



Managed coastal realignment

Lower Otter, Devon

PACCo



Promoting Adaptation
to Changing Coasts

Promouvoir l'Adaptation
aux Changements Côtiers

Interreg



France (Channel
Manche) England

European Regional Development Fund

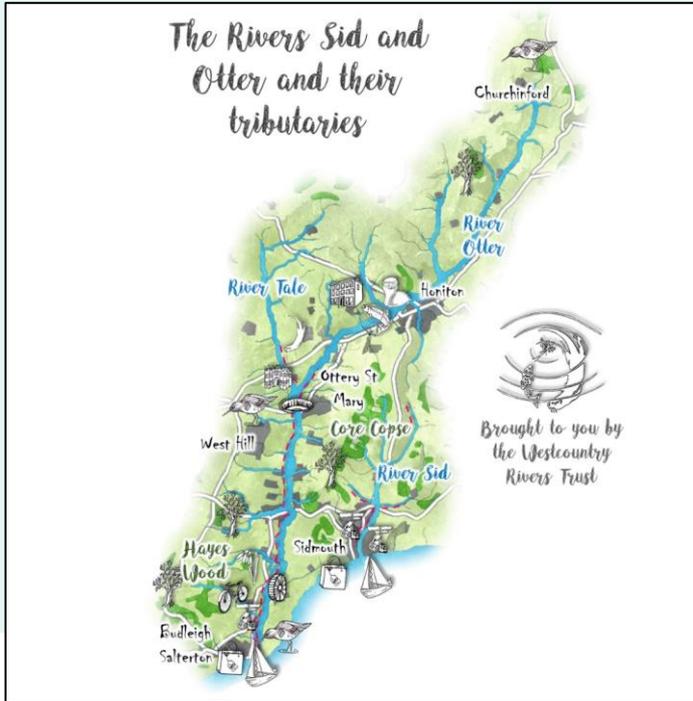


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geography
southwest

The River Otter, South Devon



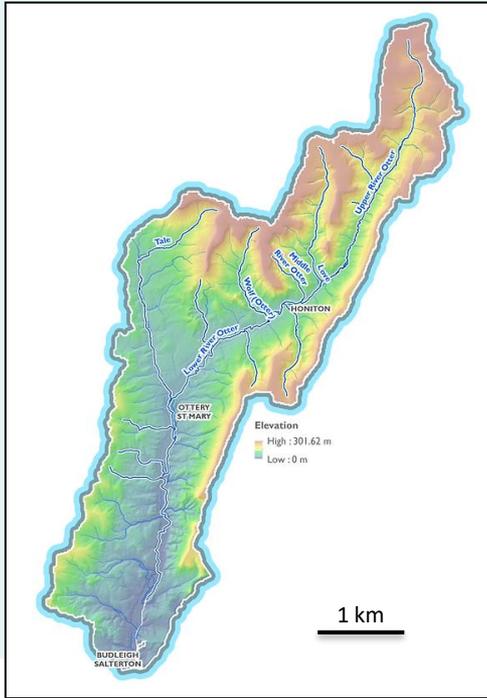
- The River Otter is a small river that flows from its source in the Blackdown Hills (Somerset) south to the English Channel coast at Budleigh Salterton (Devon).
- The river's length is 44km (27 miles).
- The river flows through a rural farming landscape, with small cattle, sheep and dairy farms.
- The Otter Estuary Nature Reserve is a Site of Special Scientific Interest (SSSI) consisting of saltmarsh and mudflats.
- Once extinct, the River Otter is England's only river with a breeding population of beavers.

<https://wrt.org.uk/project/river-otter-sid/>

https://www.freecountrymaps.com/map/towns/great_britain/117061762/



River Otter drainage basin



- The River Otter drains an area of about 230 square km.
- There is a high drainage density with many short tributaries joining the main river. This promotes rapid runoff and contributes to the risk of flooding.
- Much of the Lower Otter valley is flat and low-lying. It is prone to flooding (2018, 2021) when extreme rainfall events trigger high runoff from the headwaters.

Budleigh Salterton
Cricket Clubhouse
(2018)



<https://www.riverotterfisheriesassociation.org/maps-of-the-river-otter-catchment>

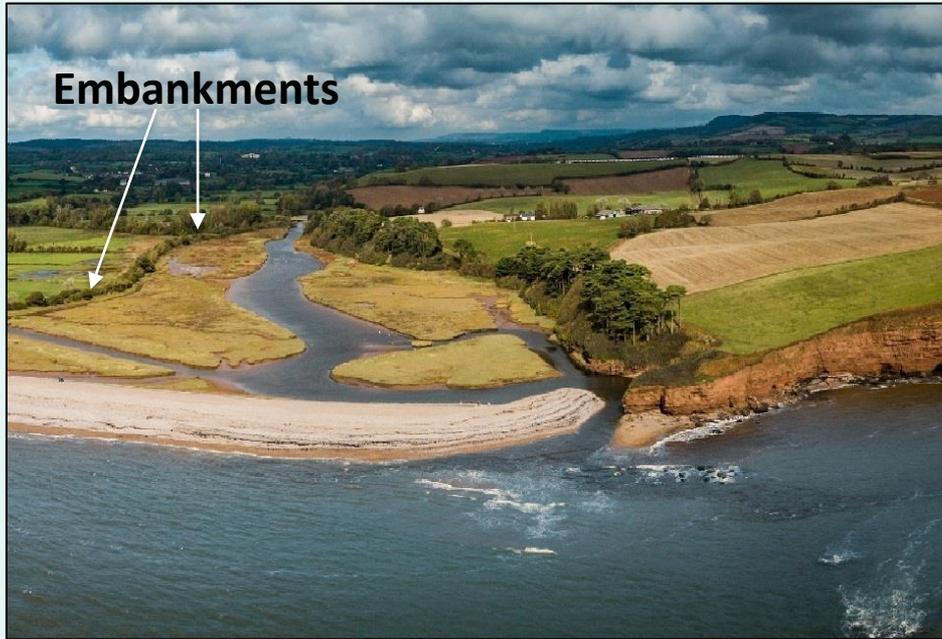
The Lower Otter estuary



https://en.wikipedia.org/wiki/River_Otter,_Devon#/media/File:River_Otter_Devon.jpg

- The Lower Otter Estuary is a very special place.
- It is home to local people and businesses.
- It provides habitats for a wide variety of breeding and wintering bird species
- It is enjoyed by tens of thousands of visitors each year.
- However, the estuary faces growing challenges due to climate change such as rising sea levels and more extreme storms and rainfall events.

Adaptation to climate change: the issue



- Two hundred years ago, embankments were constructed to reclaim land for agriculture.
- The embankments (see photo) are no longer effective and are in danger of being breached. This was nearly the case in 2018, when the cost to repair them was vast.
- With sea levels predicted to rise by over 1m in the next 100 years, the area is at increasing risk from seawater flooding.
- Seawater flooding threatens to flood agricultural land, inundate roads and footpaths, and kill trees and hedgerows in the floodplain.

Credit: KOR Communications

<https://www.gov.uk/government/news/environment-agency-submits-final-plans-for-otter-valley-project>



The need for a sustainable solution



Credit: KOR Communications

- This photo looks south towards the English Channel. Budleigh Salterton is to the right.
- The embankments (marked by a line of trees and hedges) split the floodplain into two.
- To the left, the river meets the sea forming an estuary with mudflats and saltmarsh.
- To the right, the land has been drained and improved for farming.
- The embankments are no longer fit for purpose. Climate change means that a long-term sustainable solution is needed to manage this stretch of coastline and the Lower Otter floodplain.

Flooding 2018 – a sign of things to come?



- In March 2018, following a period of heavy rainfall, the River Otter burst its banks near Otterton.
- Floodwaters surged across local roads disrupting transport communications in the area.
- The River Otter floods most years often cutting off the village of Otterton.
- The photo on the next slide shows the extent of flooding across the floodplain. Notice that the embankments are preventing water draining away at low tide!
- In 2021, serious flooding caused road closures and inundated agricultural land.

<https://www.exmouthjournal.co.uk/news/warning-to-motorists-as-roads-severely-flooded-near-exmouth-5780342>





Credit: KOR Communications

Flooding damage to embankments

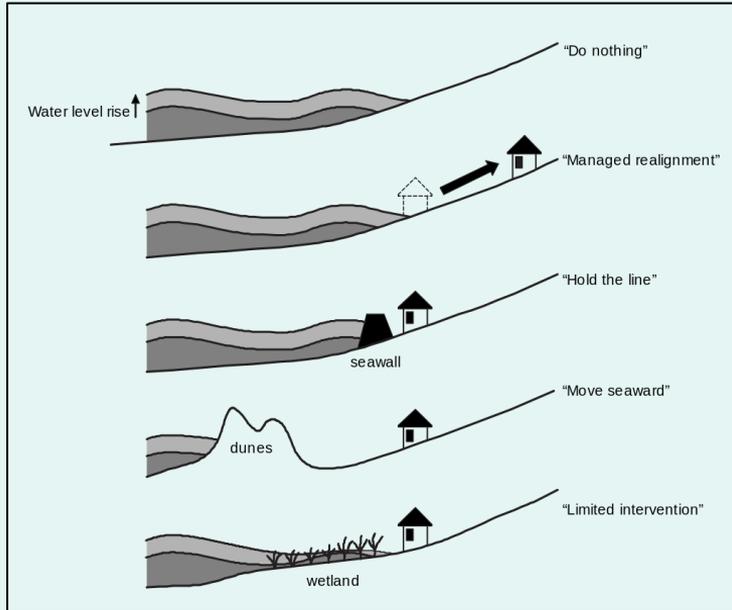


- In March 2018, floodwaters surged across the lower Otter floodplain lapping the embankments.
- The photo shows damage caused by river erosion to Big Bank. Notice that part of the embankment has been completely washed away.
- Further damage occurred during the 2021 floods.
- With flooding likely to become more frequent and intense in the future, further embankment damage and breaching is inevitable.
- This is a strong argument for adopting a more sustainable form of flood management.

Embankment repairs following the 2018 flood



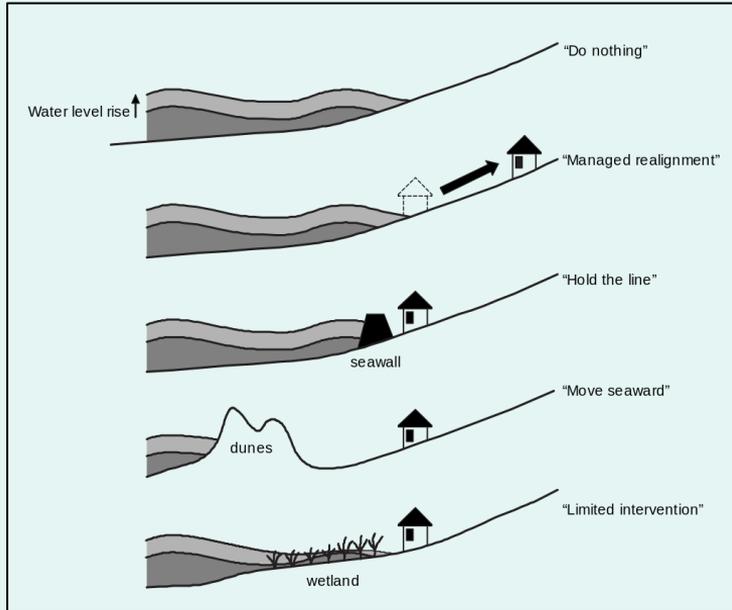
What are the generic options?



1. **Do nothing** – this involves . . . doing nothing! The coastline is allowed to adapt naturally to the changing climate. Erosion and flooding will occur.
2. **Managed realignment** - the coastline is managed to adapt to new conditions. Property is relocated.
3. **Hold the line** - coastal defences such as sea walls 'hold the line' of the coast.
4. **Move seaward** - coastal management advances the coastline to provide enhanced protection of valuable land/property.
5. **Limited intervention** - reduces the impact of changing conditions.

https://en.wikipedia.org/wiki/Coastal_management#/media/File:Fivepolicies.svg

What were the options for the Lower Otter?



For the Lower Otter, three options were identified:

1. **Do nothing** – the embankments were constructed 200 years ago when the river was straightened. There is an increasing risk that they could fail leading to widespread flooding.
2. **Hold the line** – new defences are expensive to build and usually only appropriate when defending high value property
3. **Managed realignment** – working with natural processes, the shoreline and habitats are allowed to evolve naturally through careful management, securing the best possible benefits for people and wildlife

https://en.wikipedia.org/wiki/Coastal_management#/media/File:Fivepolicies.svg



What was the decision?

In 2012, the landowner Clinton Devon Estates and a broad range of stakeholders decided to tackle the long-term challenges associated with climate change.

In the period 2012-2015, the social and economic implications of the three options ('Do Nothing', 'Hold the Line' and 'Managed realignment') were considered. Detailed site investigations were conducted (flood risk, groundwater and landfill).

In 2015, the decision was made to adopt the managed realignment option:

- Managed realignment is less costly than building new defences
- 'Do nothing' would create uncertainty and anxiety for local people who would simply have to wait for the embankments to fail
- Managed realignment can safeguard and improve public access and wildlife habitats

Managed realignment – the outline plan



- Controlled breaching of the old embankments will restore the floodplain of the River Otter.
- The farmland and old Budleigh Salterton cricket ground will be allowed to flood at high tide. This land will transition to become important mudflats and saltmarsh for wading birds.
- The Budleigh Salterton cricket ground will be relocated elsewhere and will no longer be threatened by flooding.
- The total cost is estimated to be £12m. £8.5m will come from the European Interreg France (Channel) England Programme. Other funding will come from the Environment Agency and Clinton Devon Estates which owns the land.

Managed realignment – the aims



- Maintain and secure existing public footpaths, including part of the nationally important South West Coast Path (via the footbridge over the breach).
- Secure vehicle access for local residents and businesses, by raising roads or bridges.
- Reconnecting the river to its floodplain, allowing it to flood and drain naturally by breaching the embankments.
- Bridges spanning the breaches will allow continued public access.

- Stabilising the former domestic refuse tip to protect against future erosion.
- Working with Budleigh Salterton Cricket Club to find a more sustainable site which is less prone to flooding.
- Provision of new education and interpretation facilities.
- An increased area of rare inter-tidal habitats with significant biodiversity benefits, including for birdlife.
- Working with tenant farmers to adjust existing land use, allowing livelihoods to be secured, water quality to improve and biodiversity to increase.



Managed realignment – the timeline



2021

- Clearance of vegetation
- Construction of new bridge foundations, road embankments and footpath raising

2022

- Completion and surfacing of roads, bridges and footpaths
- Diversion of services (water, electricity, sewage)
- Removal of cricket club

2023

- Completion of old landfill cover
- Controlled breaching of embankments
- Landscaping



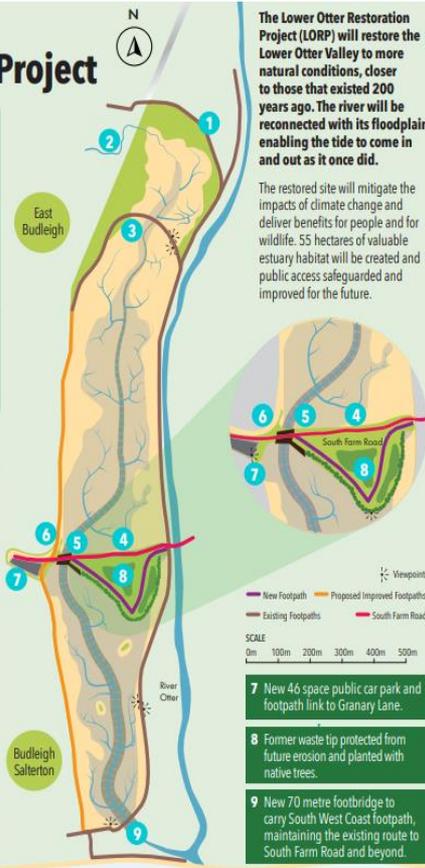
Lower Otter Restoration Project

- 55 hectares of new intertidal habitat (salt marsh and mudflat) for wildlife
- Footpaths raised and surfaces improved at specific locations
- A 6 kilometre network of creeks reconnecting the historic floodplain to the estuary for drainage (including during floods)
- 7 new wildlife viewing platforms
- Refuge islands for birds
- More than 2 hectares of woodland, hedgerows and grassland planting

The Lower Otter Restoration Project (LORP) will restore the Lower Otter Valley to more natural conditions, closer to those that existed 200 years ago. The river will be reconnected with its floodplain enabling the tide to come in and out as it once did.

The restored site will mitigate the impacts of climate change and deliver benefits for people and for wildlife. 55 hectares of valuable estuary habitat will be created and public access safeguarded and improved for the future.

- 200 metre section of embankment (Little Bank) lowered to field level to reconnect the River Otter to the floodplain. Footpath retained.
- Budleigh Brook rejoins historic floodplain in a new meandering channel. Concrete aqueduct removed allowing fish and eel passage.
- 170 metre section of embankment (Big Bank) lowered to reconnect the River Otter to its floodplain. Footpath retained.
- New raised South Farm Road at 2.5 metres above the floodplain for more resilient access to the east of the River Otter. White Bridge remains unchanged.
- New 30 metre road bridge spanning tidal creeks.
- New site for Budleigh Salterton Cricket Club out of the floodplain.



- New 46 space public car park and footpath link to Granary Lane.
- Former waste tip protected from future erosion and planted with native trees.
- New 70 metre footbridge to carry South West Coast footpath, maintaining the existing route to South Farm Road and beyond.

PEBBLED HEATHS (Coastal Management Trust) Environment Agency CLINTON DEVON ESTATES

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Managed realignment – actions

The map alongside illustrates some of the actions and works that form part of the realignment project.

Notice:

- The lower Otter floodplain will be restored to its full width increasing its natural capacity for flooding at high tide.
- River flooding (due to more extreme future rainfall events) is accommodated to prevent it ponding-up behind embankments.
- Raising of bridges, roads and footpaths to protect from flooding.
- Benefits to wildlife by the creation of intertidal habitats

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Managed realignment – the vision



The photograph is a view across the River Otter floodplain looking towards the south-east.

The artist's sketch visualises the view in years to come after the breach.

It shows mudflats and saltmarsh with a new footbridge carrying the South West Coast Path over the embankment Breach.

The next slide illustrates the evolution of the Lower Otter and shows how coastal realignment restores the natural floodplain.





THE PAST
10,000 BC - 1600

Over thousands of years the natural, meandering path of the River Otter and its Estuary are created. Wildlife thrives and is able to adapt naturally to change.

- 1 River meanders across entire floodplain
- 2 Mudflat, saltmarsh and reedbed dominate
- 3 Wildlife thrives

Photo credit:
THE LOWER OTTER RESTORATION PROJECT

NOW
1800 - 2014

Much of the estuary is reclaimed for agriculture; an embankment restricts the ability of the river to move, which becomes disconnected from its floodplain. Further modifications include the development of an old municipal tip and a cricket club, flooding associated with climate change begins to threaten access, the old tip and recreational infrastructure.

- 1 River disconnected from floodplain by an embankment
- 2 Cricket club frequently flooded
- 3 Public footpath eroding
- 4 South Farm Rd flooded
- 5 Old Municipal tip threatened

THE FUTURE
2020 ONWARDS

River reconnected to its floodplain whilst access protected and enhanced, original habitats restored, river and wildlife allowed to respond naturally to climate change.

- 1 River reconnected to floodplain
- 2 Environment adapts naturally to climate change
- 3 Original estuarine wildlife habitat restored
- 4 Embankments breached and bridged
- 5 Cricket club relocated
- 6 South Farm Rd access safeguarded by raising, or through creation of a bridge spanning the floodplain
- 7 Old Municipal tip protected
- 8 Public footpath improved
- 9 Grunary lane cliffs protected

SECURING THE OLD ESTUARY FOR *people and wildlife*

Managed realignment – costs and benefits

Costs

- The total cost is £12m of which £8.5m is European funded
- Relocation of Budleigh Salterton cricket ground
- Loss of farmland currently used for grazing
- Disruption to local people and businesses during construction (roads, bridges, etc)
- Remedial action required to secure old landfill site and prevent future contamination
- Disruption to walkers caused by closure and re-routing of footpaths during works.

Benefits

- Creation of natural habitats (mudflats, saltmarsh, reedbeds) which will increase biodiversity and provide nesting and over-wintering grounds for birds
- Sustainable management of the floodplain to address climate change (higher sea levels, increased storminess and higher rainfall events)
- Increased resilience to flooding of infrastructure (e.g. raising roads, bridges and footpaths)
- Relocation of Budleigh Salterton cricket club to non-flood prone location
- Increased amenity value particularly during the winter ‘off-season’ months by attracting birders and thereby boosting the local economy.

For more information visit www.pacco-interreg.com

