Interactive mapping for communicating the results of a fluvial audit

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Overview

1. Aims
2. Fluvial Audit
3. Options for Mapping
4. Hawkcombe Case Study
5. Other Potential Applications

1) Aims

- To demonstrate how interactive mapping can be used in river management
- The presentation will focus, in particular, on the case study of the Hawkcombe Stream, North-West Somerset, where an interactive CD was developed to illustrate the results of a Fluvial Audit to a wide variety of end-users

2) Fluvial Audit

- Fluvial Audit: 'a technique that examines the sediment conditions in a particular problem reach in relation to those in the catchment as a whole' (Environment Agency, 1998)
- uses a mixture of archive and field data to assess the catchment sediment dynamics and channel adjustments

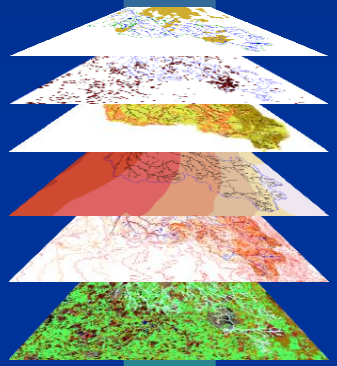
3) Options for Mapping

- Disparate types of information (much spatial)
- Tools for capture, storage and organisation of spatial information clearly useful
- Use of Geographical Information Systems (GIS) at a range of scales is well documented
- Maps taken from GIS often used in reports

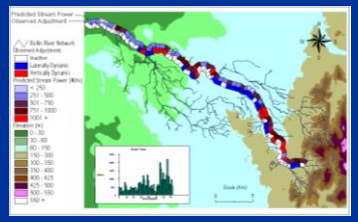
Alternative ‘deliverables’

GIS

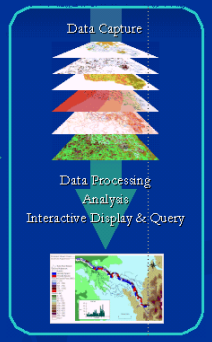
Data Capture



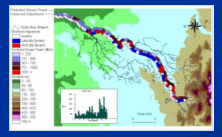
Data Processing
Analysis
Interactive Display & Query



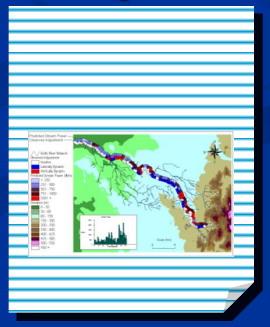
The whole system?



Digital Data



Report



Research questions

- How can we disseminate information effectively, in a less prescriptive and sequential way?
- Can we allow some of the data exploration and interactive query capabilities offered by GIS but in a more readily accessible and portable form?
- Can we explore alternative media and visualisation techniques?

Visualisation options

Dimension

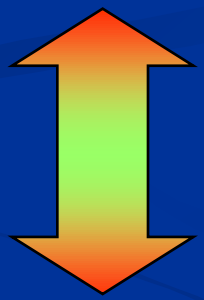
- 2D
- 2.5D
- 3D

Mode of Interaction

- Static
- Animated
- Interactive
- Immersive

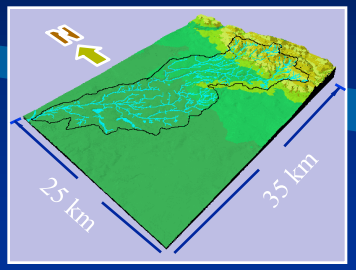
Level of Abstraction

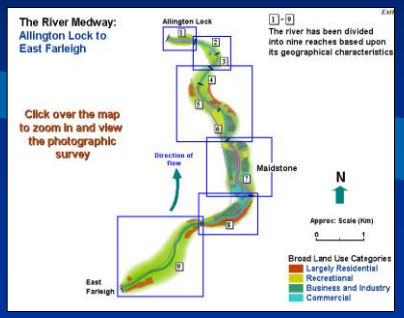
- Abstract or conceptualised data visualisation

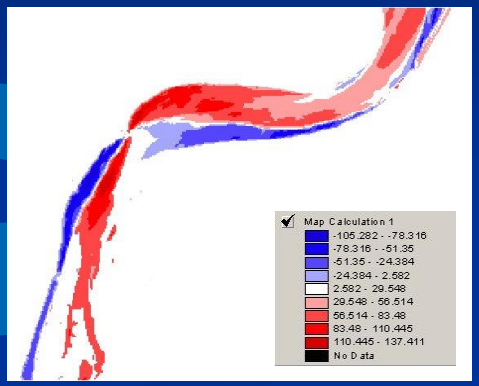


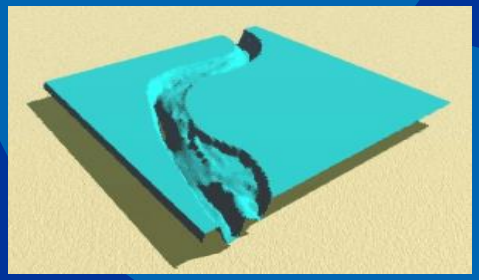
- Photorealistic Landscape Visualisation

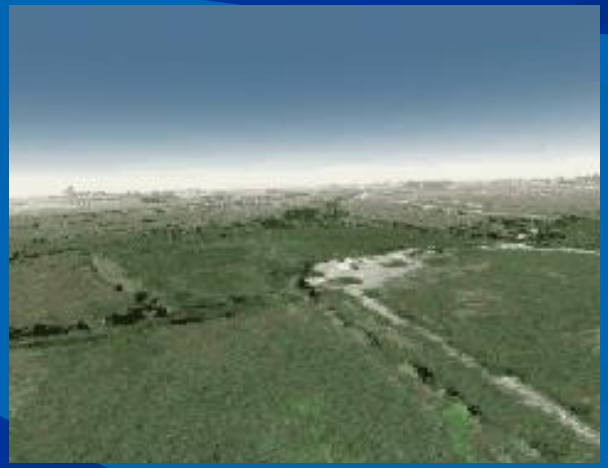
Some examples…

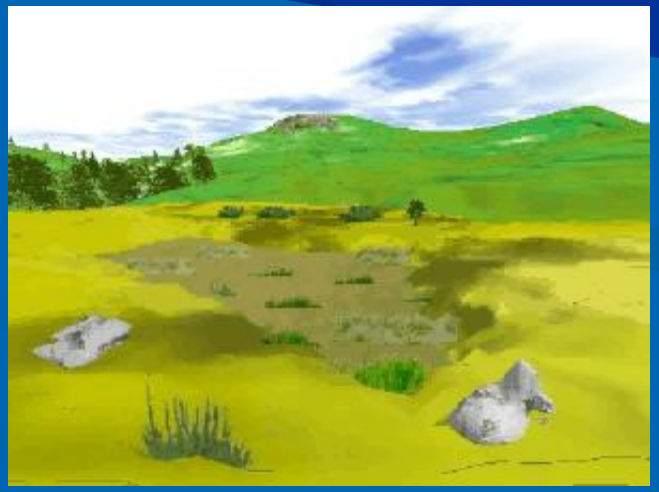






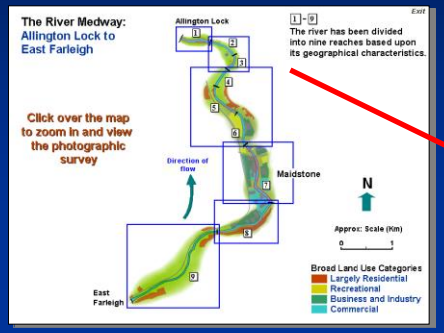






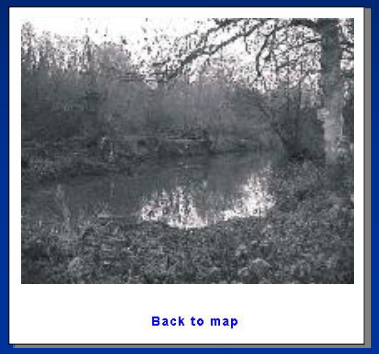
Interactive Spatial Multimedia

Base Mapping



Photos

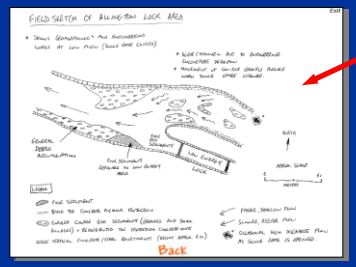
Video



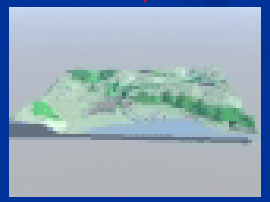
Reach Map

Text Description

Field Sketch

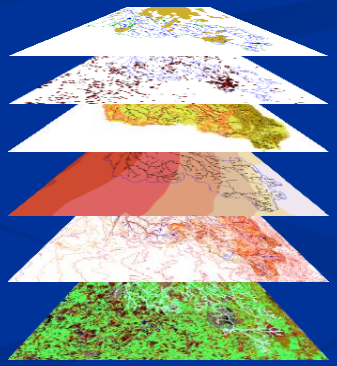


Audio



Interactive 3D models

Interactive display & query of map layers



- Distribution: CD versus Web?
- Need **evaluation** through end users

4) Hawkcombe Stream: Case Study

Steep, confined headwaters supply abundant gravel and sand/silt sized sediments

Channel has been extensively modified through channelisation, mill structures and more recently construction of gravel traps and frequent dredging

Major problem downstream of the village of Porlock where channel incision and widening has undermined a 54ft long weir and associated bank protection

Exit

Main Menu

Study Area

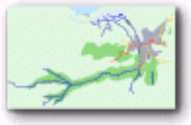
Background

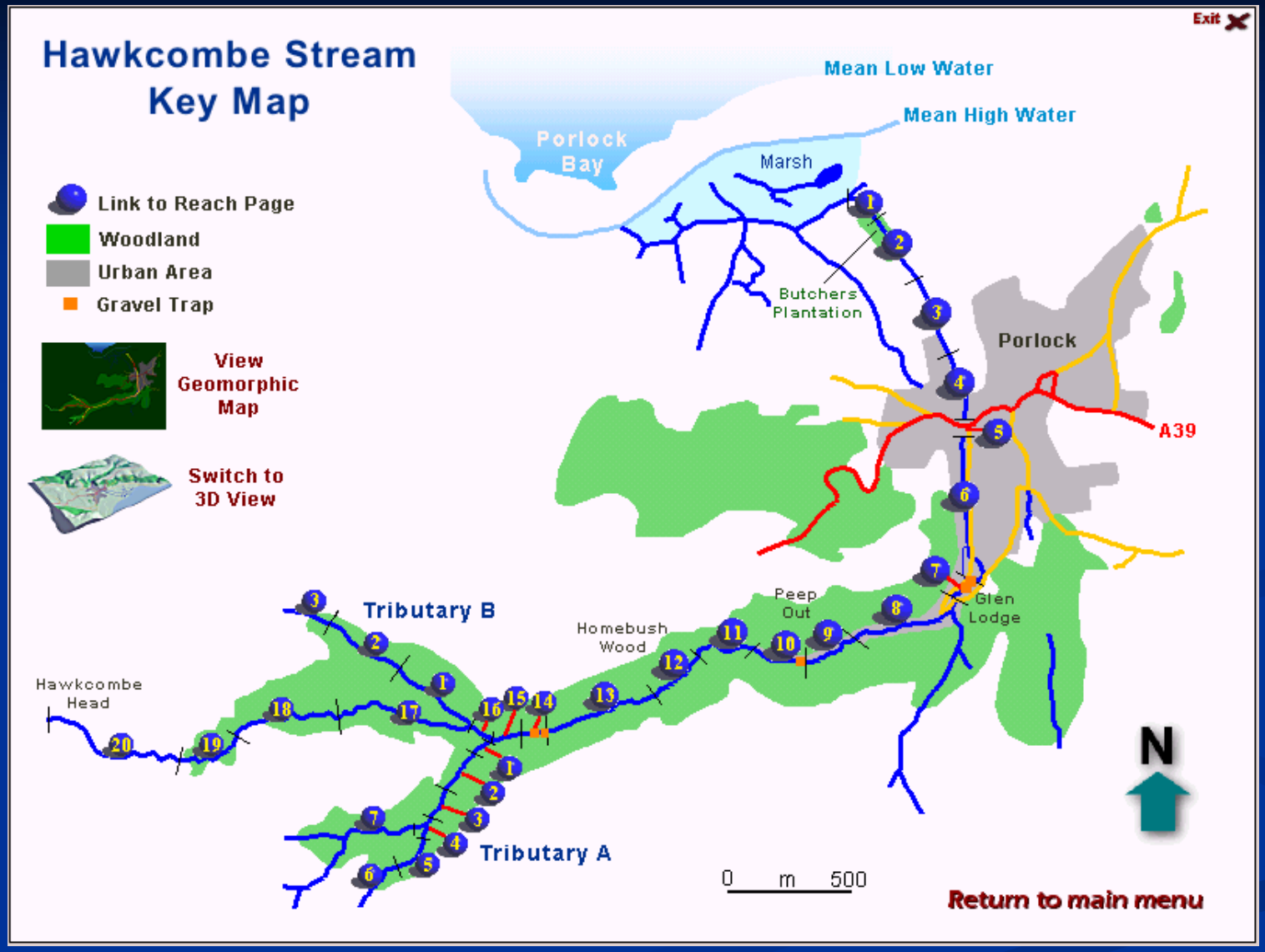
Methodology

Terminology

About the CD

Interactive Map

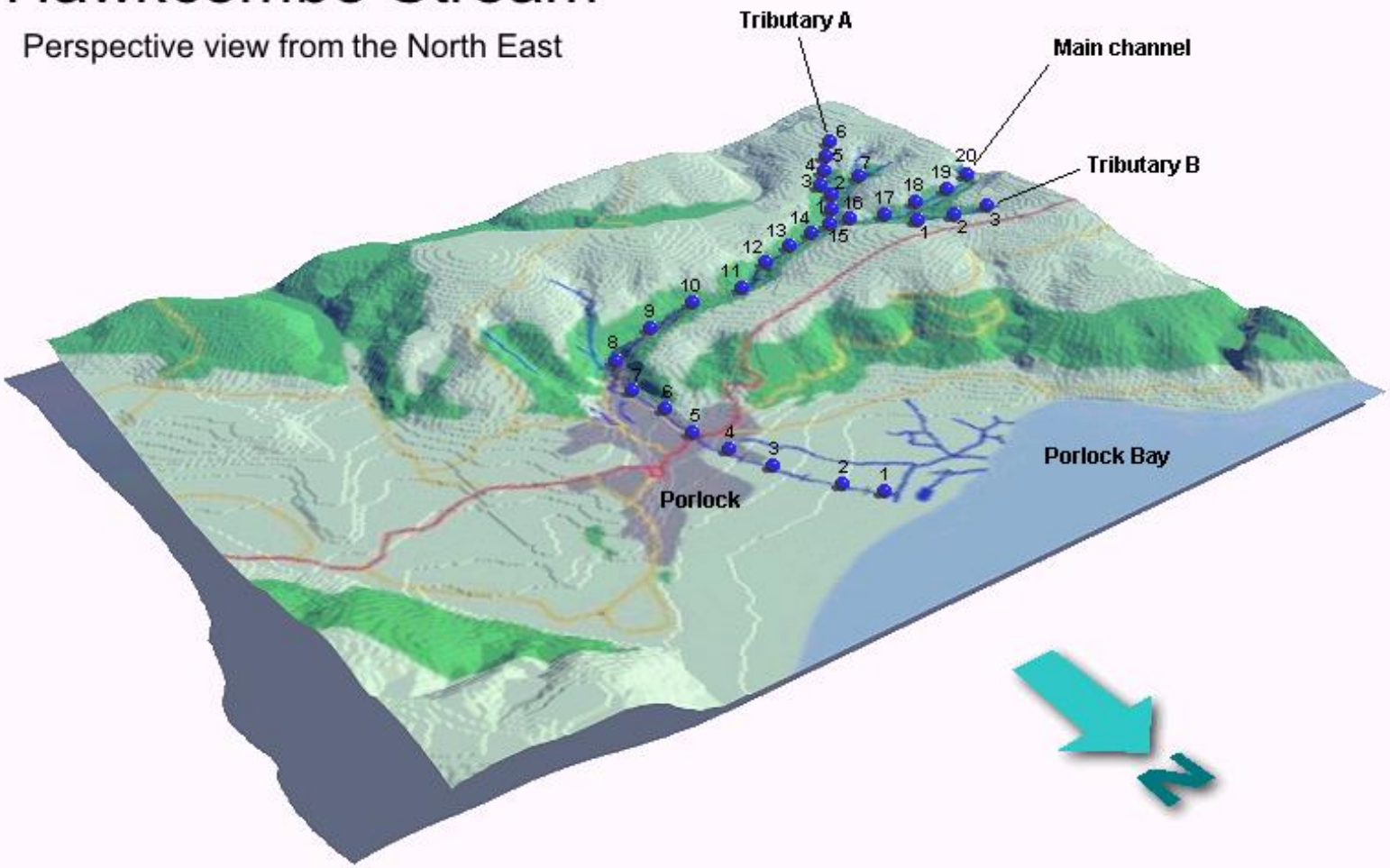



Exit
Hawkcombe Stream
Key Map
Link to Reach Page
Woodland
Urban Area
Gravel Trap
View
Geomorphic
Map
Switch to
3D View
Mean Low Water
Mean High Water
Porlock
Bay
Marsh
Butchers
Plantation
Porlock
A39
Glen
Lodge
Peep
Out
Homebush
Wood
Tributary B
Tributary A
Hawkcombe
Head
N
0 m 500
Return to main menu

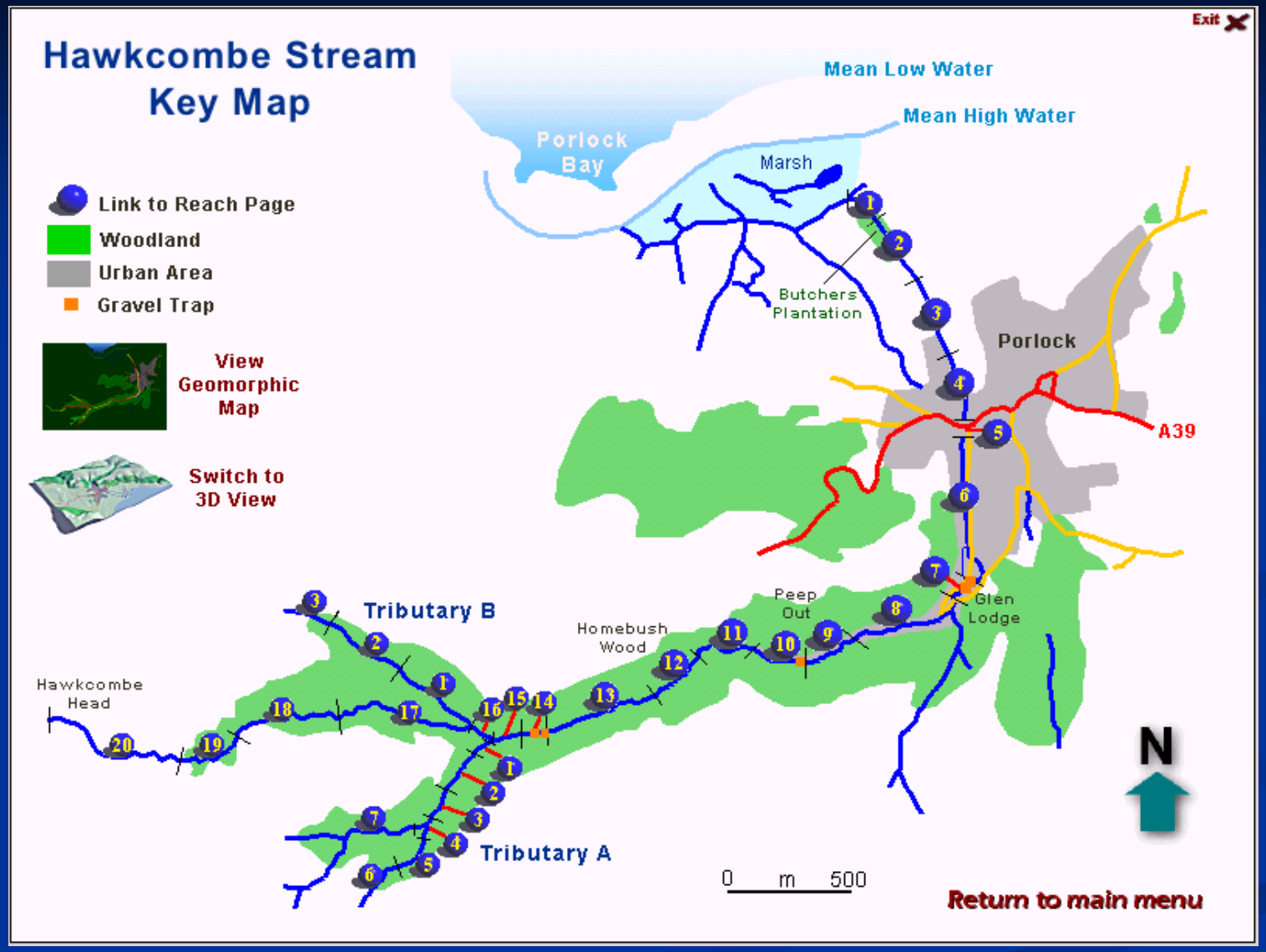
Exit

Hawkcombe Stream

Perspective view from the North East



Return to main map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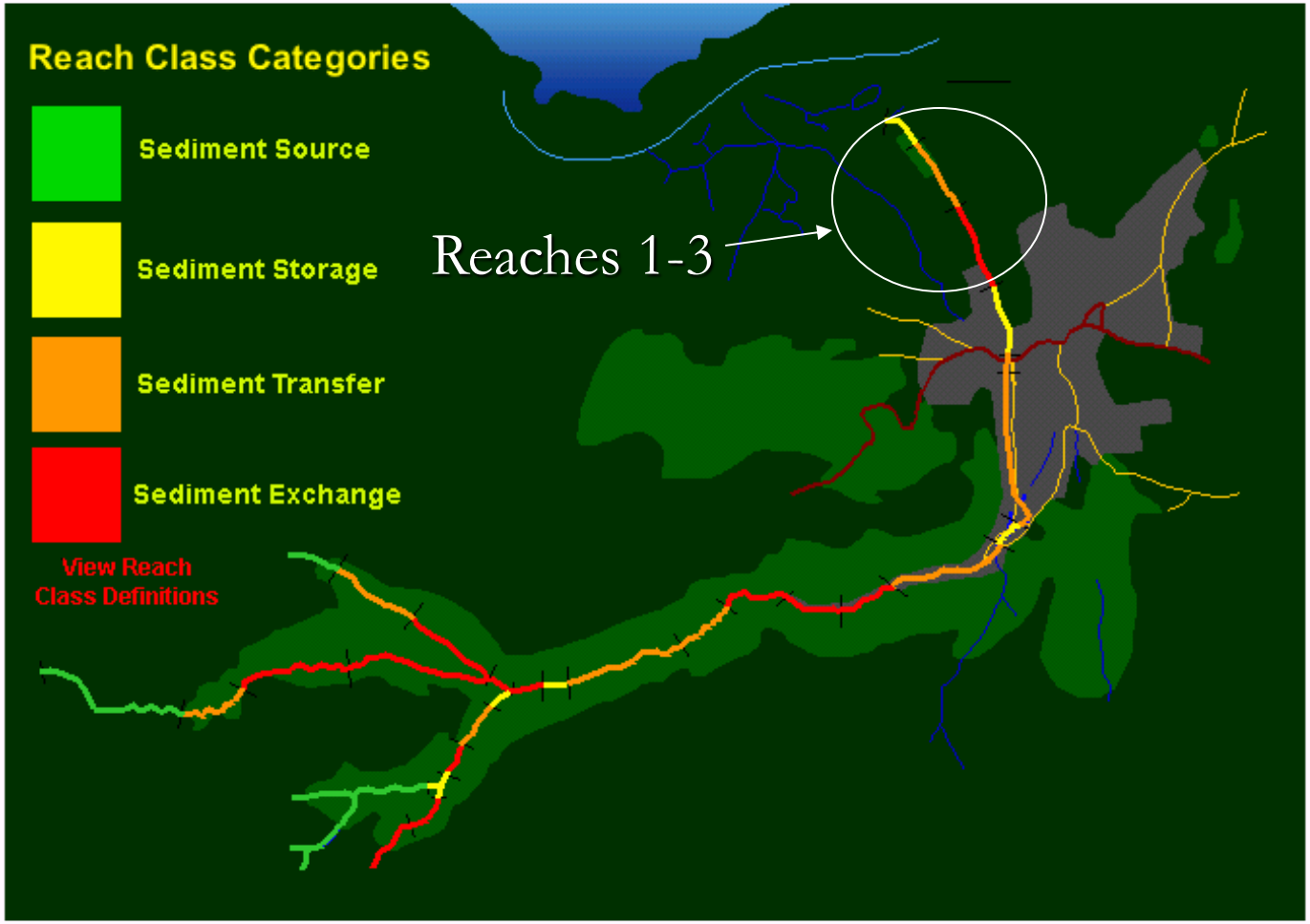
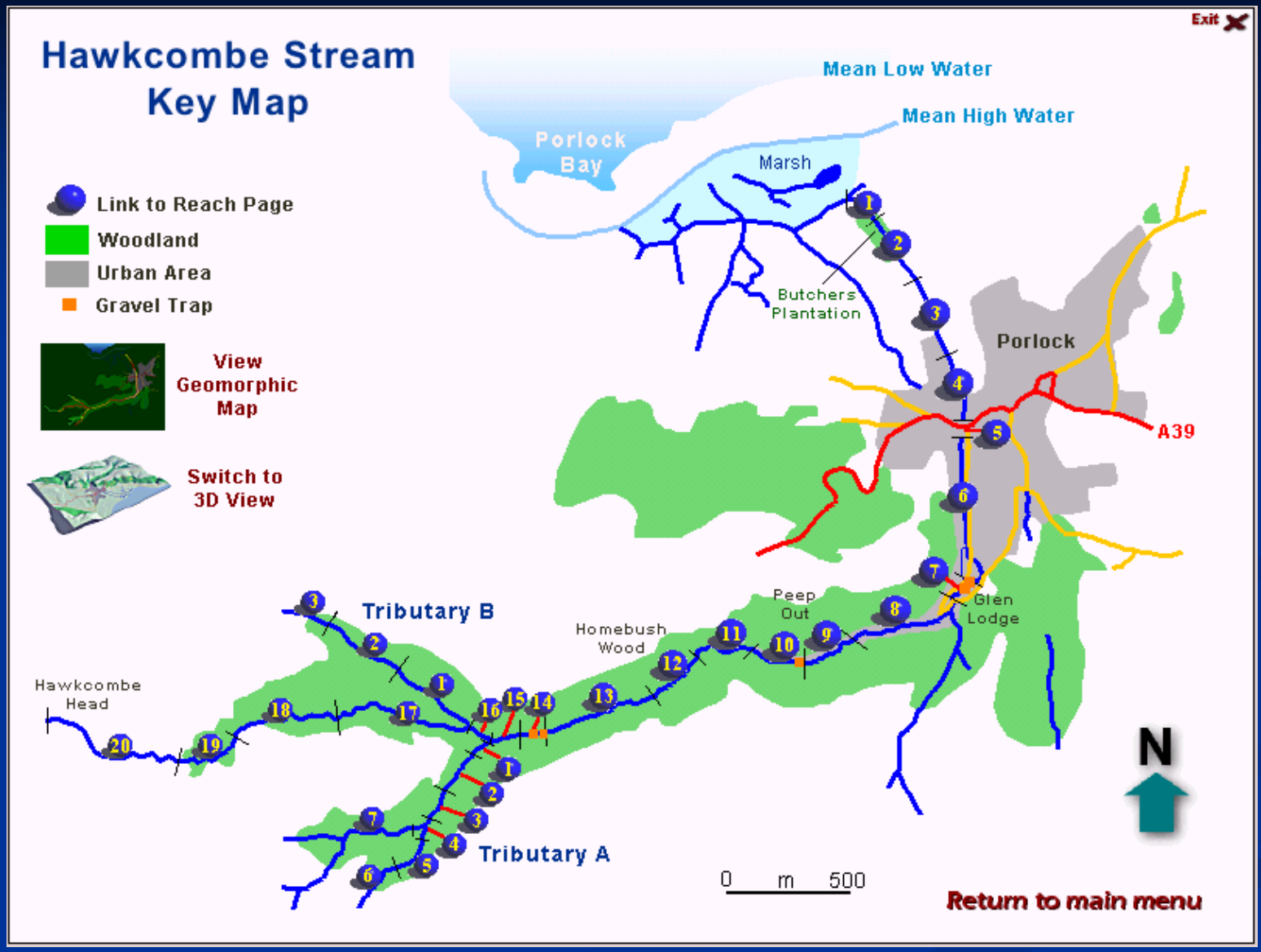
Wood
Tributary B
Tributary A
Hawkcombe
Head
N
0 m 500
Return to main menu

Exit

Hawkcombe Stream Geomorphic Map



Return to main map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Tributary B
Tributary A
Hawkcombe
Head
N
0 m 500
Return to main menu

Reach 3

Exit

move downstream

0 m 250

Bridge

Weirs

move upstream

reach description

Return to main map

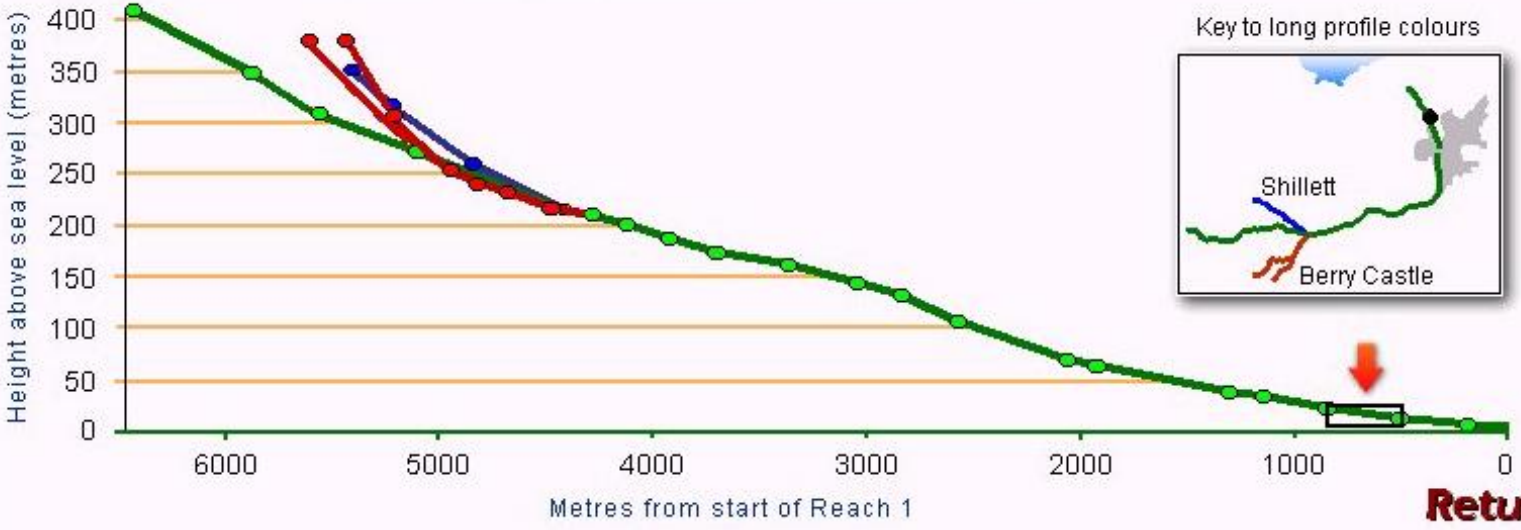
3D view

Terminology  A – C D – I P – Z
Reach Class Definitions
Exit CD

Reach 3: Source

The reach between the weir complex and the outfall pipe from the SW Water water treatment works. The stream has historically been straightened and dredged to improve its flood defence function. It adjusted initially through bed degradation. Bed lowering undermined banks leading to widening through bank erosion and collapse. These adjustments in turn lead to failure of bank protection along the right bank and undermining of low weirs at the downstream end of the weir complex.

Bed material: 150mm cobble bed
Channel Width: 3.0m **Top Bank Width:** 10.3m
Bank Height: 0.5m **Incised Bank Height:** 2.3m
Bank Composition: Sandy banks with a high degree of cobbles and gravels within the clay matrix. Clay layer being exposed at the base of the bank.



Return

Reach 3

Exit

move downstream

0 m 250

Bridge

Weirs

move upstream

reach description

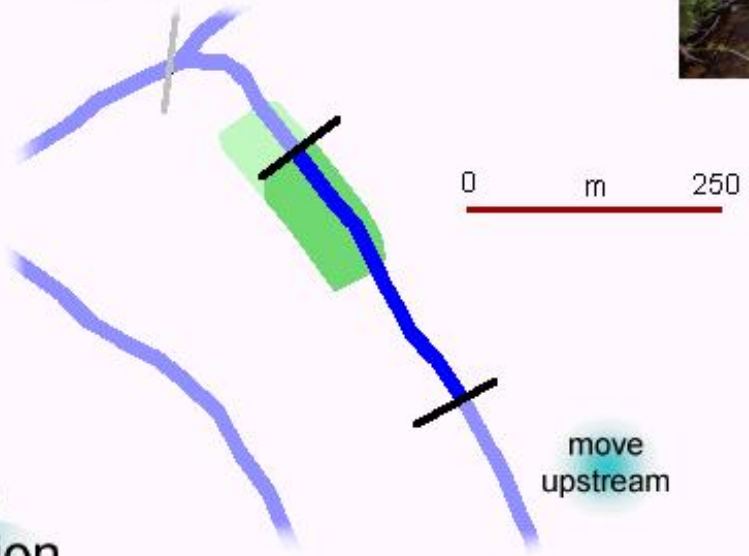
Return to main map

3D view

Exit

Reach 2

move downstream



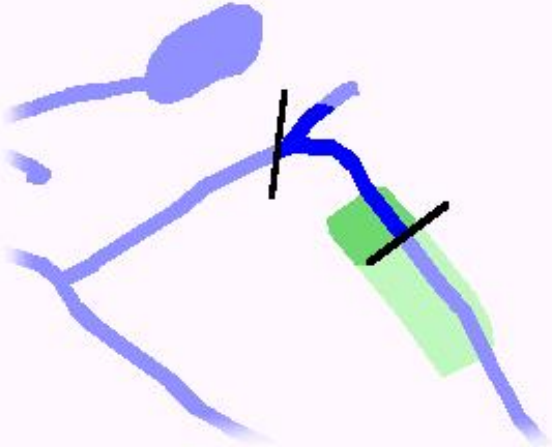
reach description

Return to main map

3D view

Exit

Reach 1



move upstream

0 m 250

reach description

Return to main map

3D view

5) Other Potential Applications

- Catchment level
- River Restoration Design
  - Design Options
- Post-Project Appraisals
  - Illustrate Results