



**Royal
HaskoningDHV**
Enhancing Society Together



Connecting River Restoration Thinking to Innovative River Management
6th Edition | 27-29 October 2014 | Vienna
Integrated with the final event of the SEE River project



Restoring natural hydromorphology

*Approaches in the Rivers Adur
and Ouse, southern England*

Ian Dennis
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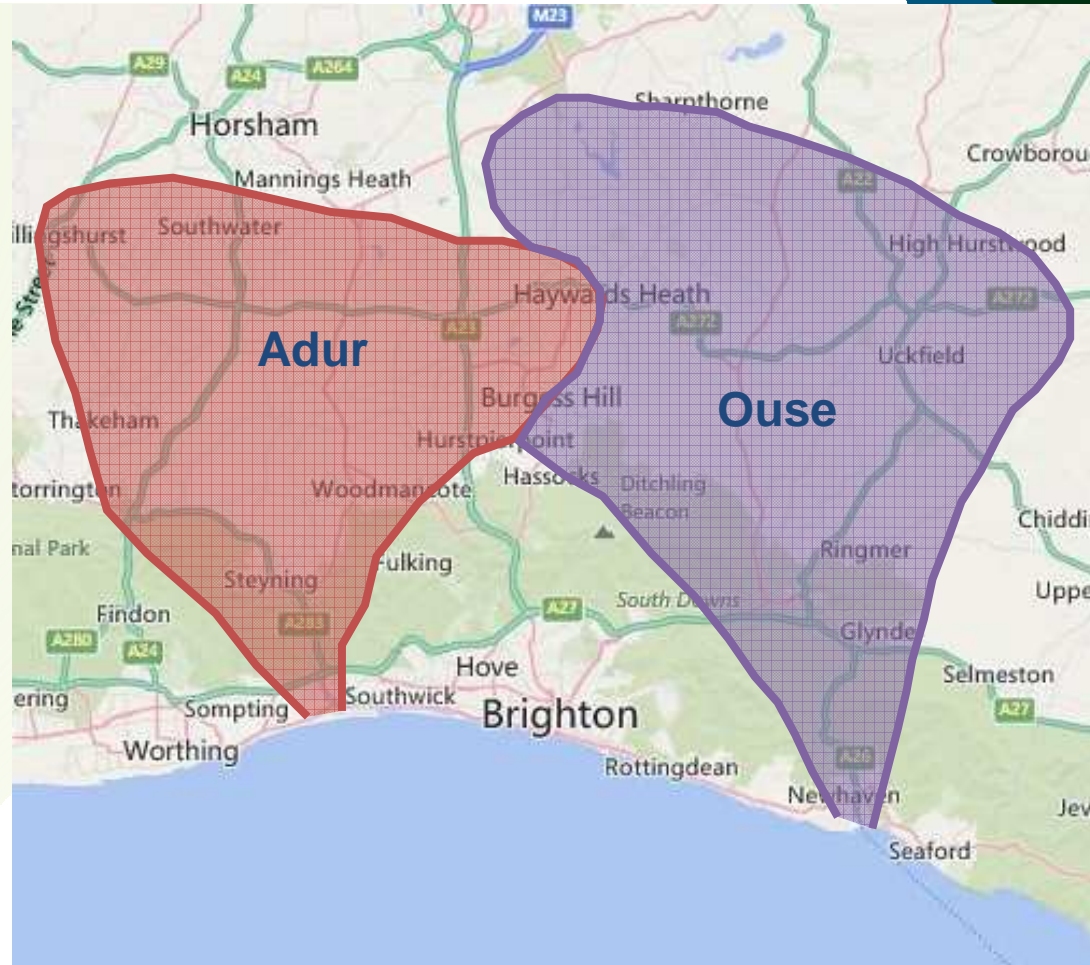
Structure of this presentation

- Introduction
- Catchment partnership
- Process restoration
 - Knepp Castle
 - Spring Meadow
 - Buxted Park
- Successes and constraints
- Lessons learned



The Adur and Ouse catchments

- West and East Sussex, southern England
- Meandering lowland rivers
- Sandstones, siltstones and mudstones
- Anthropogenic changes
 - Navigation
 - Milling
 - Land drainage
- Modified channel
 - Straightened
 - Enlarged capacity
 - Weirs



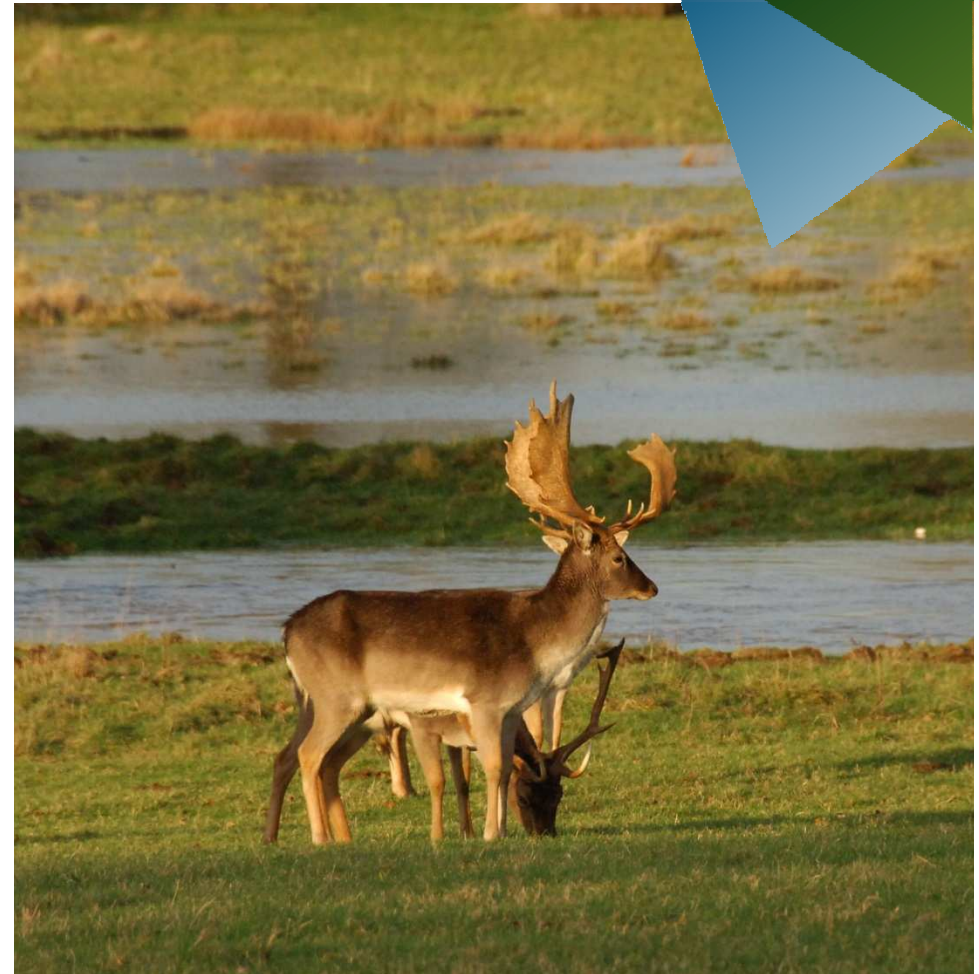
Ouse & Adur Restoration

- Main impacts
 - Loss of geomorphological diversity
 - Reduced floodplain connectivity
 - Reduction in habitat quality
- Failing WFD targets
- Increased flood risk
- Ouse and Adur Restoration of Physical Habitats
 - ARPHA (Adur)
 - MORPH (Ouse)



Catchment partnership

- Delivery partnership
 - Environment Agency
 - Ouse & Adur Rivers Trust
 - Royal HaskoningDHV
- Landowners
 - Engaged from outset
 - Establish aims
 - Identify constraints
- Three sites with “pioneer” landowners:
 - Knepp Castle (Adur)
 - Spring Meadow (Ouse)
 - Buxted Park (Uck-Ouse)



Adur at Knepp Castle

- Aims
 - Improve floodplain connectivity
 - Naturalise flow regime
 - Improve in-channel and floodplain habitats
- Key considerations
 - Sensitive flood risk receptors (road bridge)
 - Heritage features
- Knepp Castle Rewilding



Adur at Knepp Castle

- Approach
 - Detailed designs
 - Extensive hydraulic modelling
 - Create required channel capacity
 - Prevent increases in flood risk
- What was delivered
 - Construction of 1km new meandering channel
 - Enhancement of additional 1.5km channel
 - Removal of two weirs
 - Large woody debris
 - Creation of floodplain scrapes
 - Block drains



Ouse at Spring Meadow

- Aims
 - Naturalise flow regime by removing impoundment
 - Improve in-channel habitats
 - Maintain coarse gravel substrates
- Key considerations
 - Sensitive floodplain meadow
 - Narrow gauge railway
 - Limited potential for channel migration



Ouse at Spring Meadow

- Approach
 - Detailed designs
 - Reinststate historic channel
 - Minimise likelihood of instability
 - Allow processes to operate within bank line
- What was delivered
 - 0.5km new channel following historic course
 - Narrow low flow channel to maintain clean gravels
 - Large woody debris
 - Weir channel retained as backwater



Uck at Buxted Park

- Aims
 - Naturalise flow regime by removing impoundment
 - Improve in-channel habitats
 - Full natural functionality
- Key considerations
 - Fishing lake
 - Public access
 - No flood risk or land use constraints



Uck at Buxted Park

- Approach
 - Structure removal
 - Limited intervention
 - Allow natural processes to operate unhindered
- What was delivered
 - Weir removed
 - Willow spiling adjacent to lake
 - Gravels seeded
 - 0.7km natural bank readjustment



Successes and constraints

- All three approaches have
 - Increased geomorphological variability
 - Allowed natural processes to operate
 - Improved ecological habitats
- Knepp Castle
 - Adjustment limited by clay substrate and flood constraints
- Spring Meadow
 - Adjustment within high flow bank line
- Buxted Park
 - Natural processes fully reinstated



Lessons learned

- “Design” and “natural adjustment” approaches have both achieved project objectives
 - Improved ecology
 - Working towards GES
- Minimal intervention has delivered greatest benefits for hydromorphology
- Where possible, keep design to a minimum and allow natural processes to operate



**The Wild Trout Trust
Conservation Awards 2013
Sponsored by Thames Water**



Professional Winner
Environment Agency / OART
Royal HaskoningDHV
Buxted Park / Spring Meadow
Restoration Project

Lessons learned

- Stakeholder engagement vital
 - Introduce concept of “hydromorphology”
 - Manage expectations
 - Accept adjustments
- Exemplar projects
 - Reassure other landowners
 - Hydromorphological adjustment and stabilisation
- New opportunities
 - Maintain partnership
 - More schemes underway



Any questions?

Dr Ian Dennis

Principal Geomorphologist
Royal HaskoningDHV
Haywards Heath, UK

Email: ian.dennis@rhdhv.com

Tel: +44 (0)1444 476632

