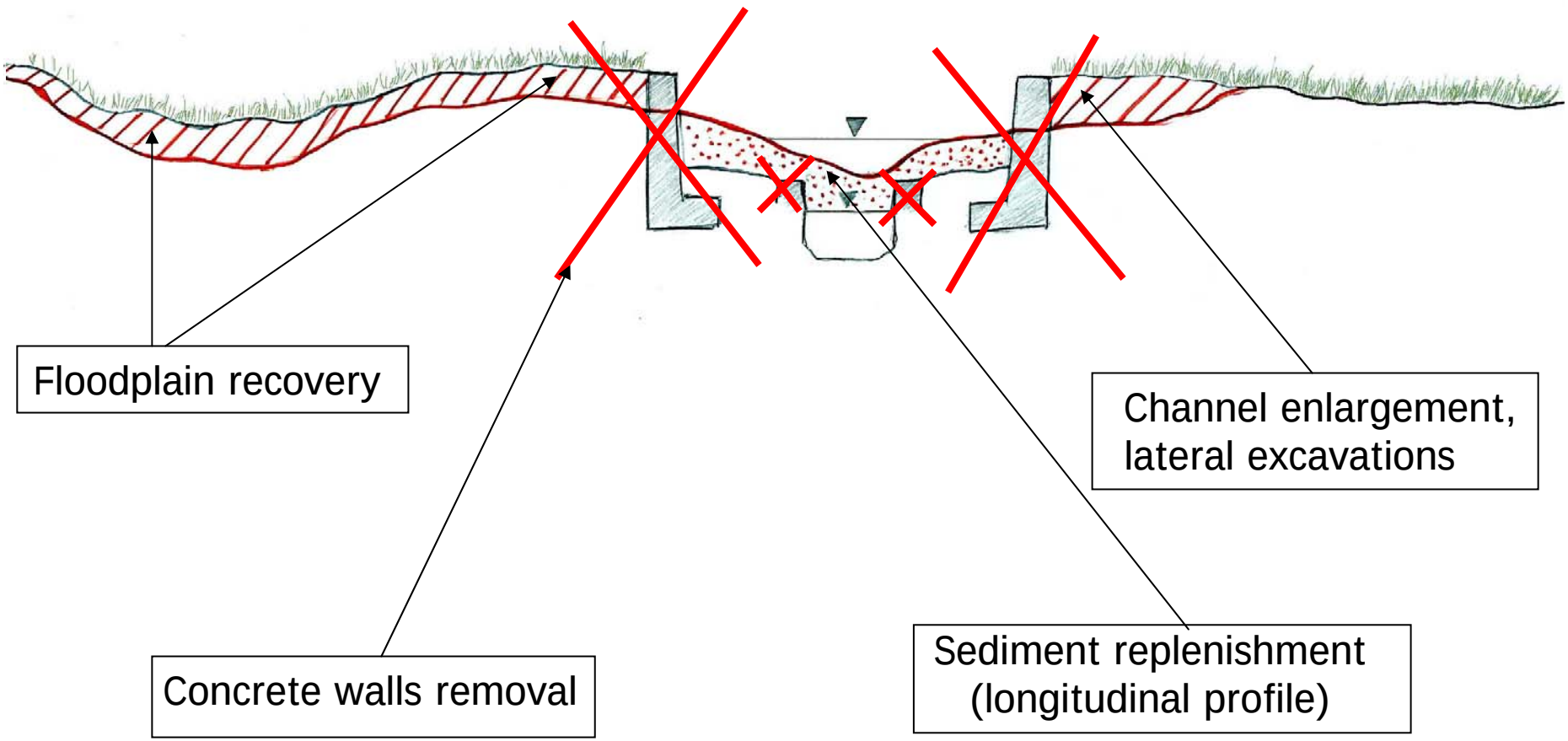
Measures to manage the mobility strip

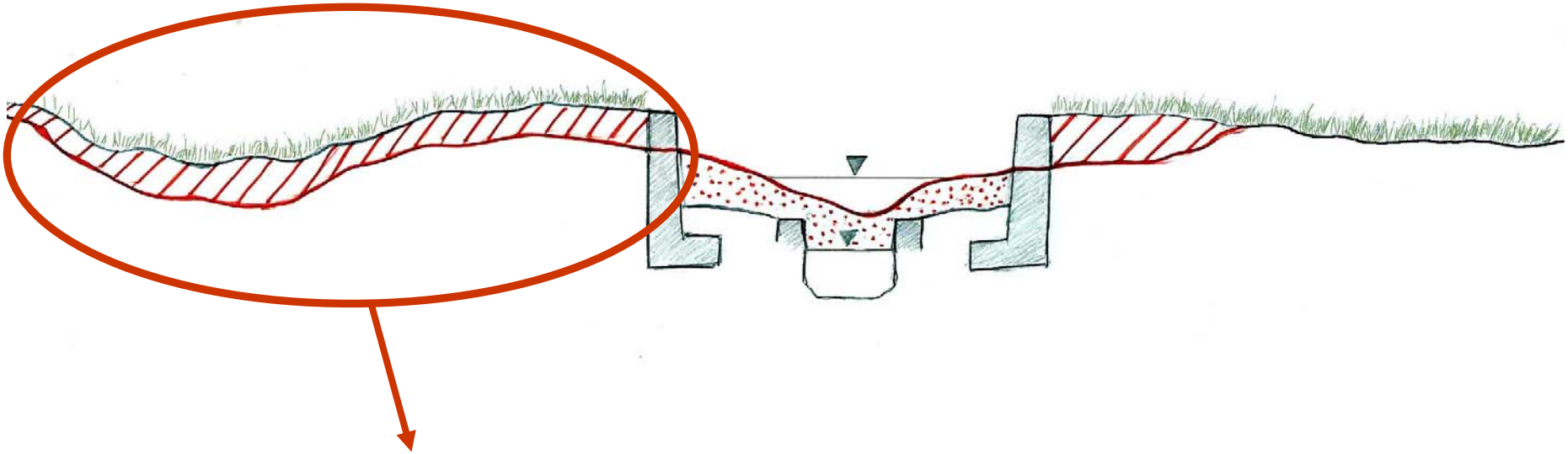


Physical environment recovery



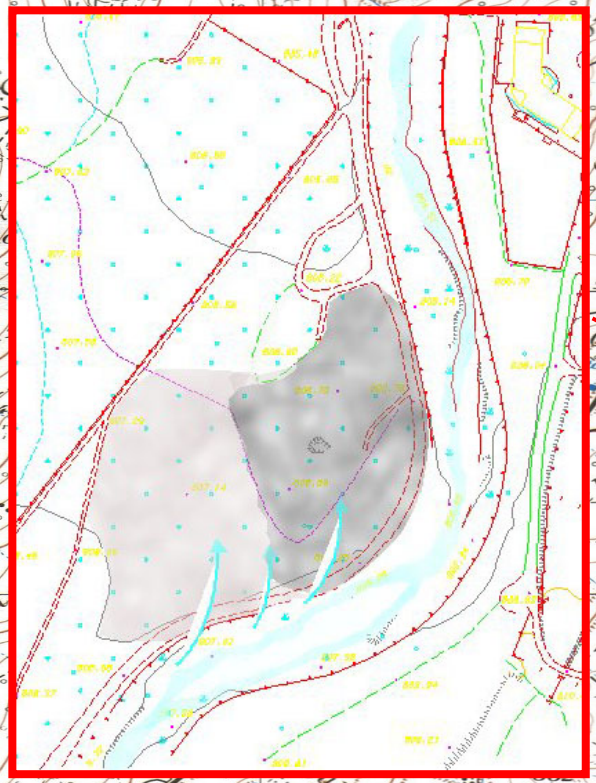
Stream channel restoration: cross section

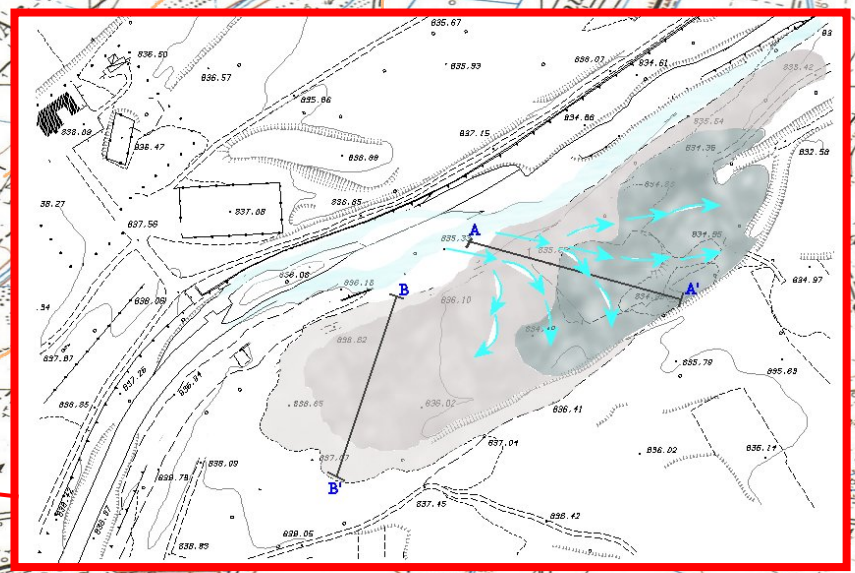


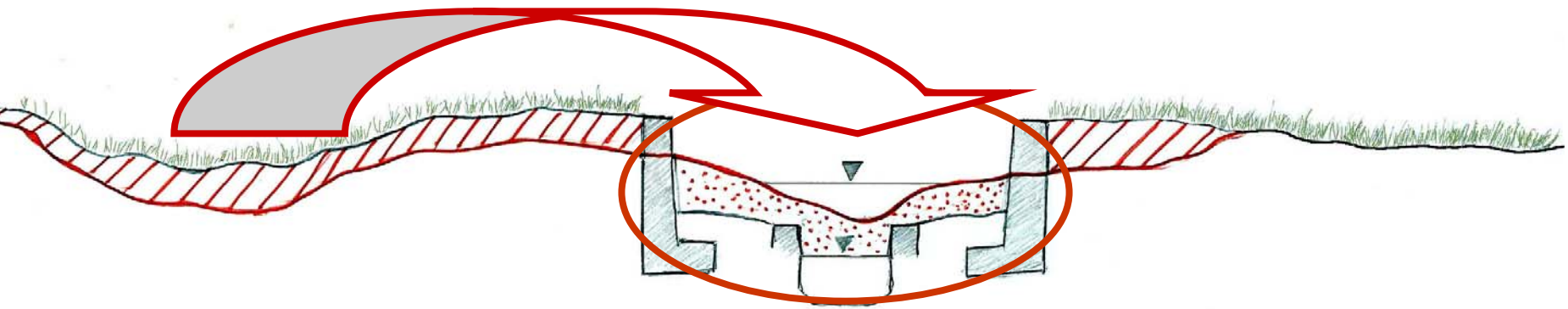


Off-channel ponds: temporary storage space for floodwaters

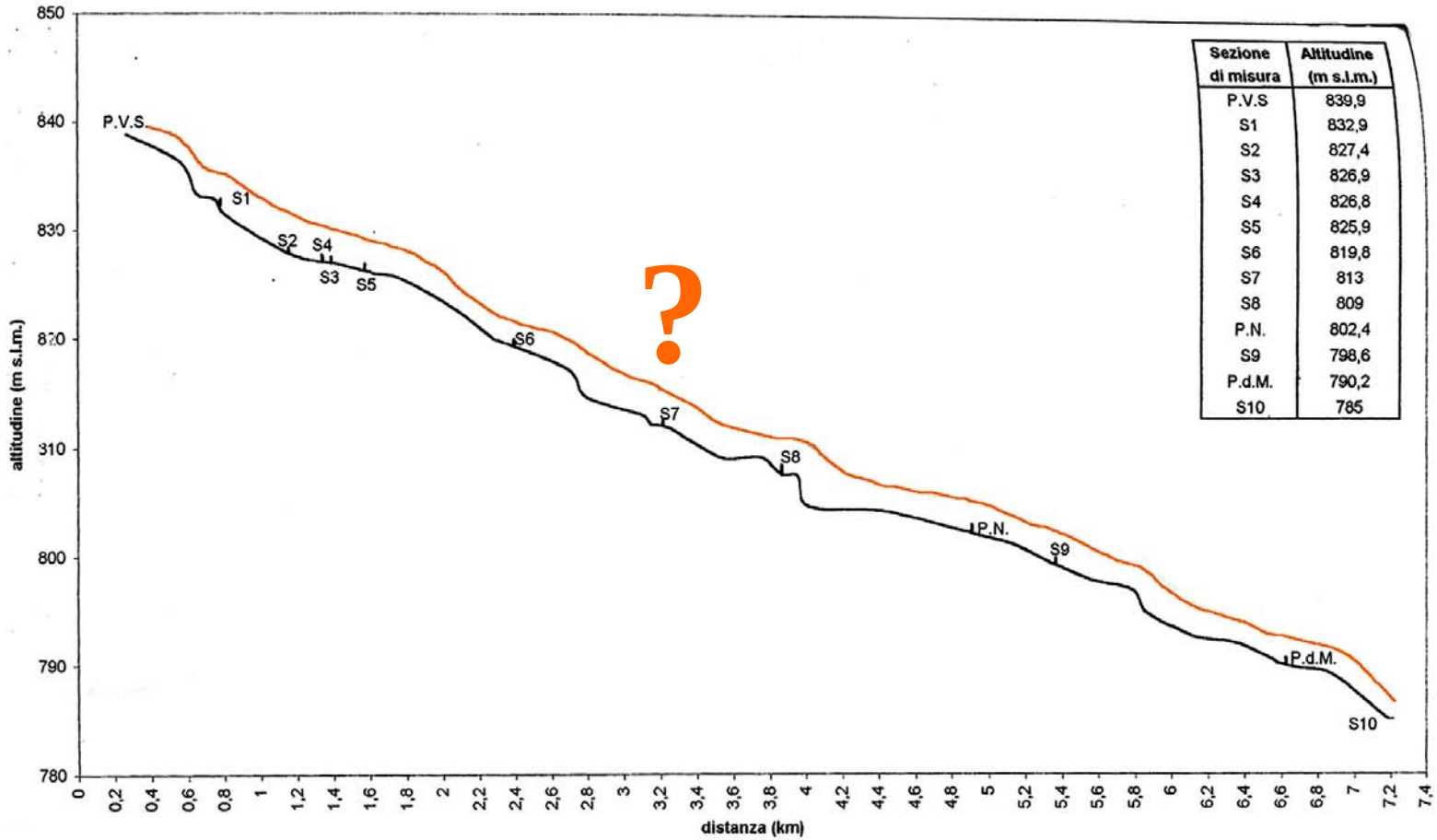
Identification of potential natural flood expansion areas







Longitudinal profile (sediment replenishment)



Sezione di misura	Altitudine (m s.l.m.)
P.V.S	839,9
S1	832,9
S2	827,4
S3	826,9
S4	826,8
S5	825,9
S6	819,8
S7	813
S8	809
P.N.	802,4
S9	798,6
P.d.M.	790,2
S10	785

“NATURE ALTERNATIVE”: 2 APPROACHES OF ACTION

Immediate,
all measures implemented
on the entire stretch

Gradual,
localized inputs
for evolution in time

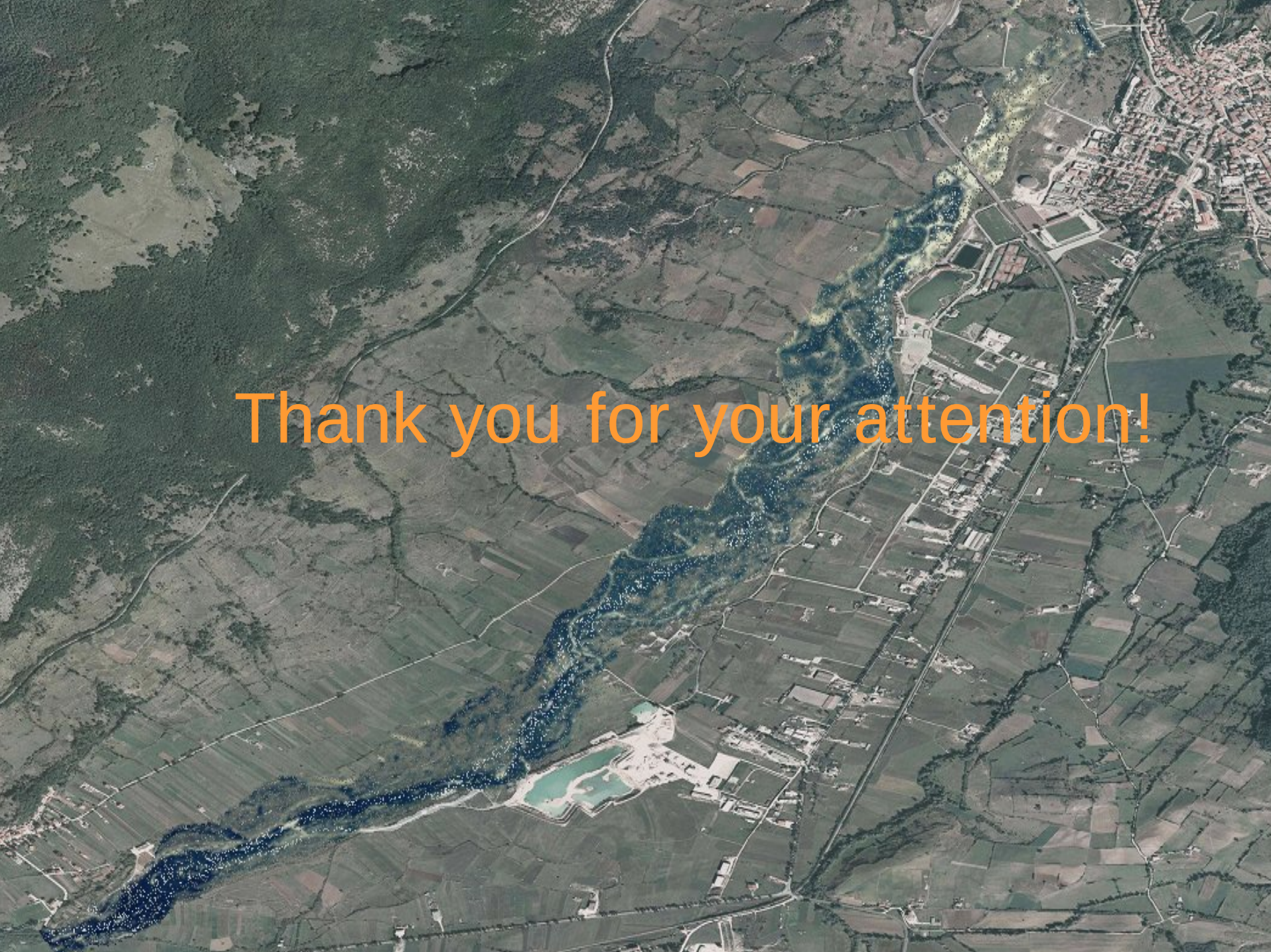
- Flushing (Management of the dam upstream)
- Partial enbankment removal
- Localized channel enlargement

Need for a funding flow in time:

- Controlled management of vegetation
- Maintanance of structures (deflectors, brushes,..)
- Trade-off….

NEXT STEPS

- **Define the Restoration Alternatives at a project level (“Nature”, etc):**
  - **– choose between the “immediate” o “gradual” option**
  - **– estimate the *channel forming discharge* and define the dam management**
  - **– implement measures for water quality improvement**
- **Predict the effects : hydraulic model/2 dimensional simulation**
- **Assess and negotiate**
- **Executive project**
- **Monitoring Centre (adaptive management)**


Thank you for your attention!

Cranfield UNIVERSITY
Silsoe

Engineering Washlands for Flood Risk Management and Biodiversity

7th River Restoration Centre Annual Conference

Joe Morris, Tim Hess, David Gowing, Peter Leeds Harrison
(see paper and references)

Report on two projects

1. Integrated washlands for flood risk management and biodiversity:
   - funded by English Nature and Defra
2. Integrated floodplain management: revisiting flood defence schemes:
   - funded by ESRC/NERC/EPSRC

Integrated Washlands

- Context
- Aim
  - guidance and inform policy
- Objectives
  - scope for integration
  - actions to achieve integration
- Approach
  - Classification system
  - Suitable interventions
  - Survey of perception of managers
  - Case studies
  - Workshop

What is a Washland?

- Land that is periodically flooded by a river or stream (The Concise Oxford Dictionary, 2001)

Washland Definition

- An area of the floodplain that is allowed to flood or is deliberately flooded by a river or stream for flood management purposes, with potential to form a wetland habitat.

Washland Objectives

Flood managers

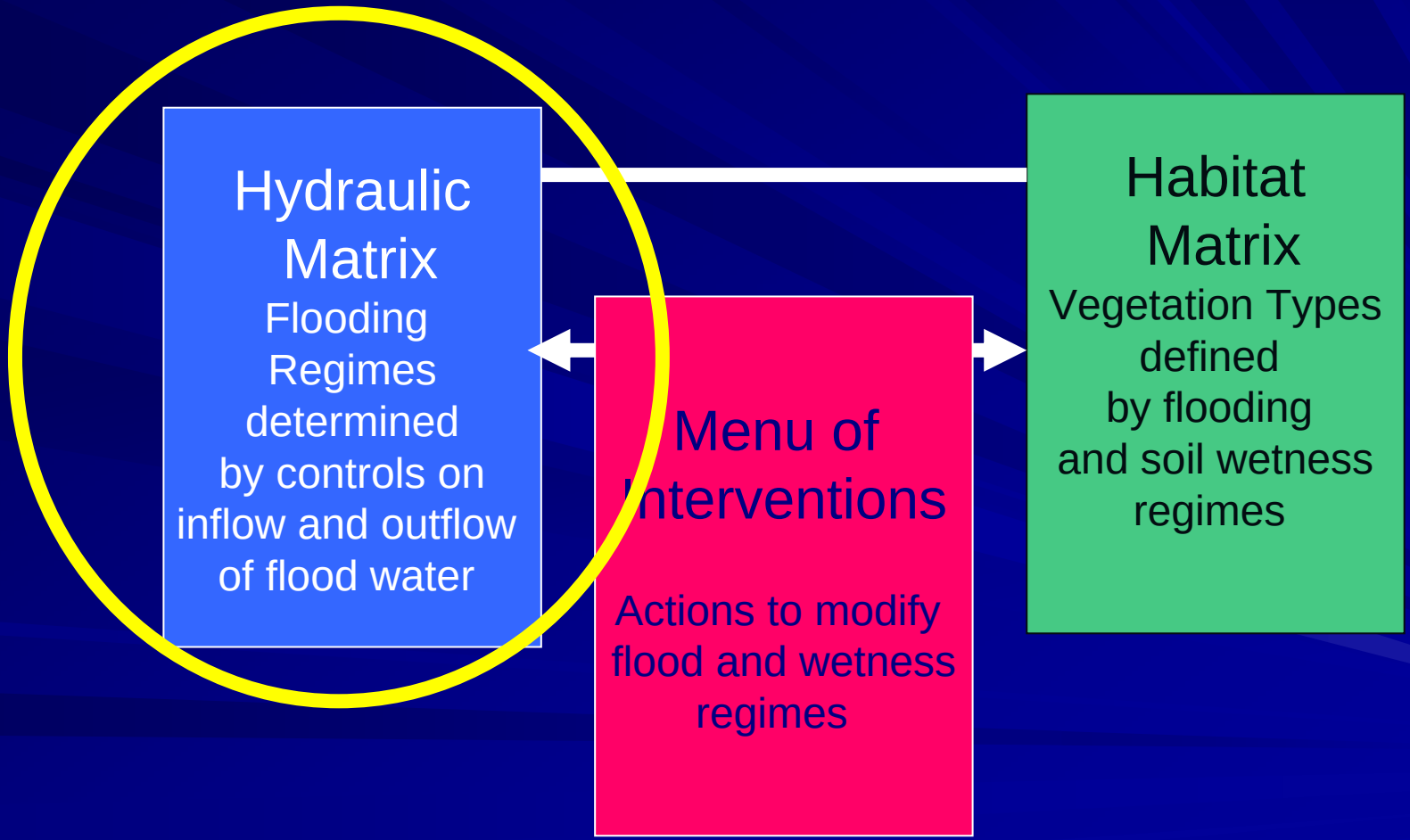
- Reduce flood risk by
  - Reducing & delaying peak flows
  - Separating conveyance and storage
  - Storing flood water
  - Maintaining a storage facility

Hydraulic control for flood risk management

Conservation managers

- Enhance biodiversity by
  - Achieving seasonally deep surface and/or shallow surface water flooding
  - Retaining high water levels in ground and ditches
  - Assuring water quality
  - Securing non-water attributes
- Water level management for habitats

Classification of Washlands



Key characteristics

- Water entering storage
  - At what 'stage' / discharge it starts to enter
  - At what rate it enters

- Water leaving storage
  - At what rate it leaves storage
  - At what level it stops leaving (*dead storage*)

- Determine ……
  - Degree of flood control
  - Frequency of washland inundation
  - Duration of washland inundation

Inflow (to the washland)

1. Uncontrolled inflow

Twyford Brook, Derbyshire (Photo T.M. Hess)

Inflow

2. Fixed controlled inflow

Walton Lake, Milton Keynes (photo T.M. Hess)

River Trent Overtopping Flood Banks at Beckingham Marshes, Gainsborough (photo Environment Agency)

Inflow

3. Variable controlled inflow

Stage

Discharge

Harbertonford (photo N Bannister)

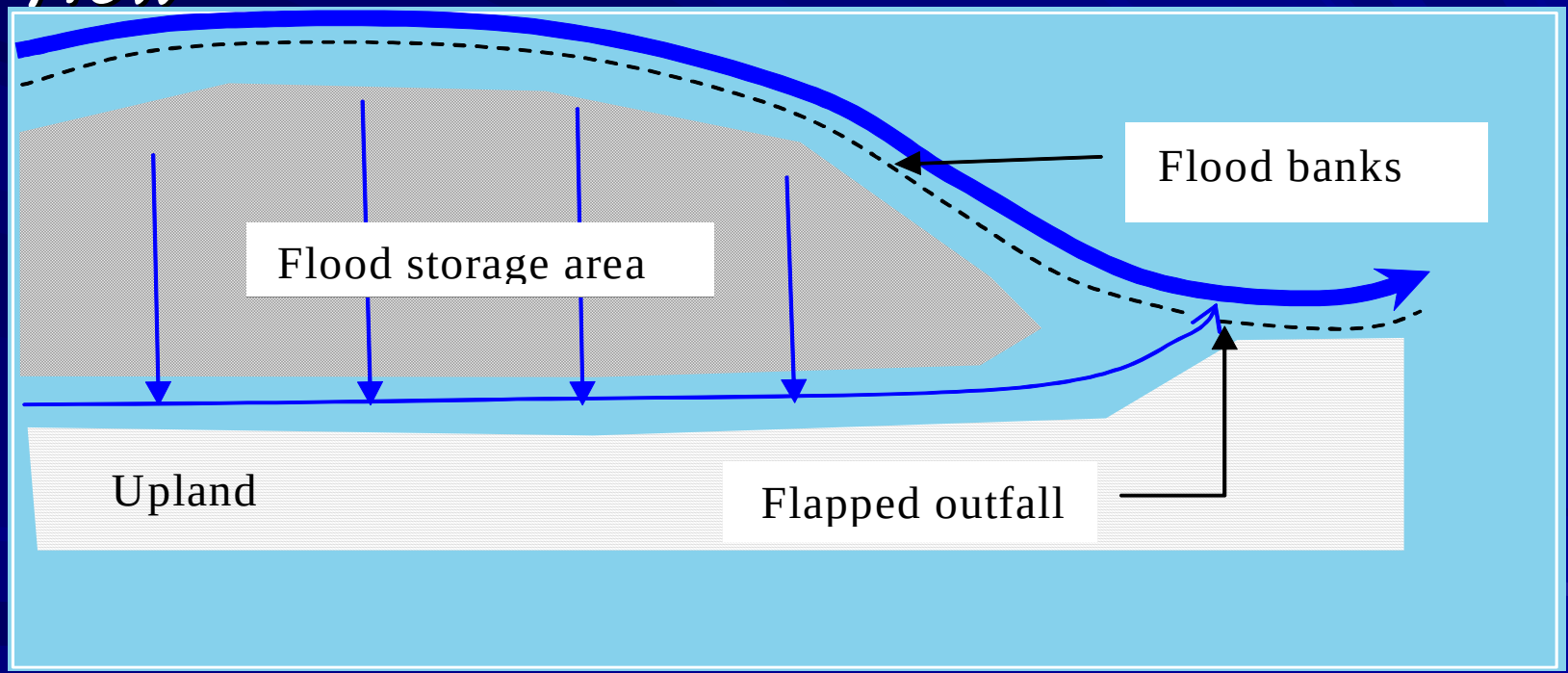
Saundby Beck (photo T.M. Hess)

Outflow (from washland)

1. Uncontrolled gravity return flow

Outflow

2. Downstream fixed controlled gravity flow



Outflow

3. Controlled return flow

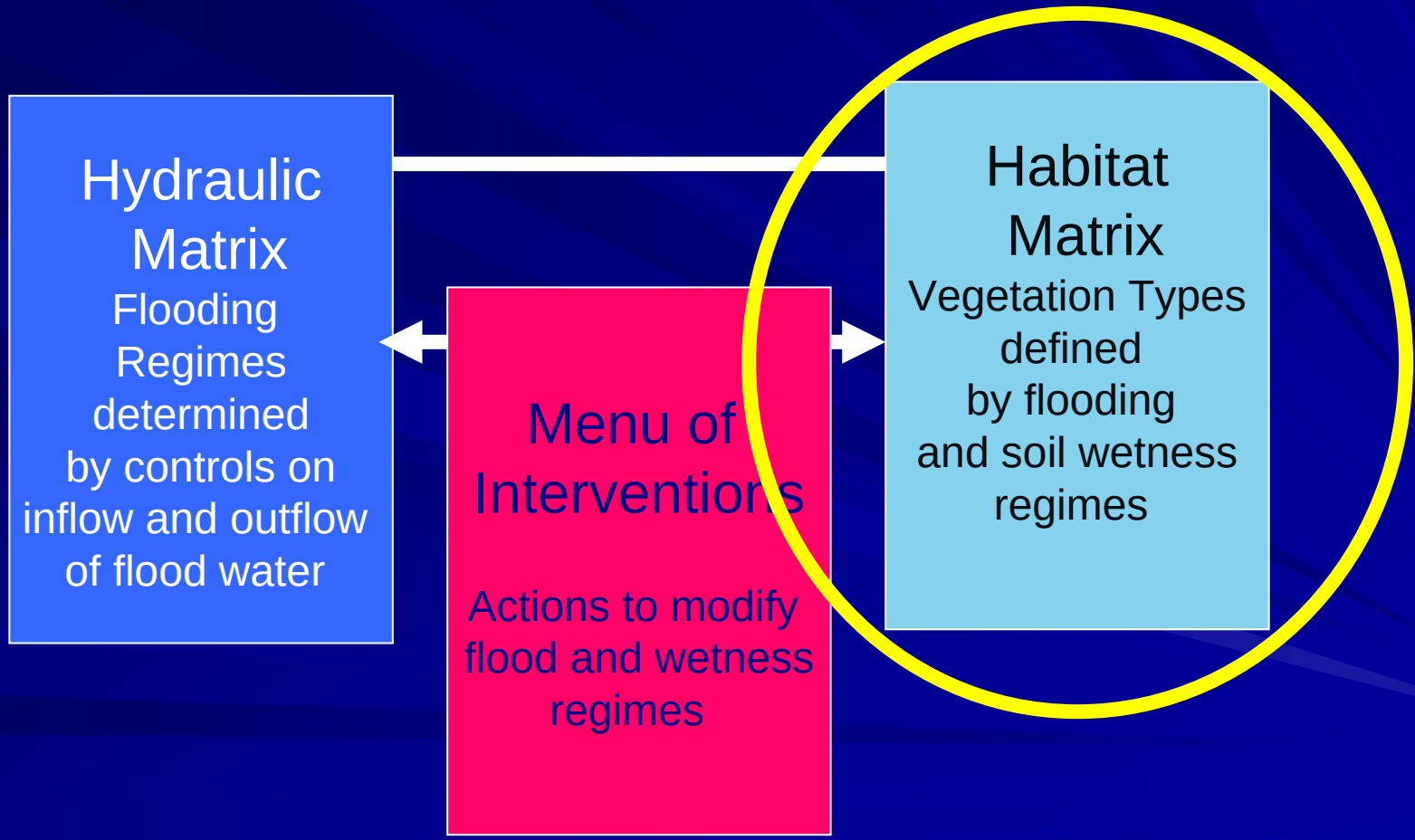
Saundby Beck (Beckingham Marsh) (photo T.M. Hess)

Hydraulic matrix

	Uncontrolled inflow	**Fixed controlled inflow**	**Variable controlled inflow**
Uncontrolled gravity return	1 (Long Eau)	2	3
Fixed controlled gravity return	4	5 (Coombe Hill)	6
Controlled return	7	8 (Beckingham Marsh)	9 (Harbertonford) (Leigh Barrier)

Hydraulic control for flood risk management

Classification of Washlands



Habitat Matrix

	Winter Flooding Only			Winter and Summer Flooding		
	Rapid soil drainage	Moderate soil drainage	Slow soil drainage	Rapid soil drainage	Moderate soil drainage	Slow soil drainage
Short duration flooding	1 Arable, Pasture, Hay meadow, Woodland	2 Pasture, Hay meadow, Woodland	3 Pasture, Woodland	4 Hay meadow, Pasture, Woodland	5 Pasture, Woodland	6 Pasture, Woodland
Medium duration flooding	7 Hay meadow, Pasture, Woodland	8 Pasture, Woodland	9 Pasture, Swamp, Woodland	10 Pasture, Woodland	11 Pasture, Woodland, Swamp	12 Swamp, Pasture
Long duration flooding	13 Pasture, Woodland	14 Pasture, Woodland	15 Swamp, Pasture, Woodland	16 Swamp, Woodland	17 Swamp	18 Swamp

- Water level management for habitats

	Winter flooding only			Flooding at any time of year		
	Rapid soil drainage	Moderate soil drainage	Slow soil drainage	Rapid soil drainage	Moderate soil drainage	Slow soil drainage
Short duration Flooding	**1** Arable Pasture Hay meadow Woodland	**2** Pasture Hay meadow Woodland	**3** Pasture Woodland	**4** Hay Meadow Pasture Woodland	**5** Woodland Pasture	**6** Swamp Pasture Woodland
Medium duration Flooding	**7** Hay meadow Pasture Woodland	**8** Pasture Woodland	**9** Pasture Swamp Woodland	**10** Pasture woodland	**11** Pasture Woodland Swamp	**12** Swamp Pasture
Long duration Flooding	**13** Pasture Woodland	**14** Pasture Woodland	**15** Swamp Pasture Woodland	**16** Swamp Woodland	**17** Swamp	**18** Swamp

Additional considerations for fauna

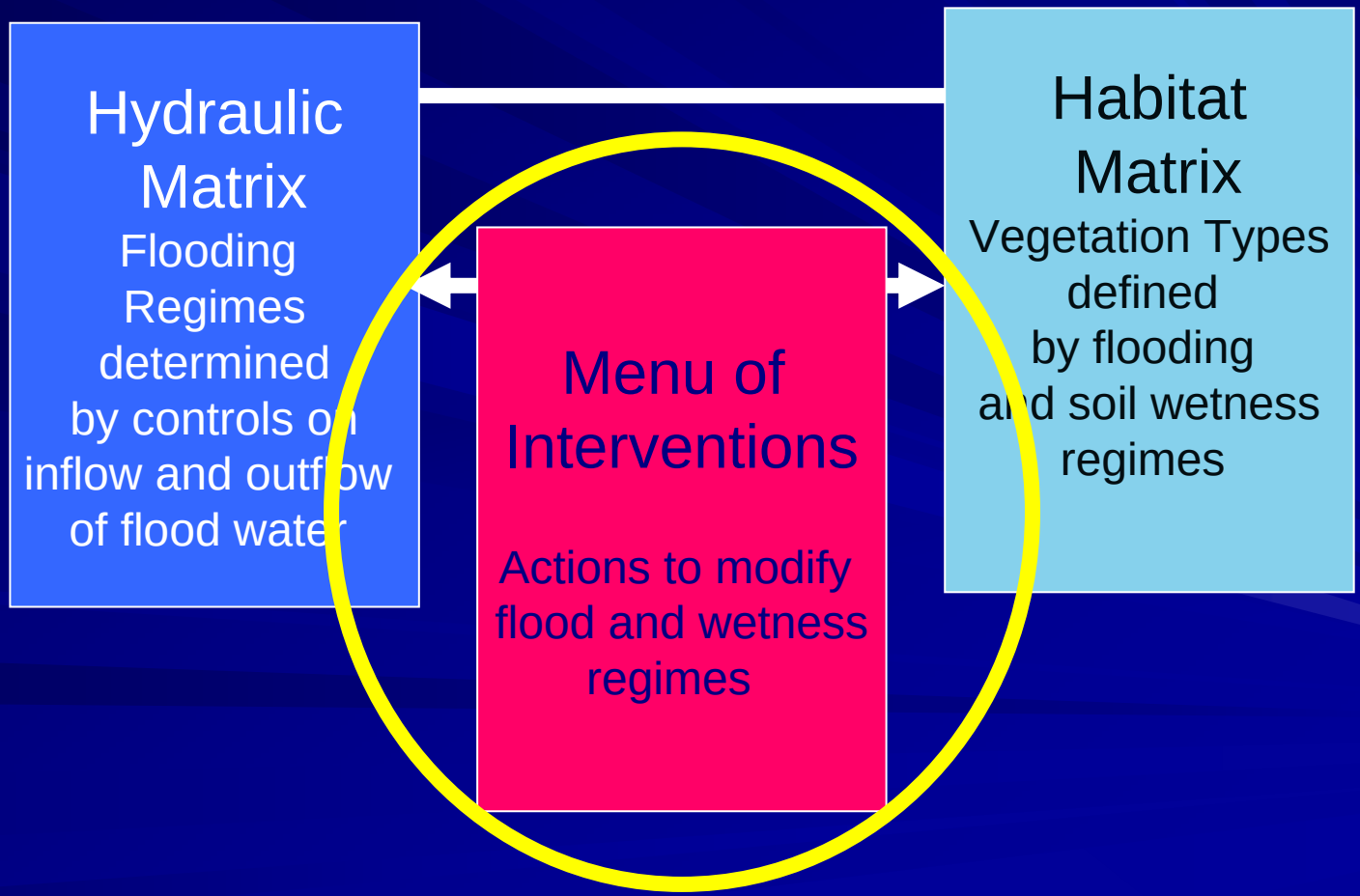
- Requirements very site specific
- Generalisations less useful
- Issues include:
  - Size
  - Disturbance
  - Connectivity

Hydrological management for conservation

- High quality wetlands require:
  - water to be retained outside flood periods
    - Design for excess capacity
  - water distribution through the site
    - Soil permeability
    - On-going management

- All washlands have some form of management
- Engineering interventions may be needed

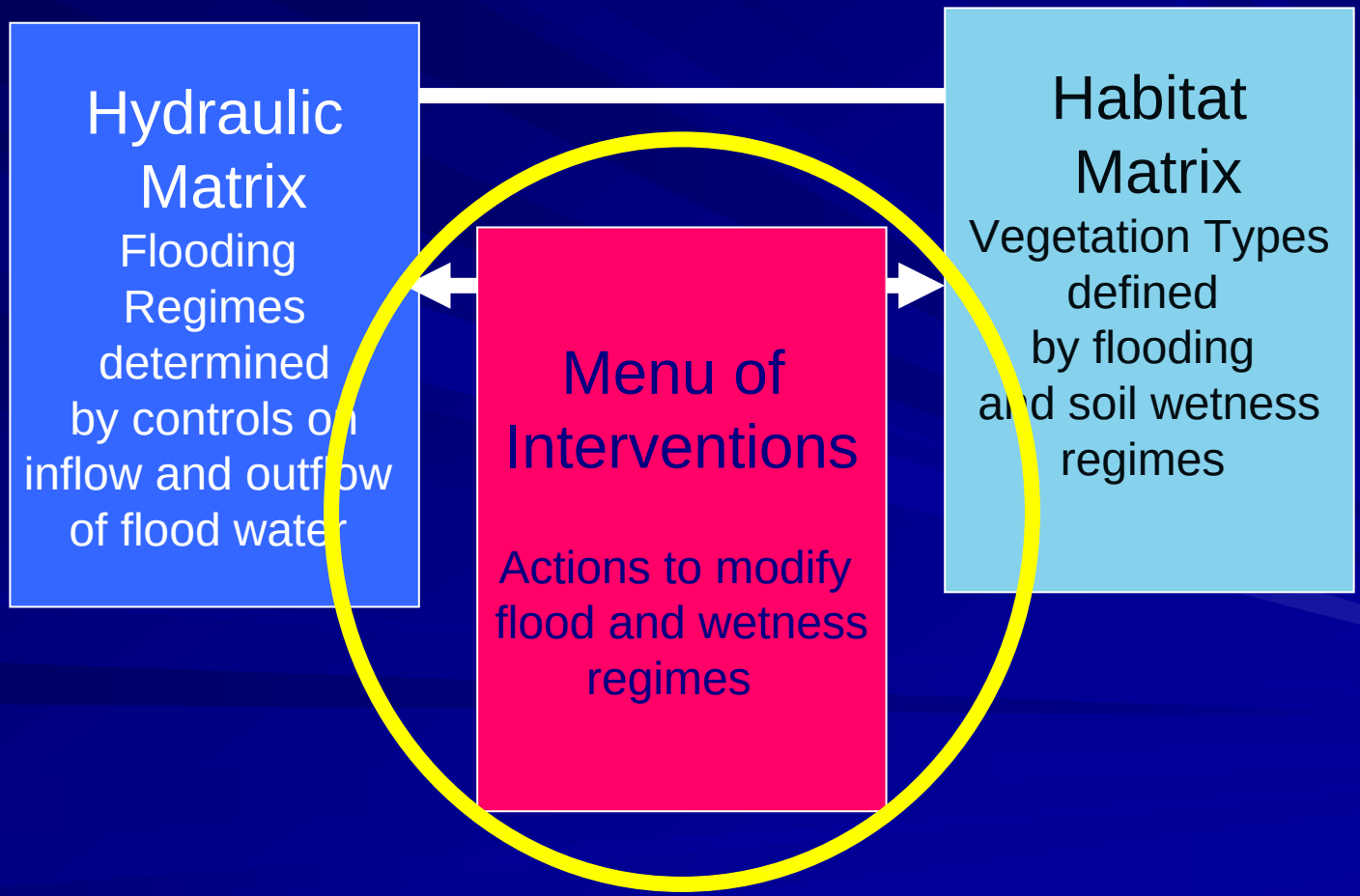
Classification of Washlands



Interventions

- Interventions to modify the frequency/duration of washland flooding and the downstream hydrograph, eg:
  - setback,
  - decreased channel maintenance
- Interventions to modify the washland soil drainage condition, eg:
  - changes in pumping regimes
  - create scrapes

Classification of Washlands



Classification by Benefit Type

- Flood Management Washlands
- Conservation Washland
- Integrated Washland

Implications for Washland Design, Appraisal, Management and Funding?

Example of Flood Management Washland: Beckingham Marsh, Notts

- 1000ha
- Hydraulic Type 8 embankments, sluice, pumps
- 2-3 days floods, winter, 1 in 10 years
- Arable and grass
- Enhancement for waterfowl
- Habitat Type 1

Example of Conservation Washland : Long Eau, Lincs

- 15 ha
- Hydraulic Type 1
  setback embankments
- 3-4 days floods, winter, 3-4 times annually
- Grassland
- Enhance general biodiversity on wet grassland
- Habitat Type 8

Example of Integrated Washland : Harbertonford, Devon

- 3.5 ha
- Hydraulic Type 9: dam, sluices, scrapes
- 2-3 days floods, winter and summer, 1:10 year design
- Grass and woodland
- 'recreate natural washland'
- Habitat Type 11

Conclusions

- Classification to reflect objectives
- Scope for Synergy
  - *Both synergy and conflict*
  - *Design for Integration:*
  - *Land use and management*
- *Appraisal, Funding and Administration*
- *Skills, Knowledge and Understanding*

Recommendations to exploit synergy

- Promote integrated, catchment scale approach
- Engage multiple stakeholders
- Review appraisal methods
- Review funding mechanisms
- Provide experience-based guidance

Integrated land and water management in floodplains:

revisiting agricultural flood defence schemes in England and Wales

Cranfield University,
Open University,
River Restoration Centre
Environmental Solutions

*Contact: j.morris@cranfield.ac.uk, tel 01525 863309

- Context
- Aim
- Research Questions
- Approach
- Outcomes

Thanks

- j.morris@cranfield.ac.uk

RRC Annual Conference,

26-28 April, Edinburgh (Scotland)

The River Rhine
- Safety measures meet ecology and vice versa -

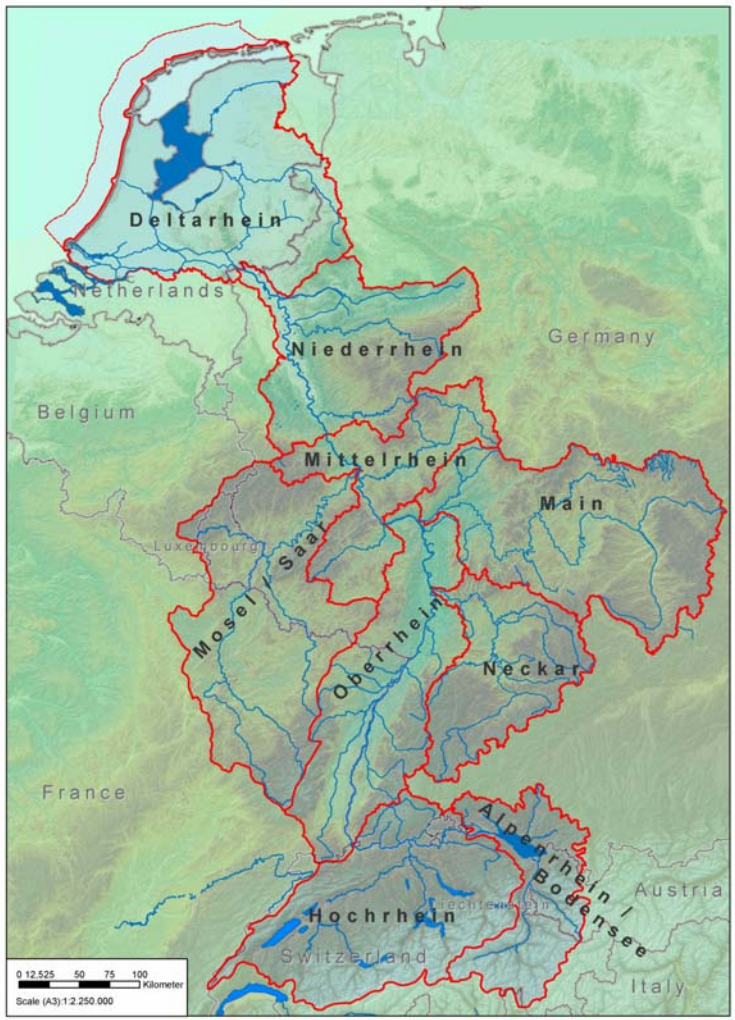
Ute Menke

Ministry of Transport, Public Works and Water Management (RWS-RIZA) /

European Centre for River Restoration (ECRR)

The Netherlands

The River Rhine basin – elevation and "parts"

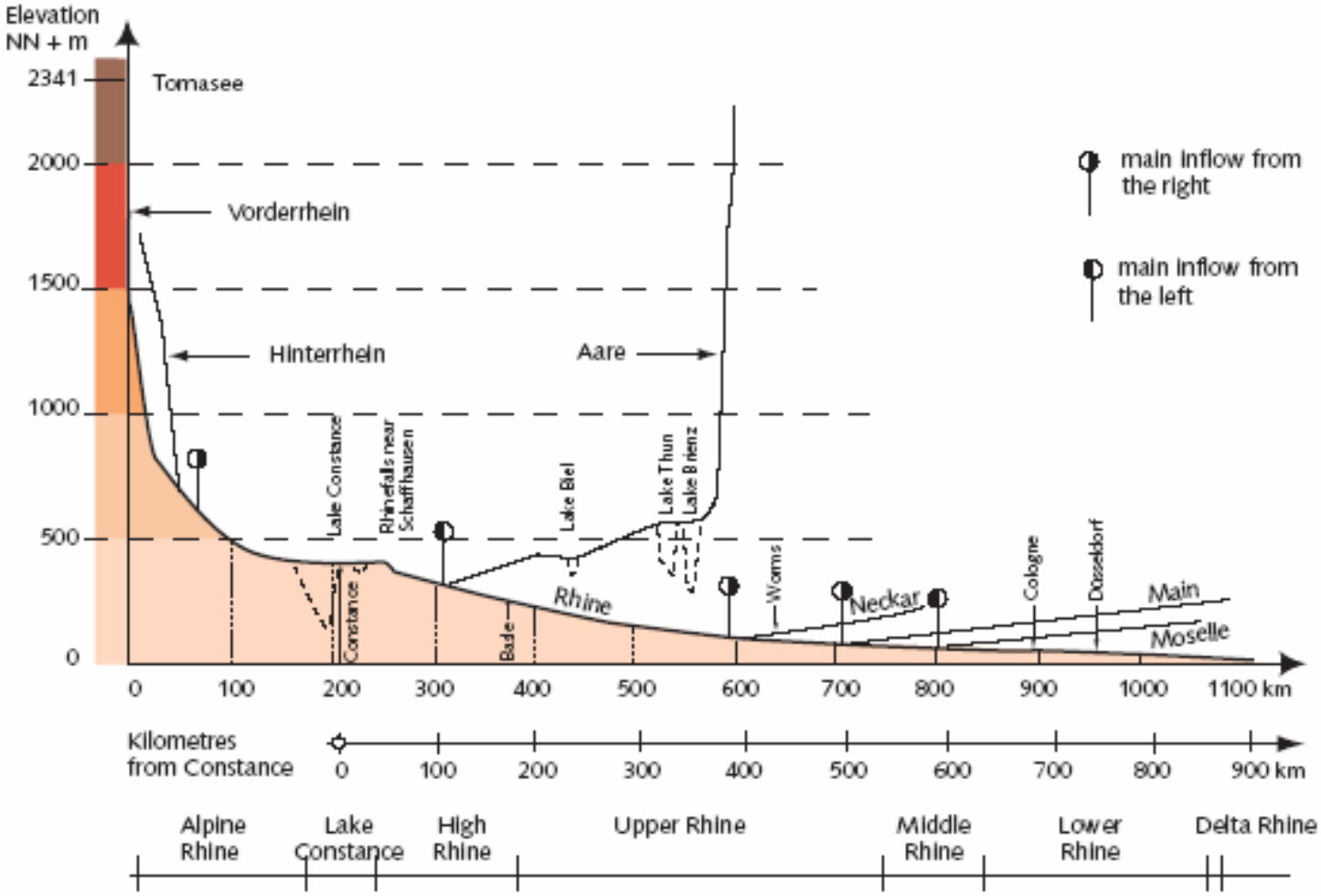


Source in the Alps at more than 2500 m above sea level;

Rhine Delta in NL at sea level.

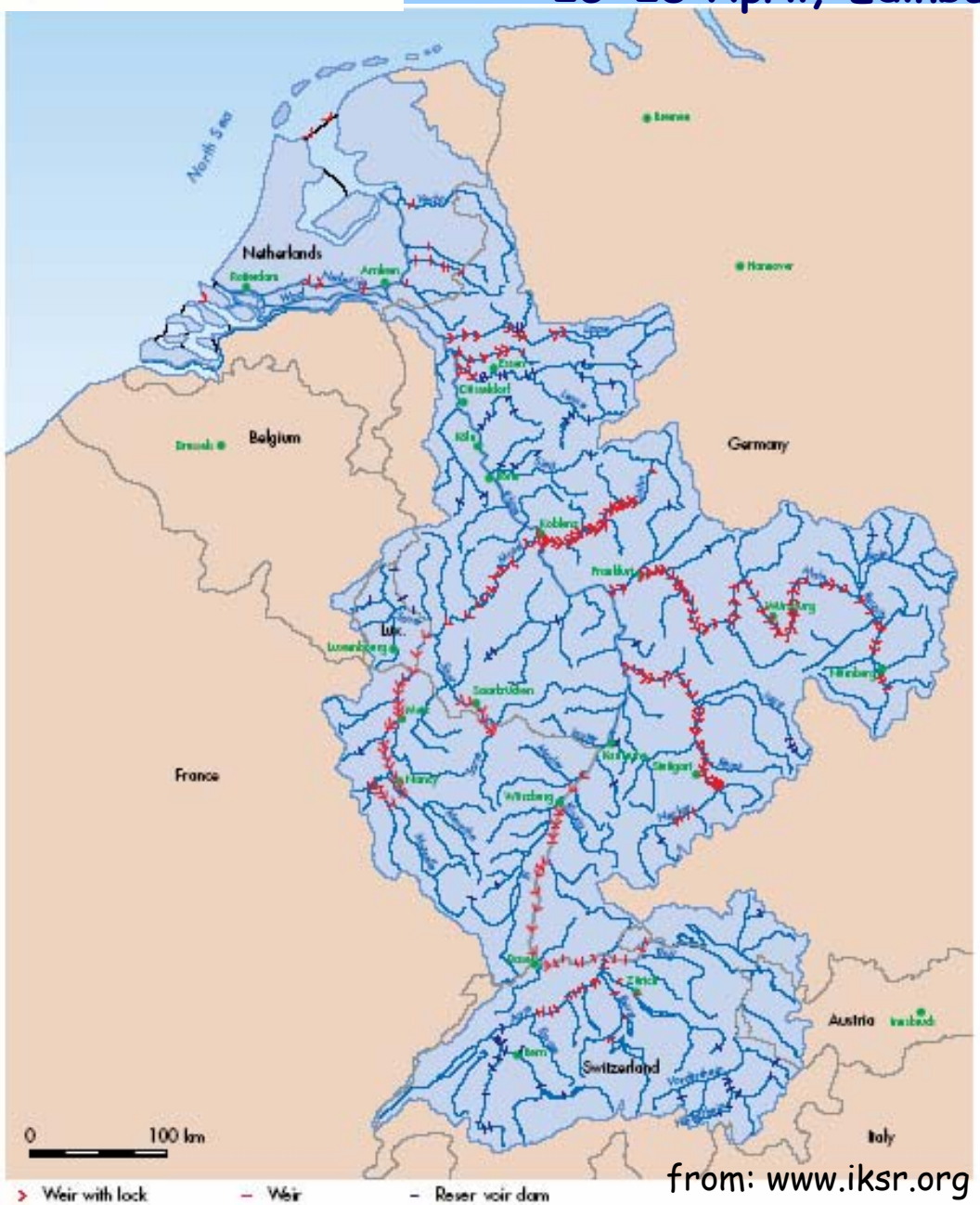
Stream length: 1320 km;
Surface: ca. 200,000 square km;
Inhabitants: 58 million

The River Rhine basin – cross section



- Upstream fed by glaciers (2% of total)
- Downstream fed by precipitation
- Discharge pattern through the year relatively even
- High discharge in winter and early summer months

Average discharge	338m^3/s	1260m^3/s	2270m^3/s

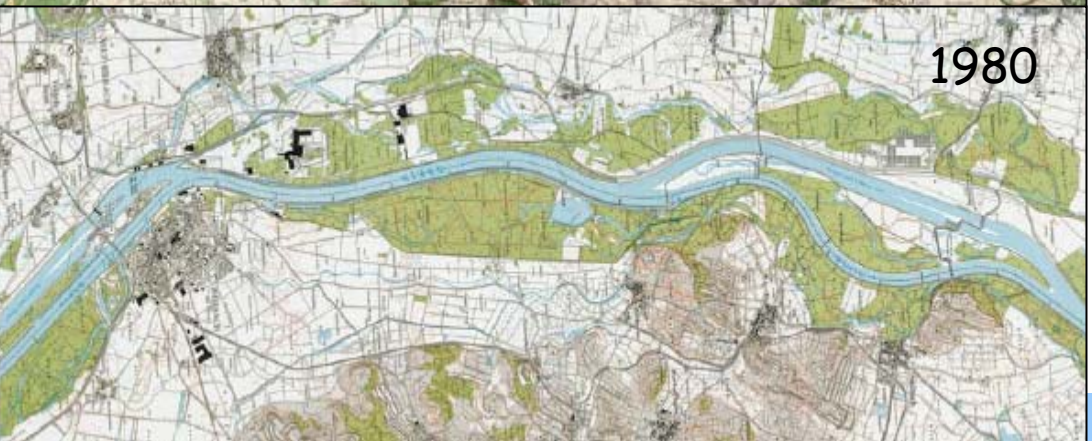


from: www.iksr.org

The River Rhine basin – 450 dams

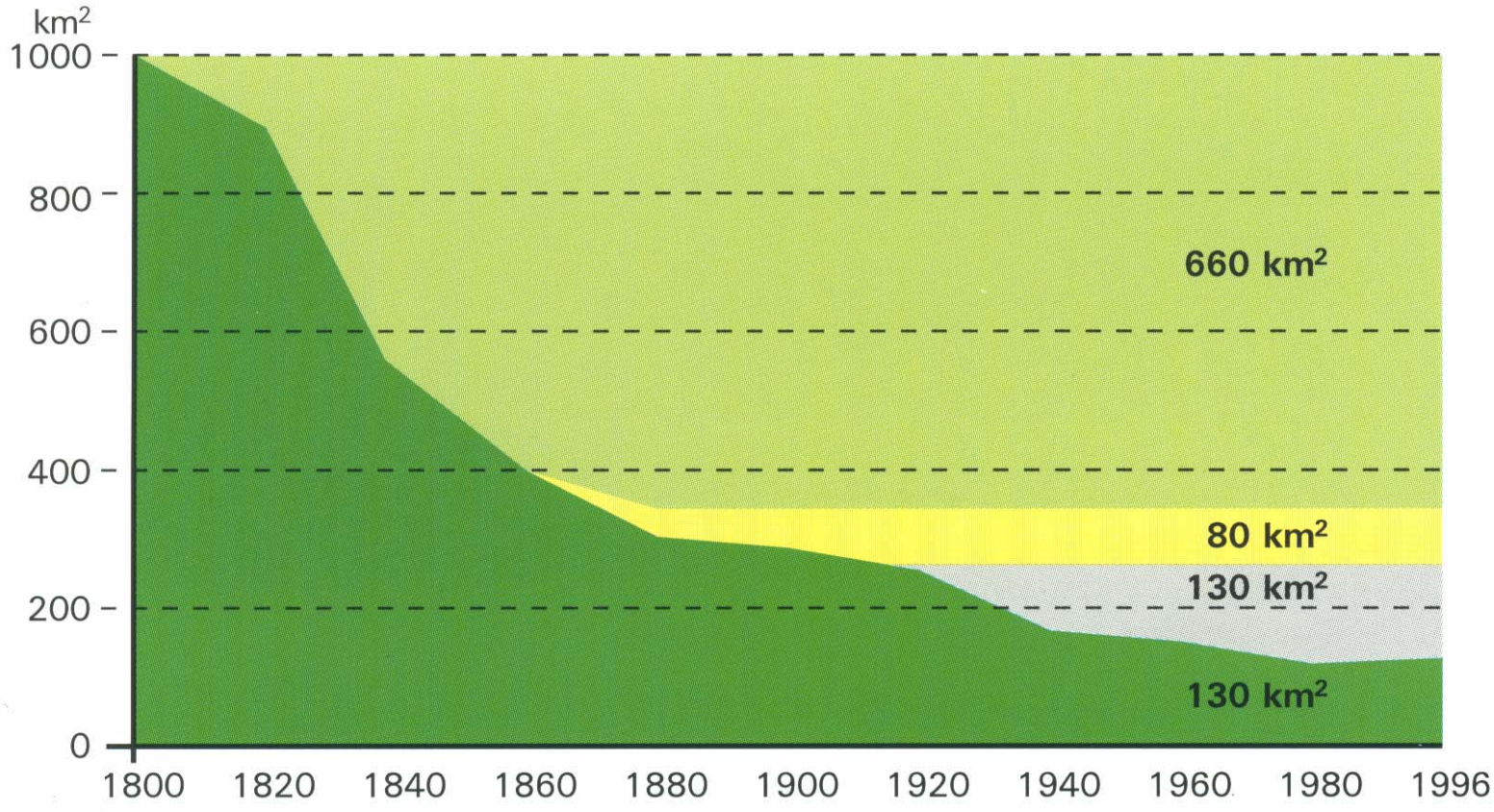
- weir with lock
- weir
- reservoir dam

The River Rhine basin – landscape change



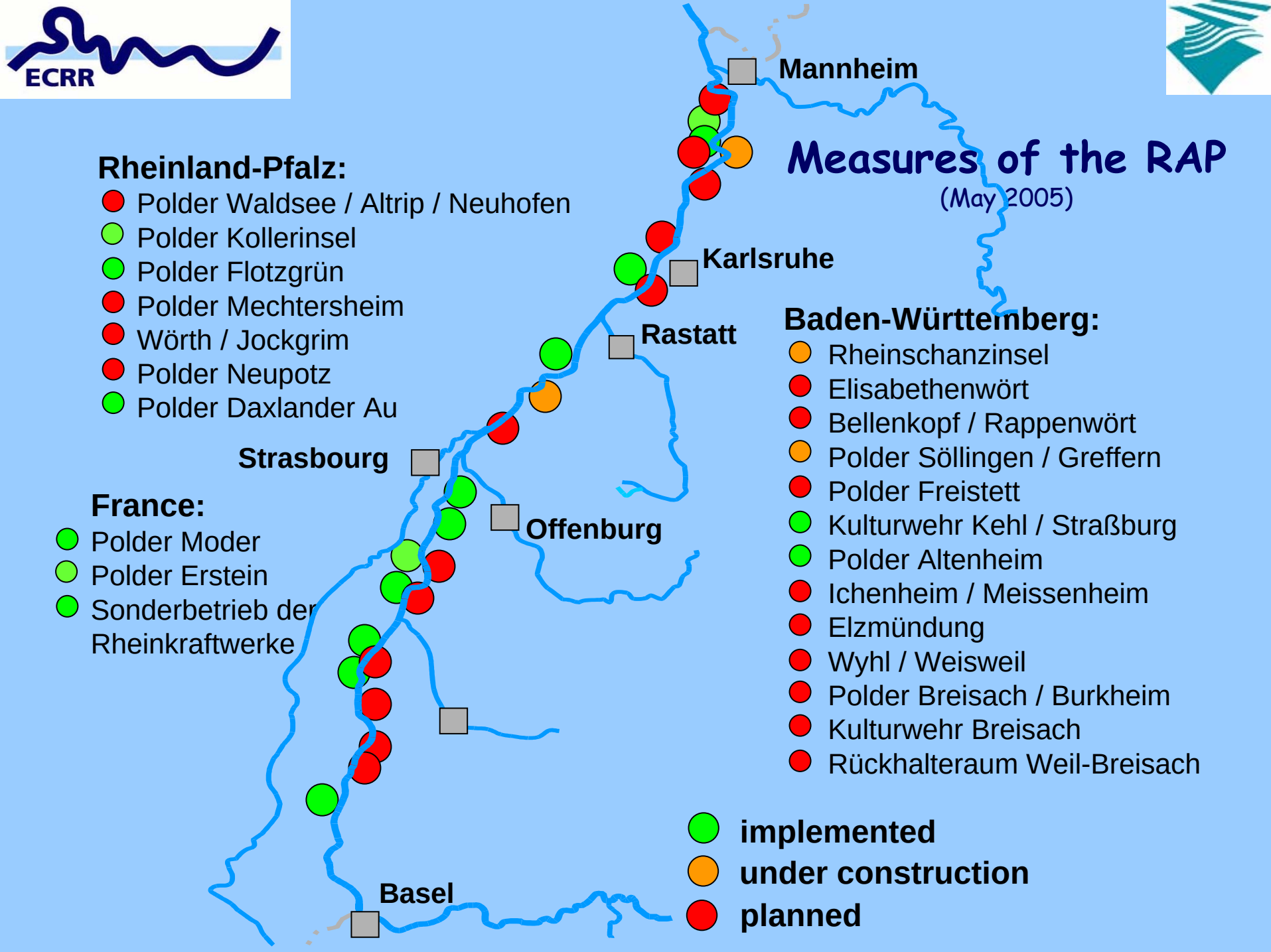
from: www.iksr.org

Loss of retention areas in the Upper Rhine area



Measures of the RAP

(May 2005)



Rheinland-Pfalz:

- Polder Waldsee / Altrip / Neuhofen
- Polder Kollerinsel
- Polder Flotzgrün
- Polder Mechtersheim
- Wörth / Jockgrim
- Polder Neupotz
- Polder Daxlander Au

France:

- Polder Moder
- Polder Erstein
- Sonderbetrieb der Rheinkraftwerke

Baden-Württemberg:

- Rheinschanzinsel
- Elisabethenwört
- Bellenkopf / Rappenwört
- Polder Söllingen / Greffern
- Polder Freistett
- Kulturwehr Kehl / Straßburg
- Polder Altenheim
- Ichenheim / Meissenheim
- Elzmündung
- Wyhl / Weisweil
- Polder Breisach / Burkheim
- Kulturwehr Breisach
- Rückhalteraum Weil-Breisach

- **implemented**
- **under construction**
- **planned**

Flood protection measures-midstream

The Netherlands

Emmerich
Kleve
Bylerward 720ha/30Mil m³
Lohrwardt 500ha/20Mil m³
Wesel
Bislicher Insel 1100ha/50Mil m³
Orsoy-Land 220ha/10Mil m³
Duisburg
Krefeld
Mündelheim 150ha/5Mil m³
Ilvericher Bruch 600ha/25Mil m³
Neuss
Düsseldorf
Itter-Himmelgeist 60ha/2Mil m³
Monheim 200ha/8Mil m³
Worringer Bruch 600ha/13Mil m³
Leverkusen
Köln
Köln-Langel 500ha/10Mil m³
Niederkassel 35ha/1Mil m³
Bonn
Königswinter

Dike
Dike to be reconstructed
Retention area

Germany

ECRR

RRC Annual Conference,

25-28 April, Edinburgh (Scotland)

Netherlands above average sea level

Part of the Netherlands subject to flooding by dike failure

Flooded part of The Netherlands when dike breach occurs

Policy development

- 1987: NGO's Black Stork
- 1992: WWF "Living rivers"
- 1993: Target to restore 7000 ha is set in The Netherlands
- 1993 +1995: Flood events in Rhine and Meuse

---> Political attention for rivers & floodplains

  - "Room for the rivers"
  - Raising dykes only as a last option

- after 2000: EU Directives; Dutch SP key decision, watermgt 21rst century

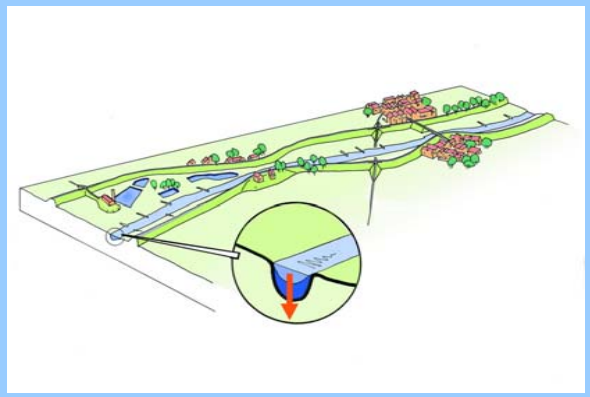
Basic package of preferred alternatives
-Spatial Planning key decision-

- First implementation steps up till 2015
- No retention
- In 2015 reconsideration of river discharges and sea level rise due to climate change
- Landscape, nature and cultural heritage limit measures in present floodplains
- Optimal use of potential win-win situations (ppp)
- Anticipating to physical planning on the long term
- Long term visions still optional
- Contributing to Natura 2000

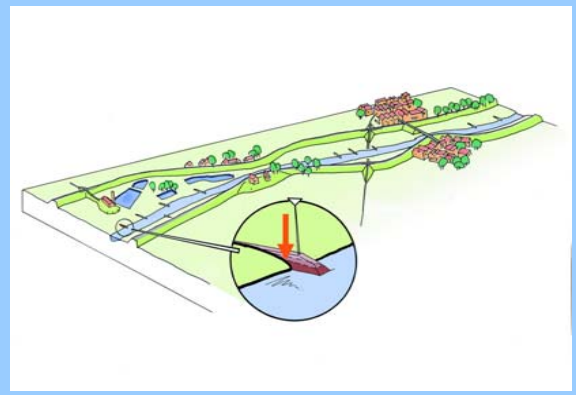
Basic package-Spatial Planning key decision-

- 9 floodplain reconstructions
- 3 obstruction removals
- 6 outside winter dike projects
- 1 green river (by-pass)
- 2 wetland development projects
- Accepted higher water levels in the delta area
- 22 km (summer) riverbed deepening
- 47 km dike elevation
- 84 km dike reinforcement
- 77 km lowering of groynes

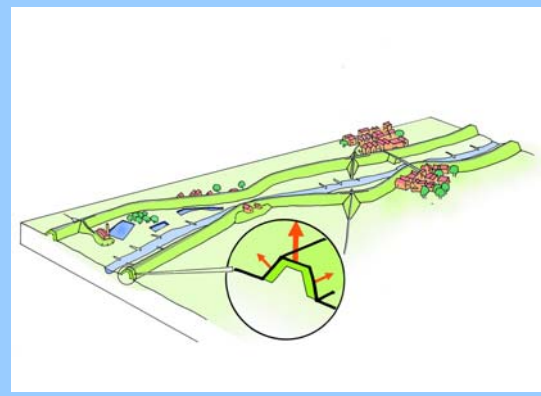
Basic package Spatial Planning key decision – examples of measures (between winter dikes)



Deepening summer bed

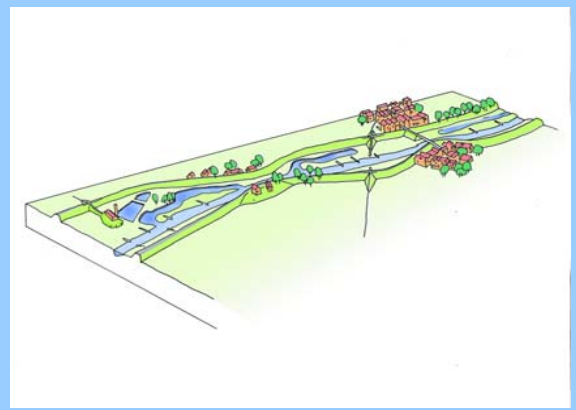


Groyne improvement



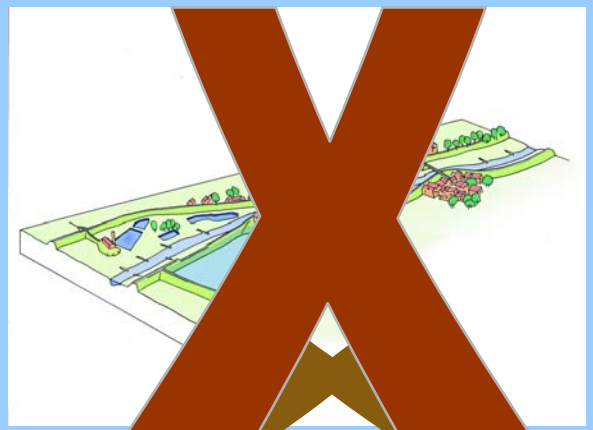
Rising dikes (if no other option exists)

Lowering of floodplains



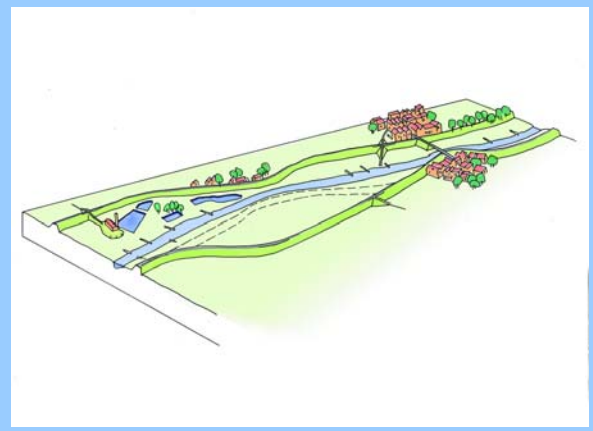
Remove hydraulic obstacles

Basic package Spatial Planning key decision – examples of measures (outside winter dikes)



Retention areas

Green river/bypass



Dike relocation

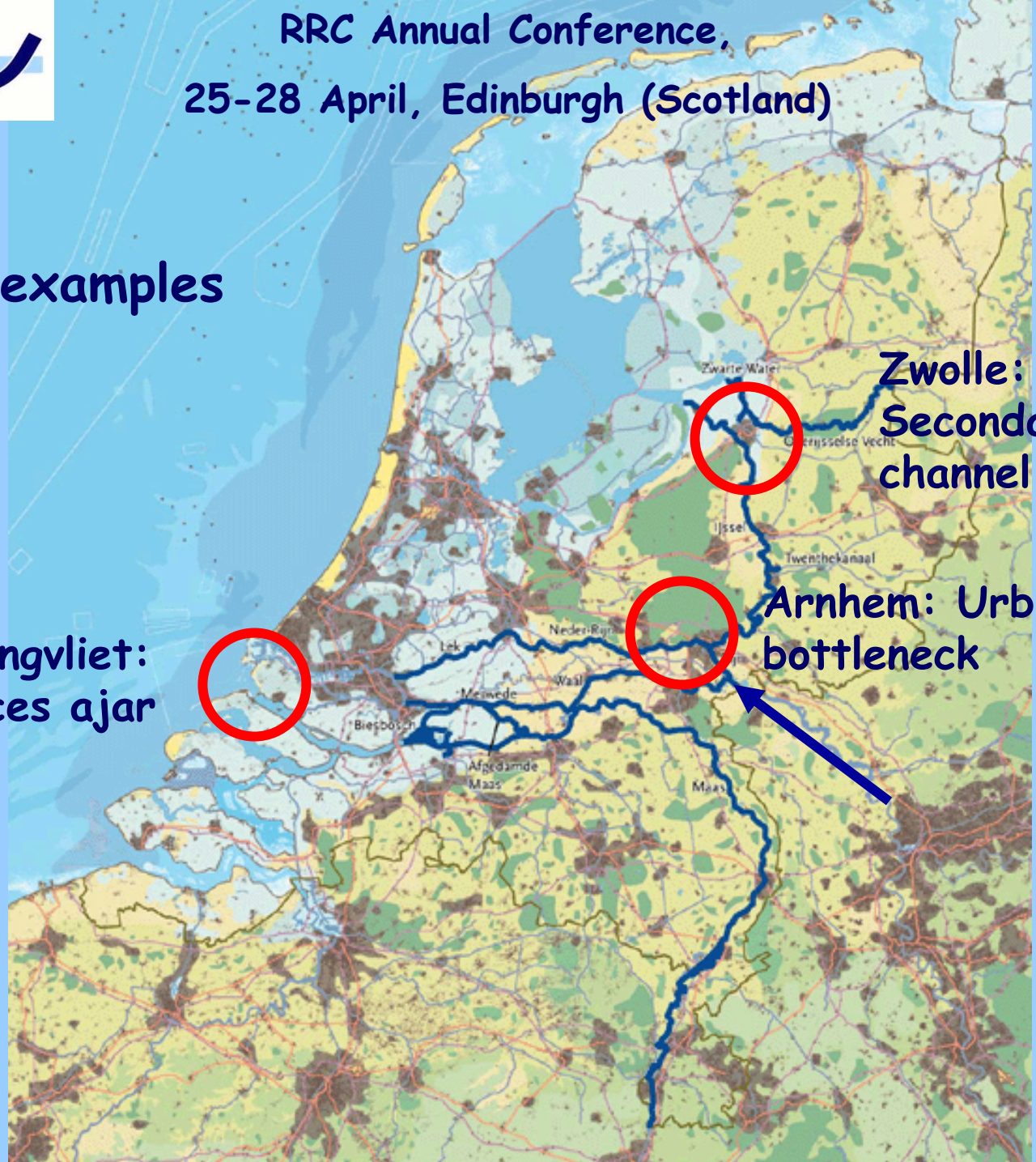
Basic package Spatial Planning key decision – results

- Extension of 1,800 ha natural habitats
- 25 million m^3 soil removal
- 10 million m^3 mining of sand and clay suitable for construction
- 9 million m^3 new water storage capacity

RRC Annual Conference,

25-28 April, Edinburgh (Scotland)

3 Dutch examples



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The "metamorphosis" of the Vreugderijkerwaard floodplain

2000

2002

2004

Objectives to implement a secondary channel

- Conservation of river dune
- Development of low-lying wet meadows, more dynamics along the sec. Channel
- Spawning habitat for fish; feeding area for water birds
- Recreational use
- Flood peak reduction

➢ No monitoring results yet, but good experiences from similar projects

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More impressions of the Vreugderijkerwaard floodplain

Making "Room for the River" in The Netherlands

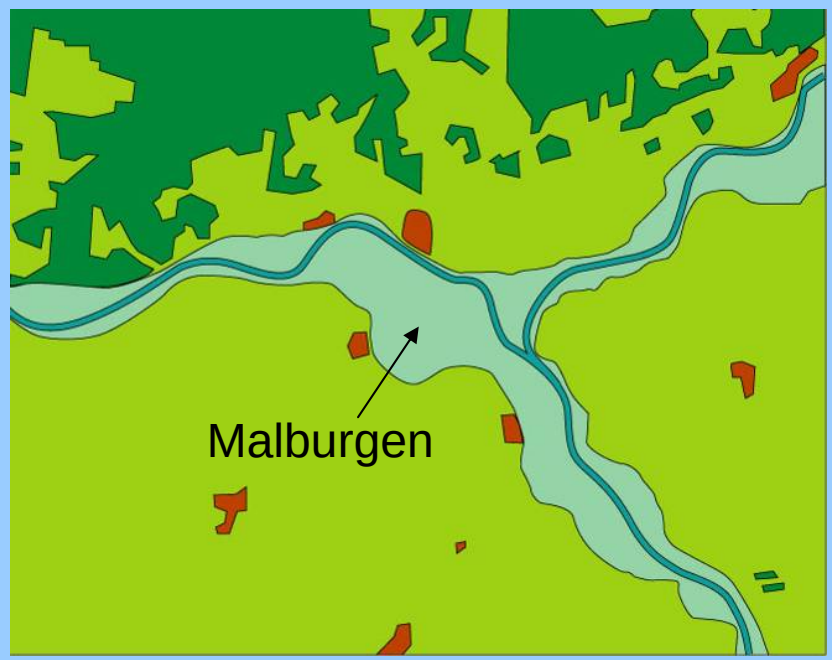
Urban bottlenecks

Arnhem

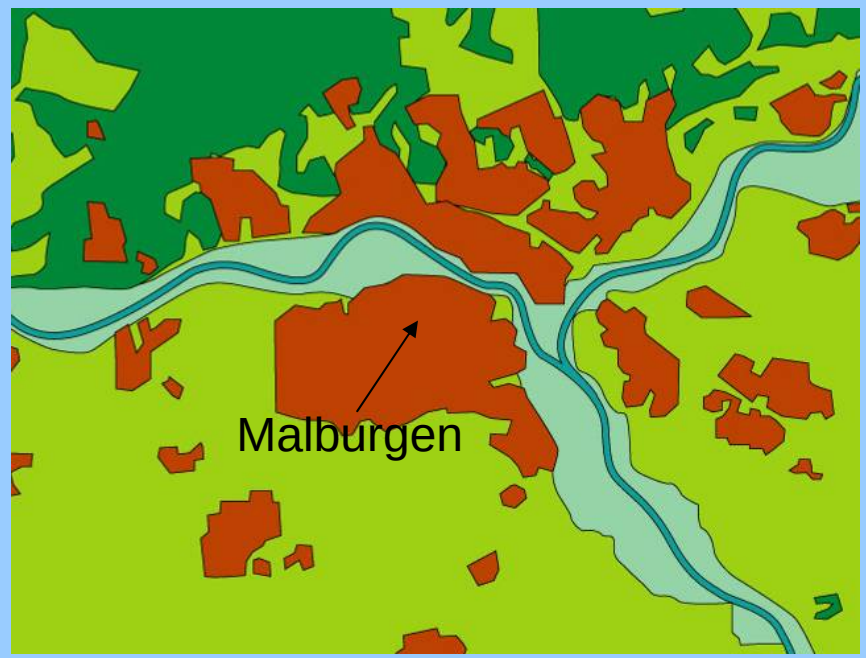
Nijmegen

Satellite image 1995

Urban Development Arnhem 1830-2000



1830



2000


Dike set back of
Bakenhof (near Arnhem)
Costs: 7.7 mill. Euro
AERO FOTO BROUWER BRUMMEN
C2902-1
27.08.2001

More impressions of the Bakenhof

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Haringvliet sluices - ajar

Costs: max. 35 mill. Euro

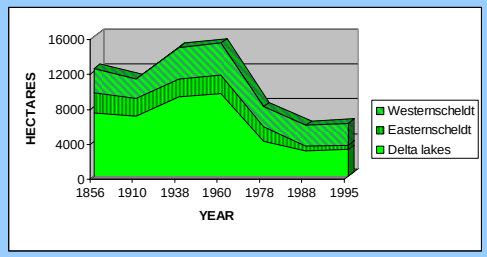
Maeslant storm surge ba
1997

Haringvliet sluices
1970

Grevelingen dam
1971

Oosterschelde storm surge barrier
1985

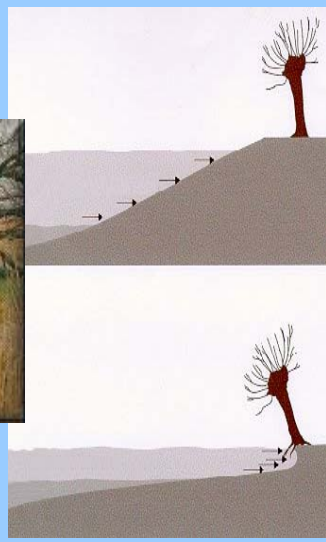
Effects "Delta works" on the former estuarine environment



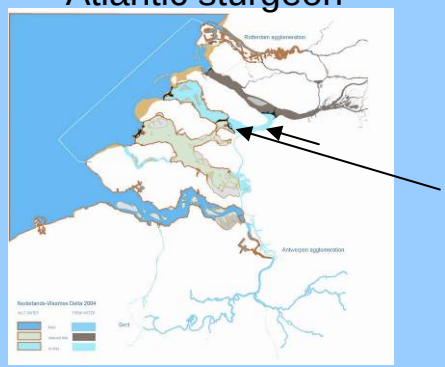
Decline of mud areas

Atlantic sturgeon

Blocking of migration routes fish

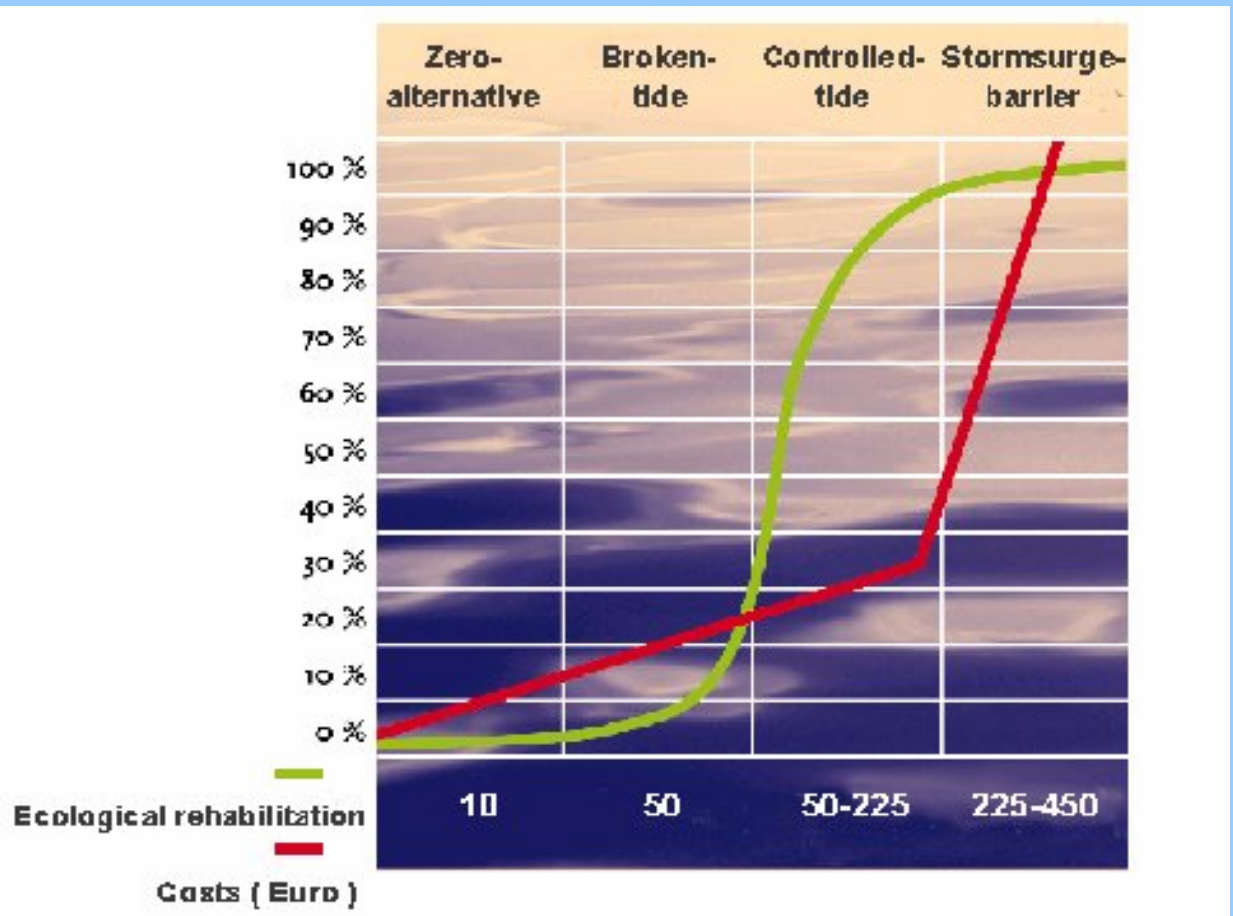


Bank erosion



Eutrophication and algal bloom in Krammer-Volkerak (Bergen op Zoom)

Haringvliet sluices - ajar



- **benefits :**

sustainable estuarine biotopes (already on short term)

savings on dredging (long term only)

- **compensation measures:**

relocation of intakes for drinking and agricultural water

dredging to ensure access to harbours

Conclusions (1)

- River system approach to find most suitable areas for flood protection measures
- Besides safety and nature, landscape quality plays a prominent role
- Plans are becoming (more) multi-functional and public participation is normal business

Conclusions (2)

- More parts of the planning cycle are covered in projects (past: maintenance and design; now: development of visions, policy development, planning, evaluation, realisation)
- Knowledge exchange within North-West Europe through EU-projects

(e.g. www.science.ru.nl/pub/faf; www.sdfproject.nl)

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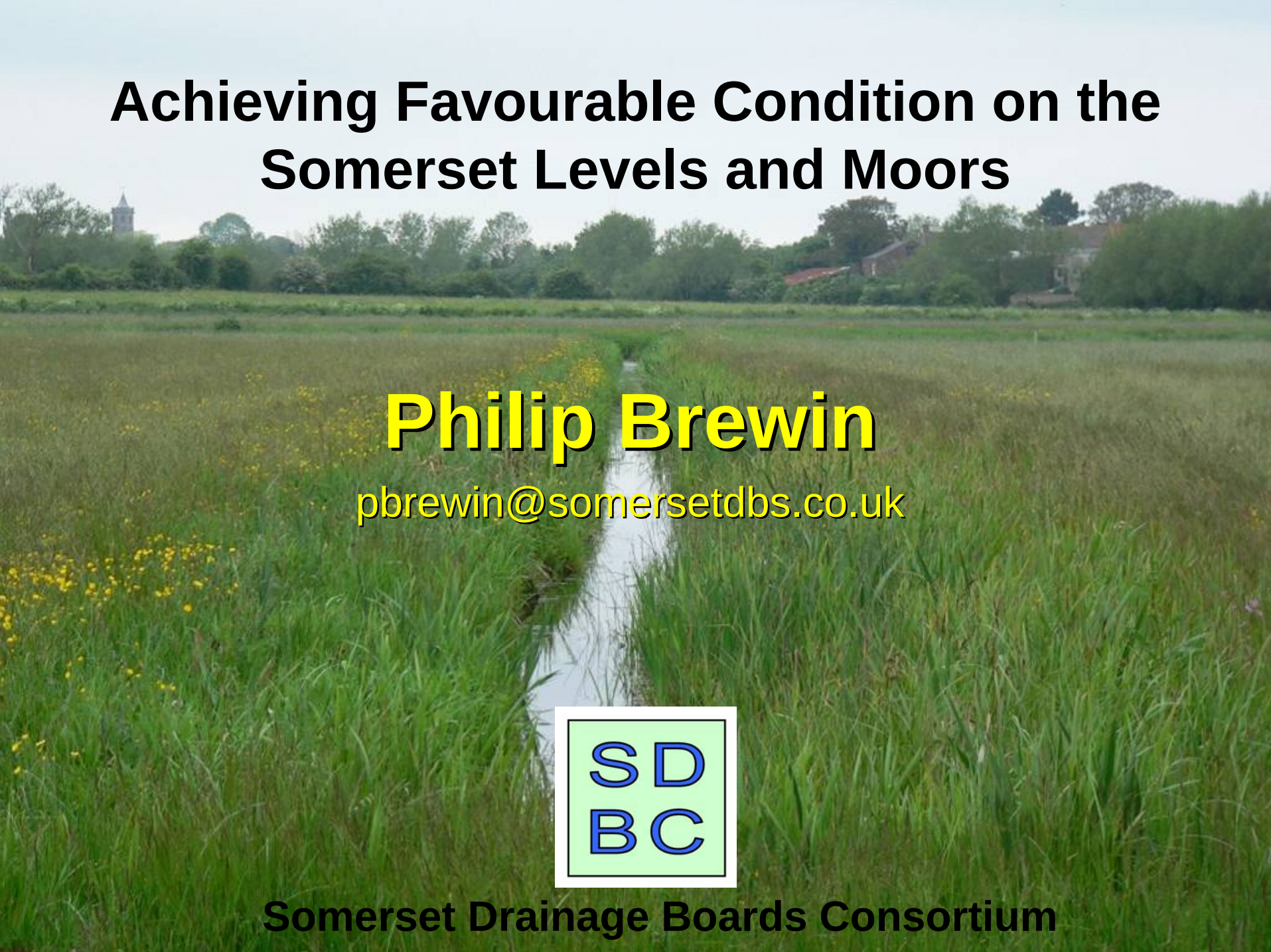
Thank you for your attention.

Achieving Favourable Condition on the Somerset Levels and Moors



Philip Brewin

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SDBC

Somerset Drainage Boards Consortium

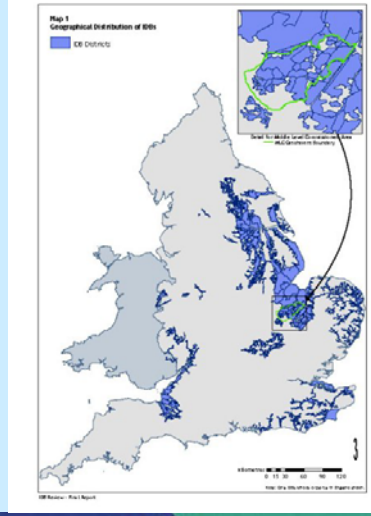
Introduction

- Internal Drainage Boards (IDBs) in Somerset
- Water level management and Favourable Condition
- Issues and opportunities for wet grassland management in Somerset

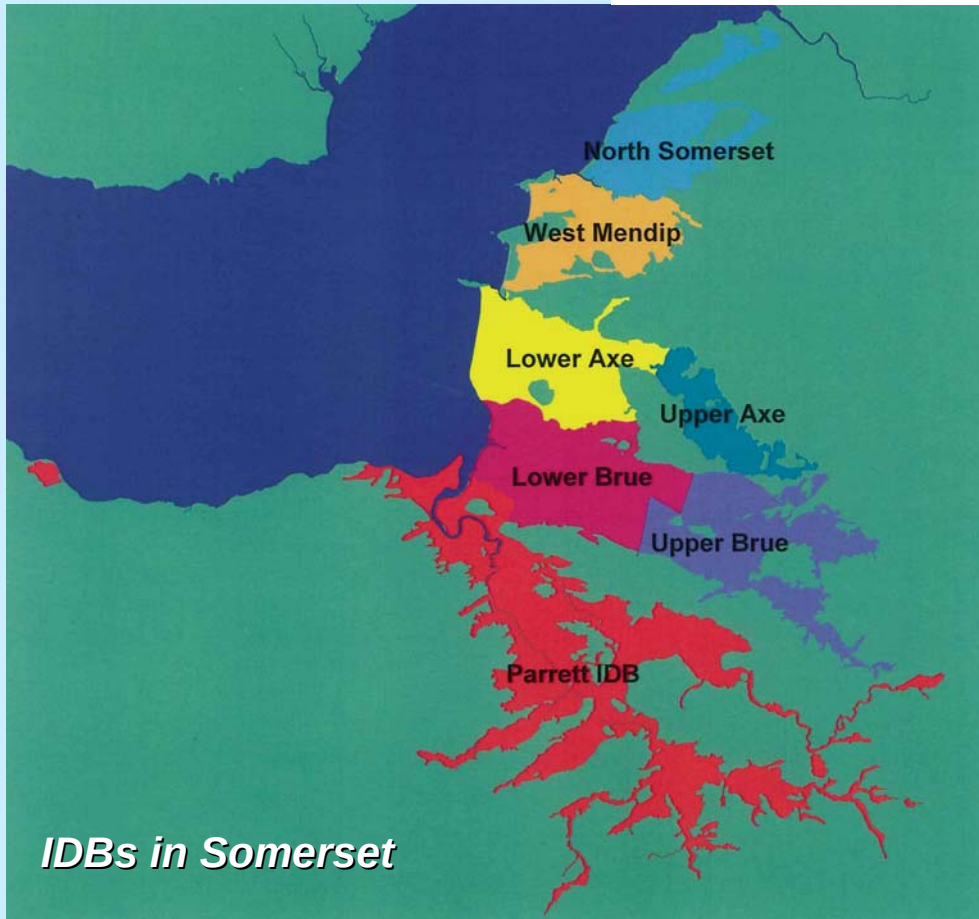

Southlake Moor


Southlake Moor

Water Level Management on the Somerset Levels and Moors

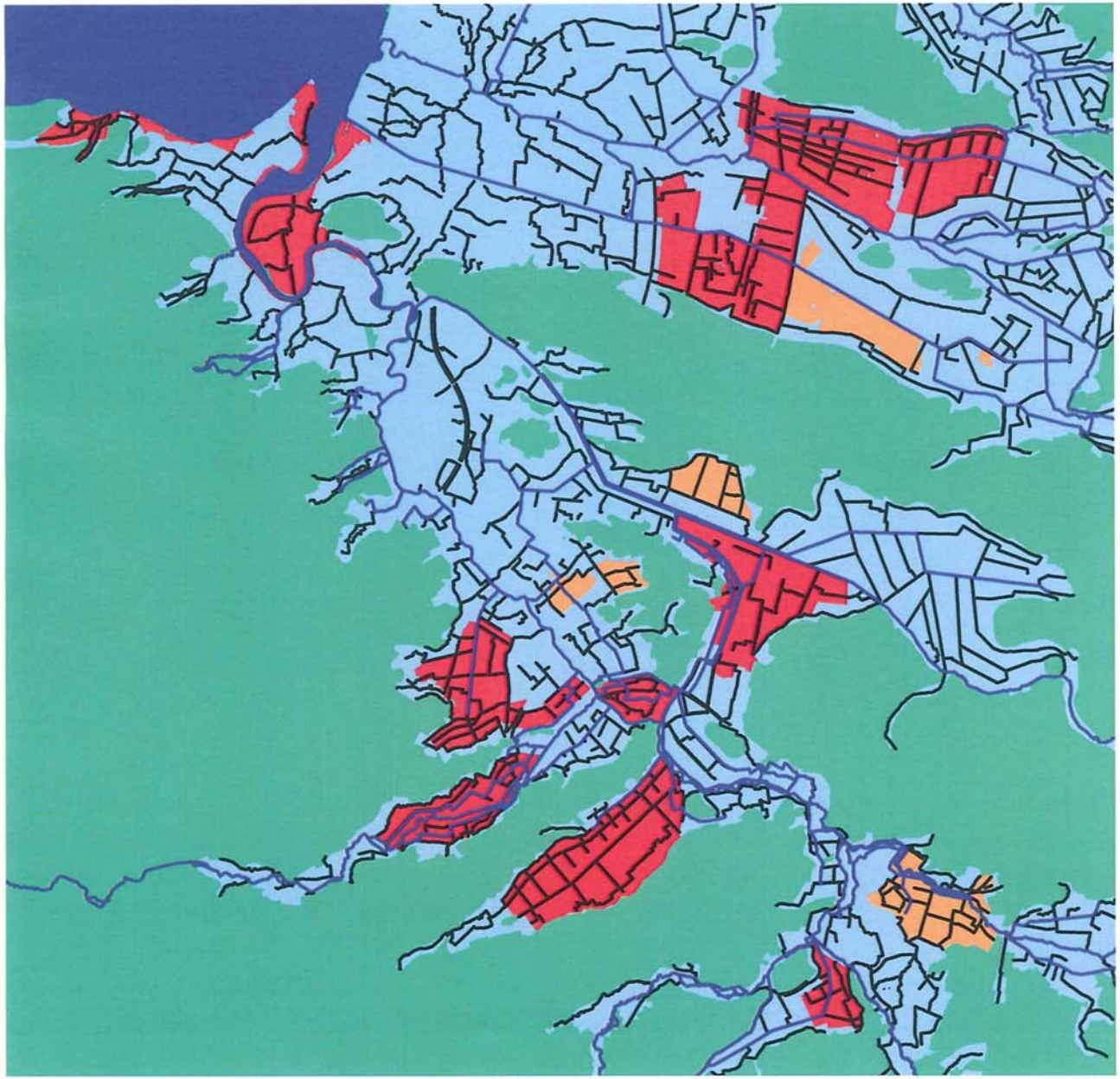


- IDBs manage water levels in floodplain areas and have duties to conservation and wetland management
- **Water Level Management Plans** provide framework for achieving farming, flood management and conservation objectives – including favourable condition



IDBs in Somerset

Water Level Management on the Somerset Levels and Moors



Somerset IDB Districts

Priority SSSI (WLMP)

Non-priority SSSI (WLMP)

Main River
(EA)

Viewed Rhynes
(IDB)

Somerset Levels and Moors
(South of the Mendip Hills)

IDB Districts	= 55,000 ha
Main River	= 492 km
IDB Viewed Rhynes	= 1,178 km
Wetland SSSI	= 8,000 ha
Priority Wetland SSSI	= 6,680 ha

Somerset Levels and Moors

The largest remaining area of lowland wet grassland in the UK

The Levels and Moors include:

- 23 SSSIs
- 2 SPA and Ramsar sites

- 60,000 ha of potential habitat
- 8,000 ha in protected areas

National wet grassland resource:

Historical – 1,200,000 ha

Remaining – 220,000 ha

High conservation value – 20,000 ha

Somerset Levels and Moors

Important for:

- Species rich grasslands
- Aquatic plants and insects
- Breeding birds
- Wintering ducks and waders
- Otters, water voles and other wetland species

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Somerset Levels and Moors

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Wetland archaeology on the peat moors

Somerset has more waterlogged prehistoric Scheduled Monuments than the whole of the rest of England

At risk from peat wastage (oxidation):

- 50 cm per 100 years under pasture
- 1 to 2 cm per year under arable

Favourable Condition

- **Special habitats and features of a SSSI are in a healthy state and are being conserved for the future by appropriate management**

Government Target

- 95% of all SSSIs in favourable or unfavourable recovering condition by the year 2010

- Currently less than 50% of the 8,000 ha of wetland SSSI in Somerset is achieving this target

Water level management and Favourable Condition

Water level management should:

- Support summer grazing and farming activities
- Maintain soil wetness
- Prevent low water levels in winter
- Provide suitable habitat wintering and breeding wetland birds
- Manage ditches sensitively to retain habitat features and diversity
- Promote good water quality
- Control invasive plants

Aller Moor

West Sedgemoor

Water level management and Favourable Condition

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Low winter water levels

Moorlinch

Curry Moor

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- Control invasive plants

Sensitive ditch maintenance

West Sedgemoor

Huntspill Level

Working in Partnership

IDBs are working in partnership with:

- English Nature
- Defra (Rural Development Service)
- Environment Agency
- Landowners/managers
- Local communities
- Conservation organisations

…to develop integrated whole moor management systems

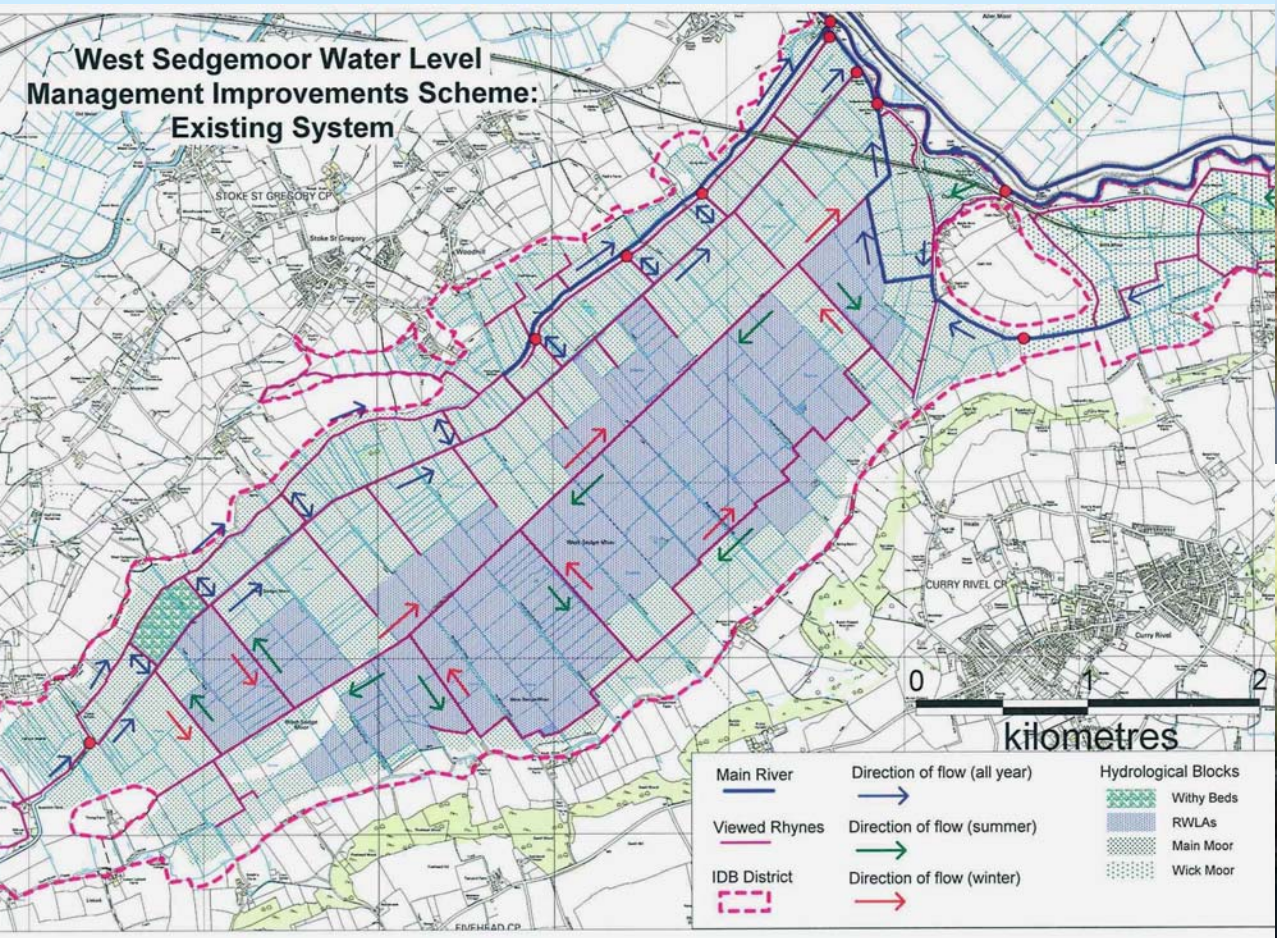
Aims:

- Work with existing **topography**, **hydrology** and **ecology**
- Operate at appropriate **scales**
- Promote floodplain (ecosystem) **functions** and **services**

Integrated whole moor management systems

Learn from the management of Raised Water Level Areas (ESA Tier 3)

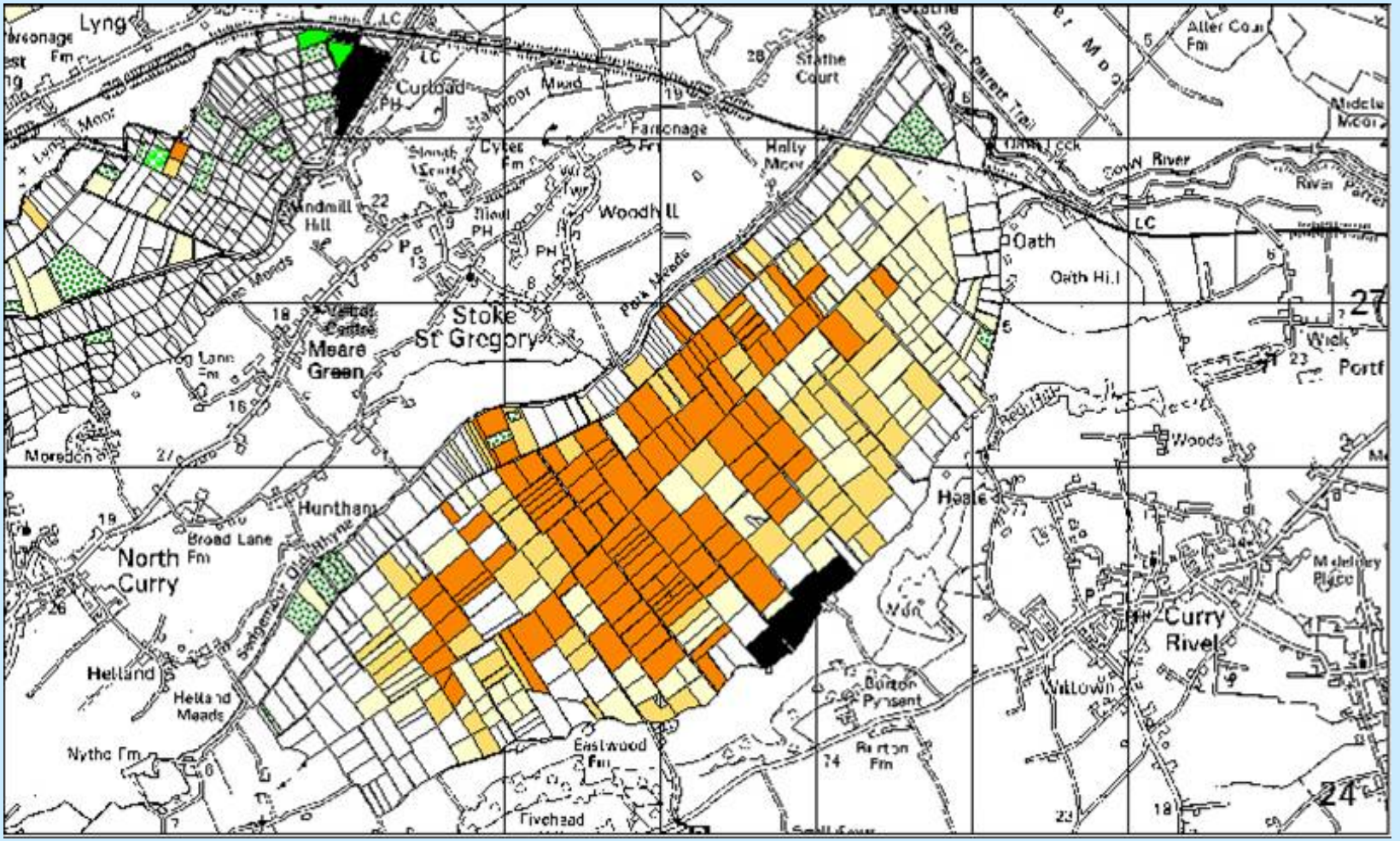
(1,750 ha currently in RWLA schemes)



Integrated whole moor management systems

Existing Ecology - Species rich fields on West Sedgemoor

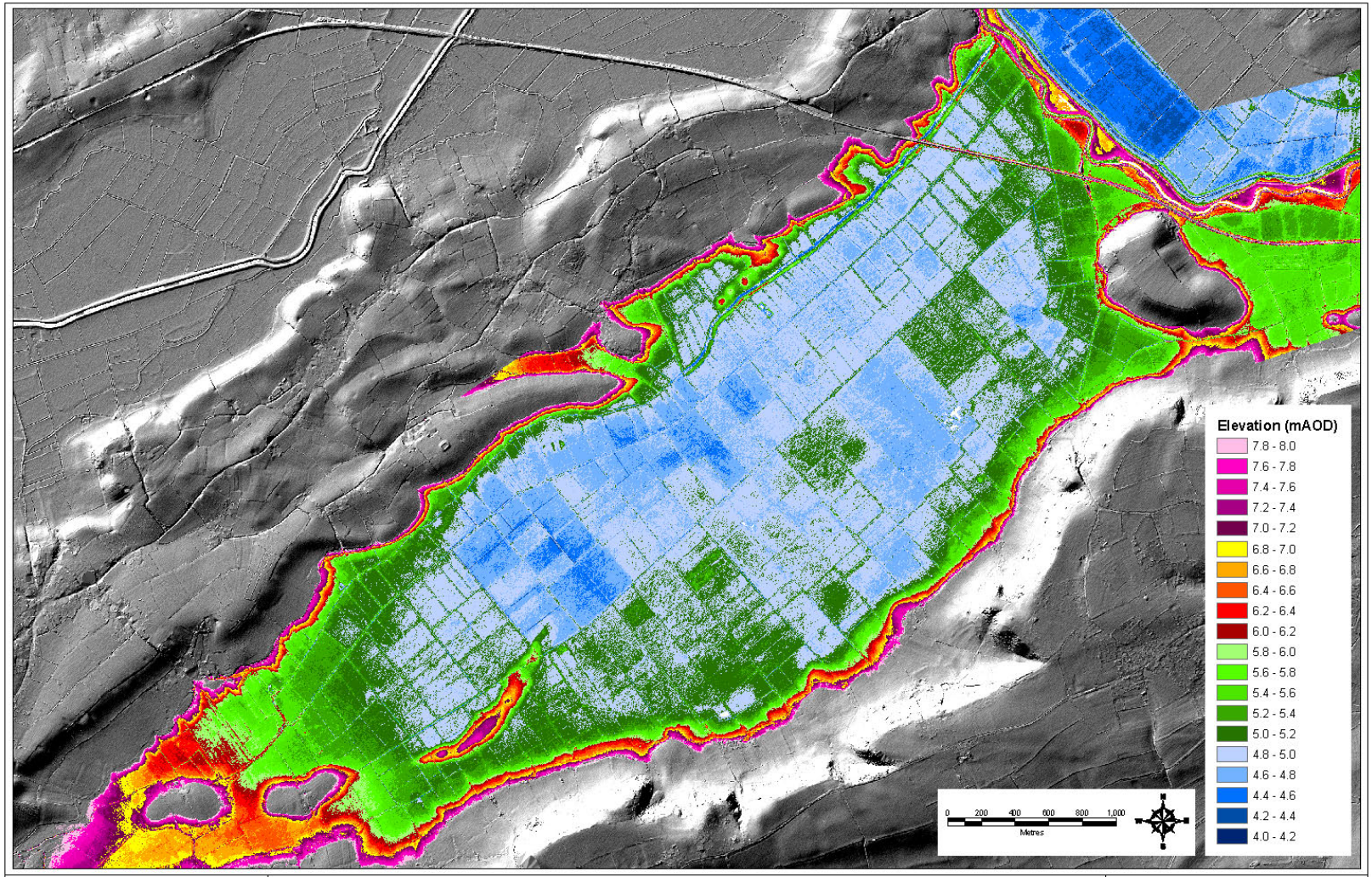
Used to define land and water level management objectives



Integrated whole moor management systems

Existing topography – land levels on West Sedgemoor

Used to define land and water level management objectives



Integrated whole moor management systems

High Level Stewardship (HLS) options

key HLS options for Somerset Levels and Moors –

Wet grassland for wintering waders & wildfowl

- HK10 & 12 - Maintenance or restoration of wet grassland for wintering waders & wildfowl £255/ha

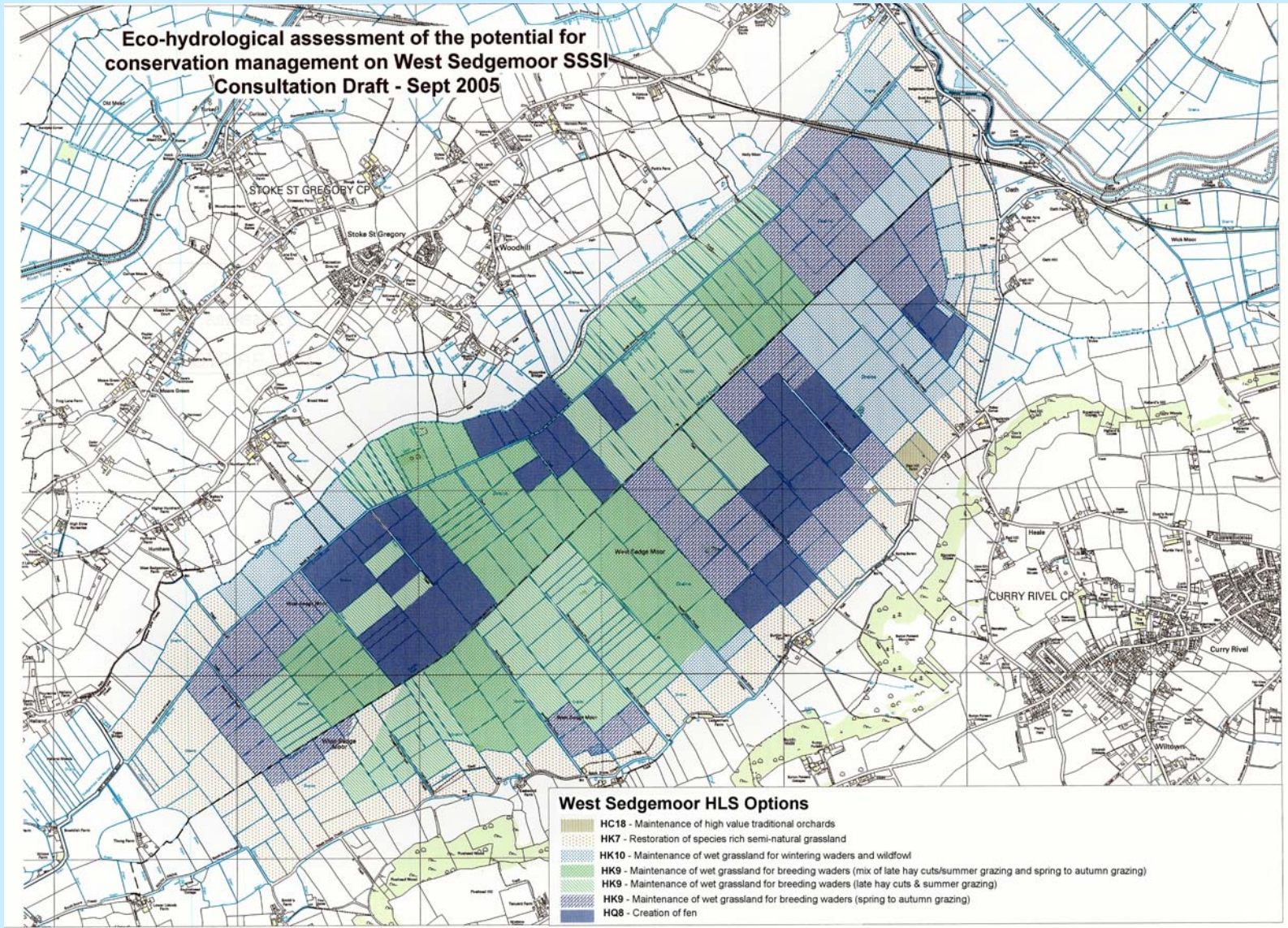
Wet grassland for breeding waders

- HK9 & 11 Maintenance or restoration of wet grassland for breeding waders £335/ha

Plus HLS supplements

- *HK19 Raised water level supplement - £80/ha*
- *HQ13 Inundation grassland supplement - £85/ha*
- *HK18 Supplement for hay making - £75/ha*
- *HR6 Supplement for small fields - £35/ha*
- *HR7 Supplement for difficult sites - £50/ha*
- *HR8 Supplement for group applications - £10/ha*

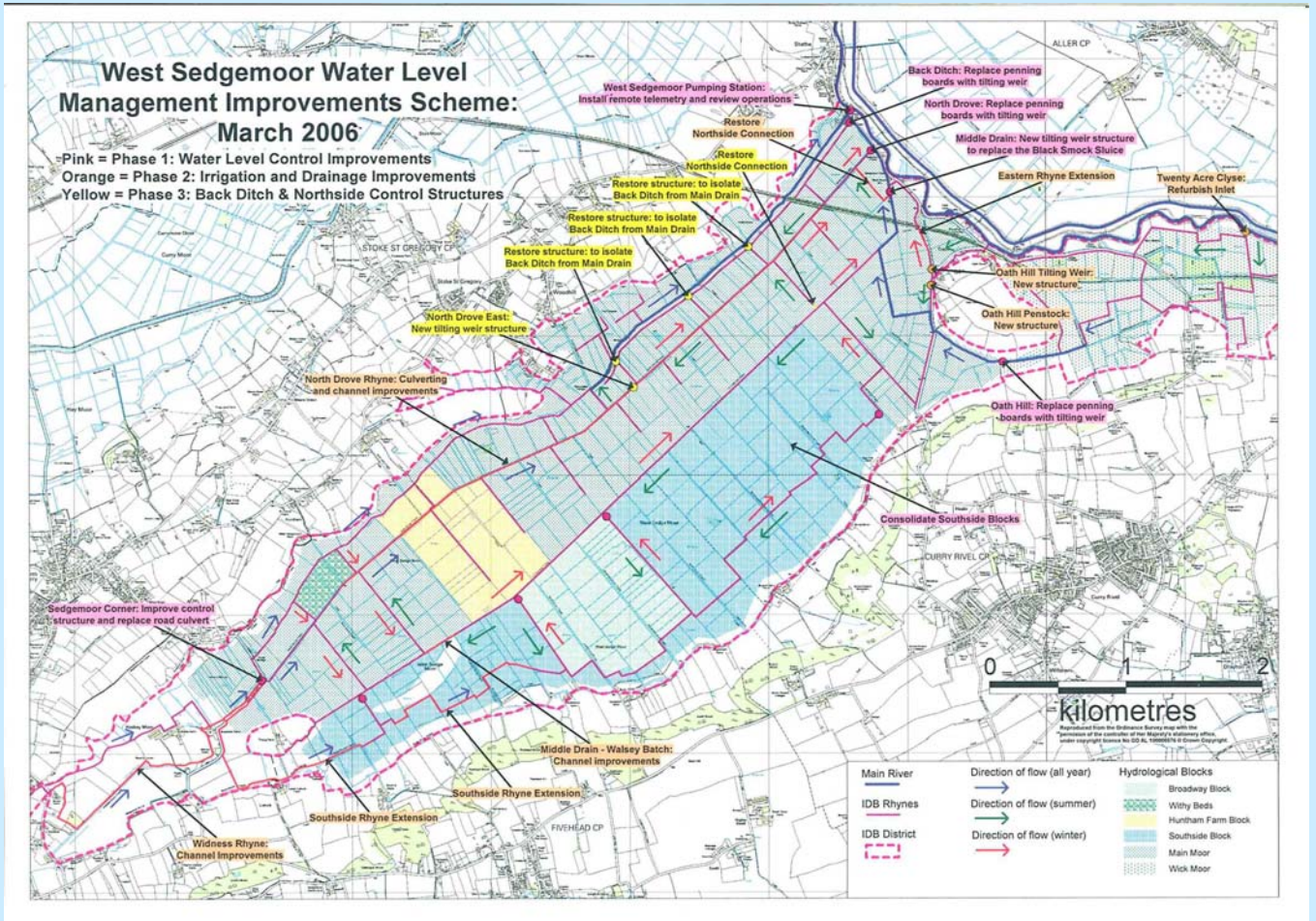
Target High Level Stewardship (HLS) options to support objectives



Identify Capital Improvements Schemes

(*e.g. West Sedgemoor Scheme*)

- Minimise water control structures, bunds and hydrological blocks
- Restore connectivity in ditch system
- Move floodwater away from houses and roads

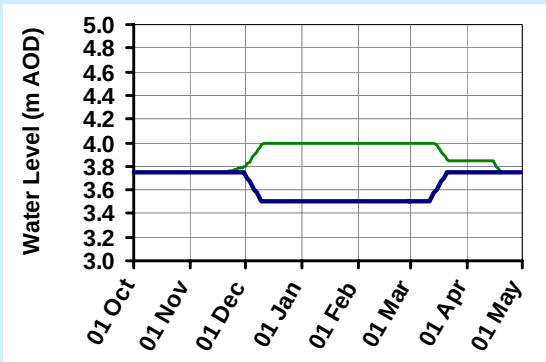


Integrated whole moor management systems

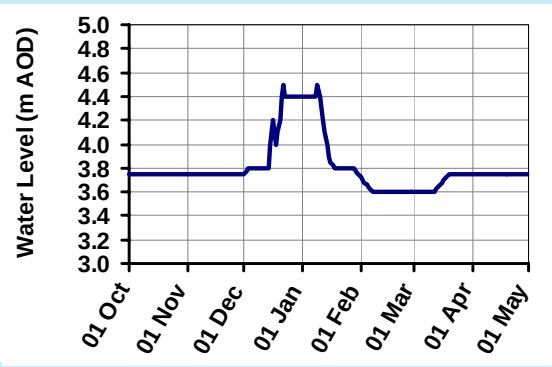
Restore floodplain connectivity

(*e.g. Southlake Warping Scheme*)

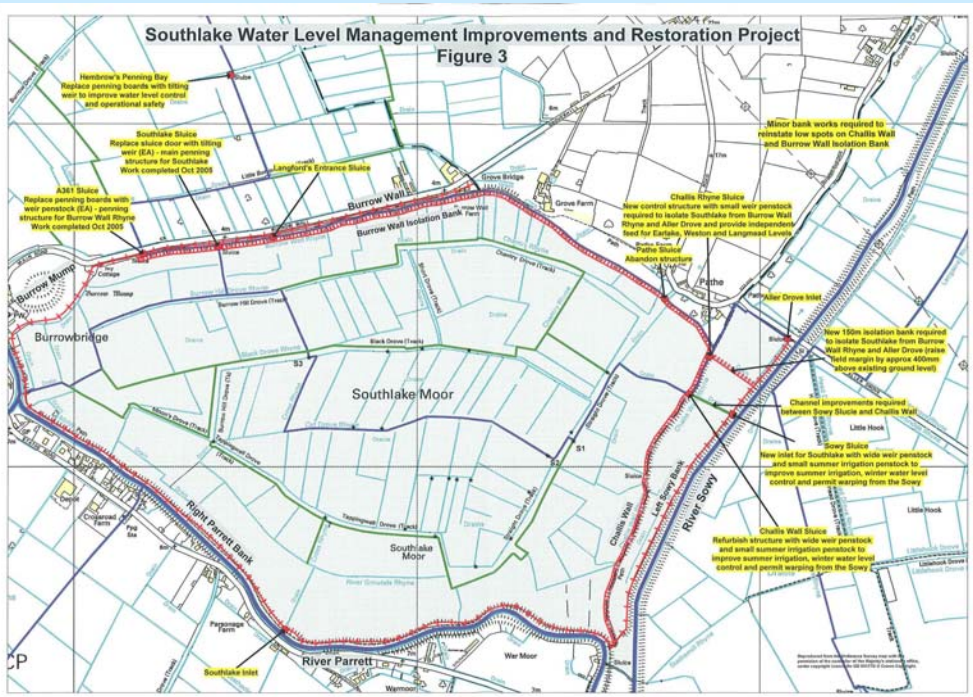
New tilting weir structure with wide operating range



Existing RWLA



Proposed Warping



Integrated whole moor management systems

Agreed Water Level Management Plan

Southlake Project
Water Level Management Improvements and Restoration Scheme
Somerset Levels & Moors Multi Agency Project

Parrett IDB Southlake Project

A review of existing water level management practices on Southlake Moor has identified the capital improvements and operational changes necessary to support Higher Level Stewardship agreements across the moor and to achieve favourable condition for the SSSI. The proposed water level management scheme for Southlake will provide modern effective control structures that will enhance water level control and improve operational and public safety. The scheme will also provide a flexible management system that allows management practices to be reviewed and adapted in response to changing conditions and requirements.

The Southlake Project is part of a wider Somerset Levels and Moors initiative to develop sustainable and integrated systems for land and water level management for conservation, farming and local communities. This approach reflects the essential role that land and water level management practices play in maintaining the conservation and landscape interests of the internationally important wet grassland habitats on the Somerset Levels and Moors.

Site Description

Southlake Moor comprises 196 ha of lowland wet grassland located in the heart of the Parrett floodplain. The moor is enclosed by 12th century medieval flood embankments (including Burrow Wall and Challis Wall) and is designated as a Site of Special Scientific Interest (SSSI) for its wintering and breeding birds and diverse wetland plant and insect communities. Southlake also forms part of the Somerset Levels and Moors SPA and Ramsar site. One of the reasons Southlake Moor SSSI is currently in unfavourable condition is because the site is no longer warped during winter. Warping on Southlake is a traditional agricultural practice involving the controlled flooding of the moor between January and March to bring nutrient rich sediment from the river onto the fields. Warping also offers significant conservation benefits for both Southlake and the wider Parrett floodplain by providing excellent roosting and feeding habitats for large numbers of wintering wildfowl and waders. Warping was a regular feature on Southlake until 1995, when the poor condition of control structures and concerns over operational safety meant the practice was discontinued.


Grazing on Southlake


Southlake Moor

Water Level Management and Favourable Condition

The nature conservation interests of Southlake are dependent on appropriate water level management practices to maintain high ground water tables and soil wetness throughout the year. Water level management must also support extensive low input grazing systems that are essential to the maintenance of wet grassland habitats and conservation interests.

Water level management practices should:

- Support summer grazing and appropriate farming activities;
- Provide roosting and feeding habitats for wintering birds;
- Provide nesting and feeding habitats for breeding birds;
- Protect ditch habitats and maintain soil wetness;
- Maintain a diverse range of aquatic habitats;
- Promote good water quality.

SDBC defra Environment Agency ENGLISH NATURE

Southlake Project
Water Level Management Improvements and Restoration Scheme
Somerset Levels & Moors Multi Agency Project

Proposed Scheme

The proposed water level management scheme aims to restore the water control infrastructure on Southlake, in order to improve water level management throughout the year and enable the cessation of winter warping. It also aims to continue warping on the moor through suitable agri-environment schemes and provide additional environment related benefits for the archeologically and landscape area.

Engineering and hydrological assessments have identified that warping from the Sowy River channel would provide a more sustainable water supply arrangement than warping from the River Parrett.

The main benefits of warping from the Sowy River are:

- A more secure freshwater supply with less tidal influence than the Parrett;
- A main river feed at a more suitable level to improve control and reduce the inflow of debris on to the moor;
- Safe structures with fewer operational and maintenance requirements;
- The opportunity to attenuate peak flows from the Sowy for the benefit of nature conservation and for the short-term storage of winter floodwater;
- Improved summer irrigation and water level control.

Warping from the Sowy will be combined with a whole moor management system that will use the primary structures to control water levels across the moor. This system will replace the existing Raised Water Level Area, reduce the number of structures and improve water level control in both winter and summer.


Warping on Southlake

Scheme Implementation

The Southlake Project has been developed by the Parrett IDB (which includes the original Othery, Middlezoy and Westonzoyland IDB and Aller Moor IDB) in partnership with English Nature, the Environment Agency and Defra (RDS) and in consultation with landowners and managers. The scheme is considered necessary for the management of the designated site and for the maintenance of the wildlife and landscape interests of the area. It will also enable farmers to enter land on the moor into Higher Level Stewardship agreements.

The capital improvement works on Southlake were started by the Environment Agency in 2005, with the replacement of two control structures. The IDB proposes to complete the scheme in 2006/2007, including the construction of a new inlet from the Sowy and refurbishment of Challis Wall Sluices. Minor operational improvements have already been implemented on Southlake and the scheme is expected to be fully operational in winter 2007.


Proposed location for new Southlake Inlet


New EA tilting weir structure with wide operating range – Southlake Sluice

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Thank You