

Allow the river to flood its floodplain

Project summary

Title: Knepp Castle Floodplain Restoration
Location: Knepp Castle, Horsham, West Sussex, England
Technique: River restoration scheme (floodplain reconnection, bed and bank reprofiling, backwater creation, structure removal)
Cost of technique: ££££
Overall cost of scheme: ££££
Benefits: ££££
Dates: 2009-2013

Mitigation Measure(s)

Allow the river to flood its floodplain
 Improve channel geomorphology to create habitat
 Preserve and improve water's edge and bank side habitats
 Remove structures that are no longer needed

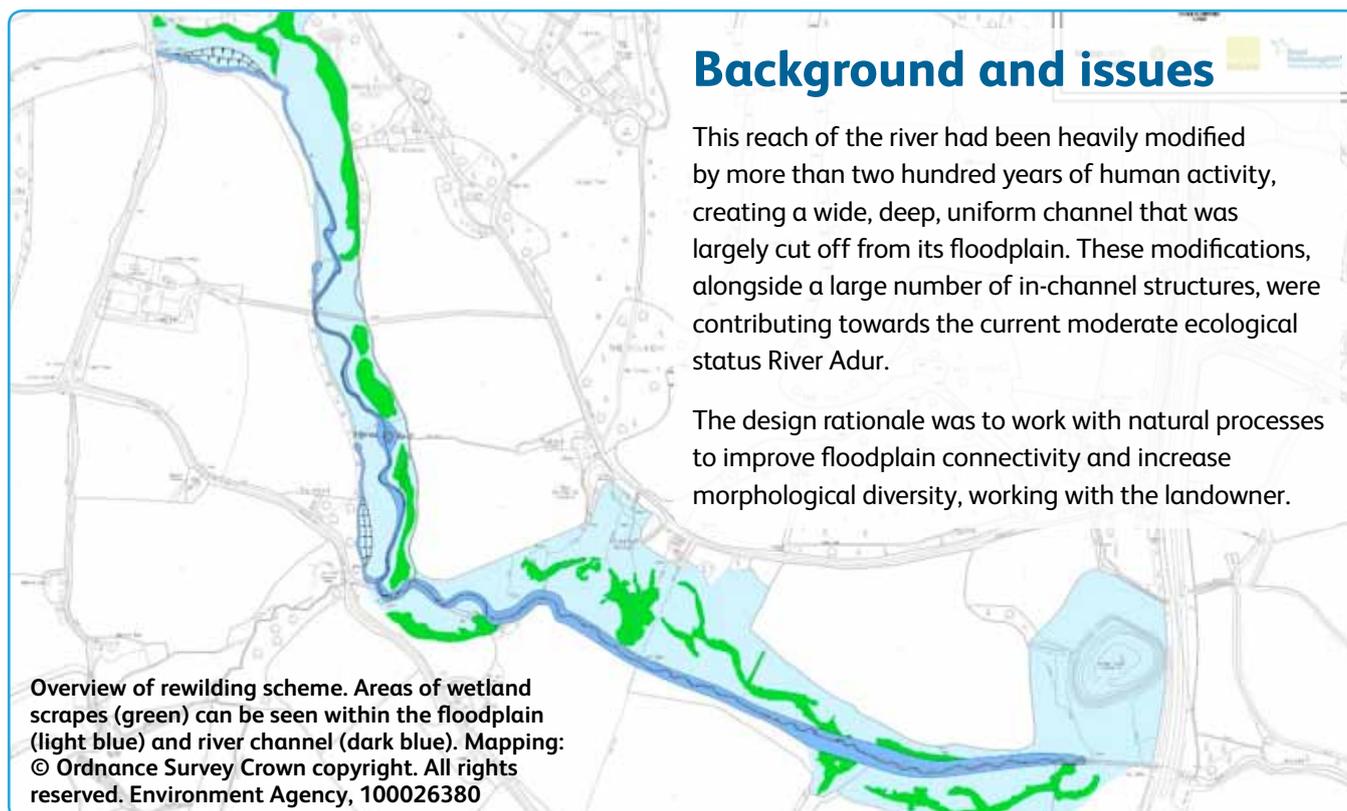
How it was delivered

Delivered by: Environment Agency
 Partners: Knepp Castle Estate; Natural England, Royal HaskoningDHV



The project has renaturalised a long reach of the River Adur and reconnected it to its floodplain.

All images © Royal HaskoningDHV copyright and database rights 2013



Overview of rewilding scheme. Areas of wetland scrapes (green) can be seen within the floodplain (light blue) and river channel (dark blue). Mapping: © Ordnance Survey Crown copyright. All rights reserved. Environment Agency, 100026380

Background and issues

This reach of the river had been heavily modified by more than two hundred years of human activity, creating a wide, deep, uniform channel that was largely cut off from its floodplain. These modifications, alongside a large number of in-channel structures, were contributing towards the current moderate ecological status River Adur.

The design rationale was to work with natural processes to improve floodplain connectivity and increase morphological diversity, working with the landowner.

Step-by-step guidance

The renaturalisation of this 2.5 km reach of the Adur can be divided into 3 main stages:

Feasibility studies: Studies undertaken included a geomorphological walkover survey, analysis of historical mapping and LiDAR and ISIS-Tuflow modelling. These resulted in the outline of a preferred option that included a smaller channel with shallower banks and a more natural planform, the incorporation of large woody debris (LWD) and the creation of backwaters, ponds and floodplain scrapes.

The project identified a strategy to significantly increase river connectivity and improve the range and quality of in-channel and riparian habitats present in this reach of the Adur.

Detailed Design: Using outline options, hydrological modelling outputs and detailed topographical data,

a team of engineers produced detailed designs that ensured the achievement of the opportunities outlined in the feasibility stage of the project without compromising flood risk at neighbouring properties. This included detailed channel designs, bank profiles, location of floodplain scrapes and LWD, materials to be used and location of plants and access routes for construction.

Construction: The construction stage (Sept 2011 – Sept 2013) resulted in:

- Creation of a new meandering channel with reduced capacity to increase floodplain connectivity
- Enhancement of remaining channel to increase morphological diversity without increasing flood risk to assets
- Removal of a sluice and stepped weir
- Improvements to fish passage at third structure
- Creation of floodplain scrapes



Over-widened channel



Barrier to fish passage



New meandering channel (during construction)

Benefits

- Restoration of natural river processes.
- Floodplain reconnection.
- Improvements to river continuity and range of in-channel and riparian habitats.
- Benefits to fish, macrophyte and invertebrate populations.
- Contribution towards achievement of Good Ecological Status at a water body level.
- Increase in amenity value for the public using the Knepp Castle Estate.

Lessons Learnt

- It is important to maintain site supervision to ensure that the outcomes are as expected. However, focus should be put in adherence to project objectives and not “cosmetic” finishing.
- The use of appropriately detailed modelling was essential in order to ensure that the central aim of increasing floodplain connectivity could be delivered without increasing flood risk to nearby assets and infrastructure.

Project contact: Fisheries & Biodiversity, Solent and South Downs Area, South East Region, Environment Agency