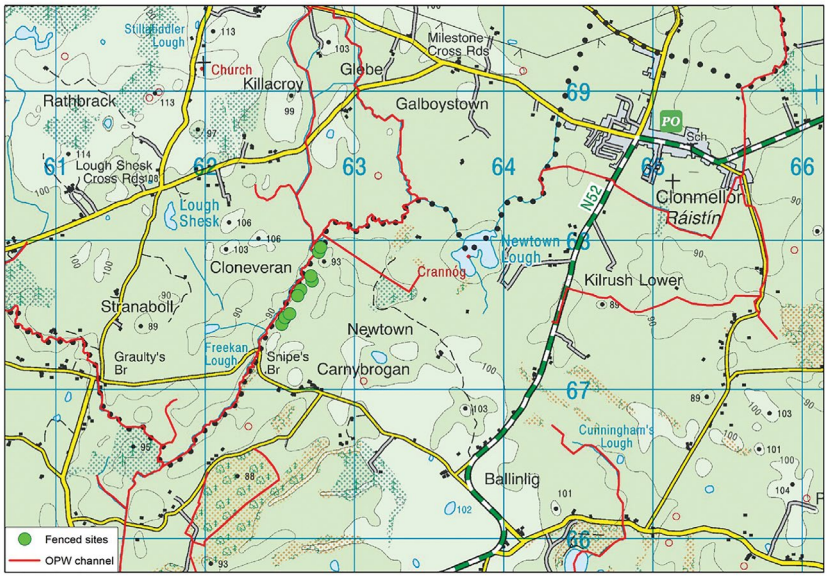
# Environmental River Enhancement Programme Factsheet Series

## 3. Restoration: Stonyford River, Boyne catchment

OPW
Oifig na nOibreacha Poiblí
Office of Public Works

Iascach Intíre Éireann
Inland Fisheries Ireland




Location of fenced sites along the Stonyford River.
CYAL50346939 © National Mapping Division of Tailte Éireann

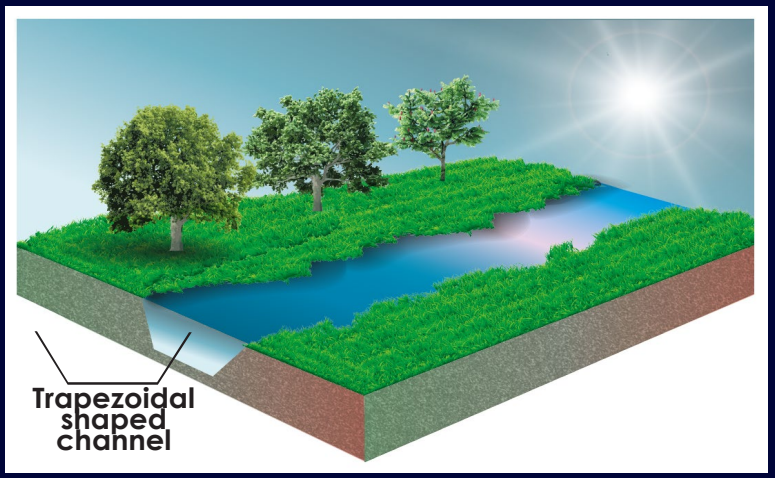
## Methodology

Five sample sites were selected within a one kilometre section of the Stonyford river, a tributary of the Boyne. It is a lowland river with low to moderate flows, abundant macrophytes (aquatic plants) and a mixed bed load of sediment types.

Each 30 metre site was spaced into 11 transects with physical attributes collected:

- Substrate (sediment type)
- Macrophytes (aquatic plants)
- Water velocities

Each site was also electro-fished.




## Long-term river restoration project

The OPW undertakes channel maintenance across 11,500km of inland waterways. Across OPW schemes, the physical channel shows many characteristics typical of channelisation, for example:

- incised and trapezoidal shape
- the river channel is disconnected from its floodplain and no longer overspills onto it
- large amounts of silt or fine sediment on the river bed
- uniform river flows dominated by extended glides

A study site was set up on the River Stonyford in 2013. The rehabilitation strategy was to fence the channel, excluding livestock, and eliminating channel maintenance. The type of routine maintenance which had previously been undertaken by the OPW at this site included vegetation removal and silt management.

The objective of the study was to monitor the changes in the absence of livestock and regular maintenance over short and long timescales.


Survey site pre-livestock exclusion and halting of maintenance works (2013), three years post-works (2016), four years post-works (2017) and seven years post-works (2020).

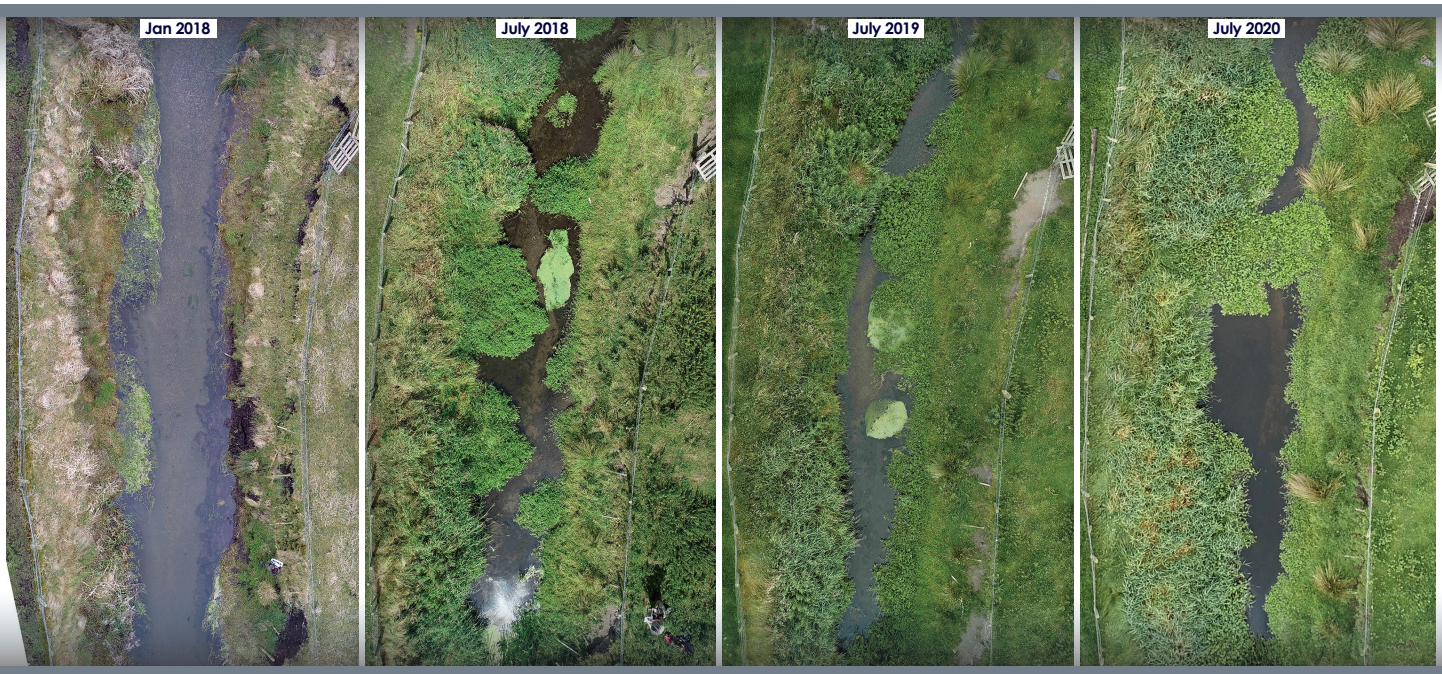
## What was the result?

**Substrate:**
- Reduced fine sediment and increasing substrate coarseness over time
- More variety for juvenile fish to inhabit and more potential spawning areas

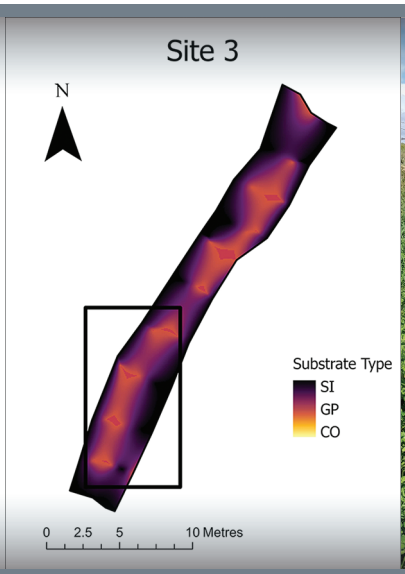
**Macrophytes:**
- Lack of plant diversity initially
- Pioneer macrophytes established
- Lag period where instream plants filled the channel space, impeding flow
- More recent surveys indicate reduction in plant cover as the channel adjusts to more natural conditions
- The river channel is now self-cleansing, reducing the level of active maintenance required

**Velocities:**
- Initial decline in mean velocities due to vegetation growth followed by
- Increased mean velocities in main channel in the most recent surveys

**Fish:**
- Initial increase in fish numbers following mitigation measures
- Fish community composition indicates the proportion of roach has decreased over the survey period



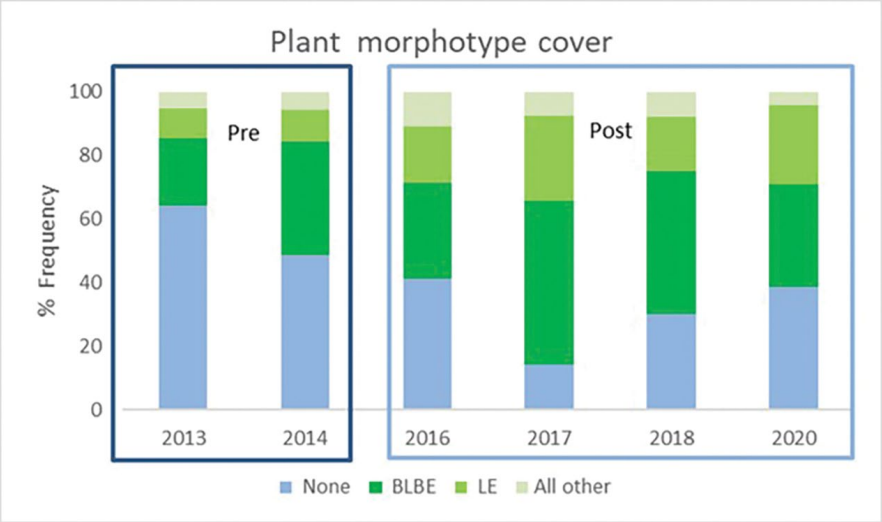

Drone imagery of experimental site 3 showing winter conditions (January 2018, left) and summer growth (July 2018, 2019 and 2020) over a 3 year period.



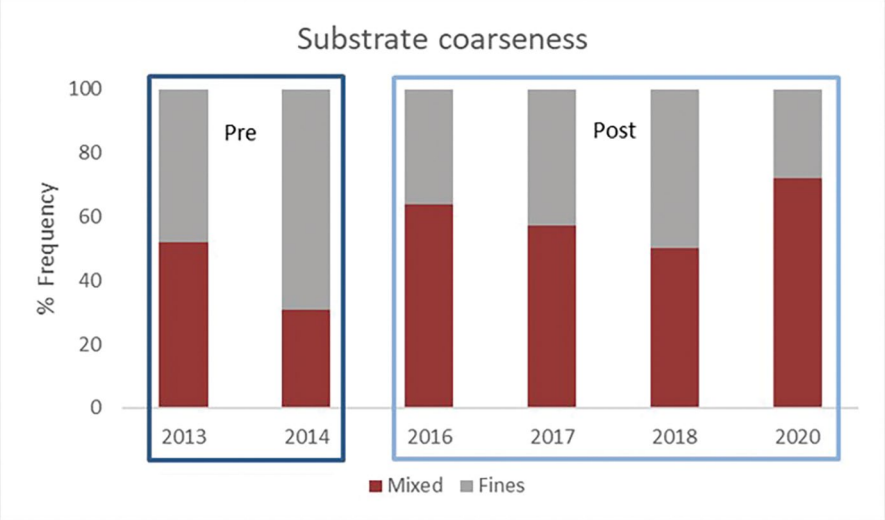

On site photos taken of experimental site 3 in September 2022 of spawning gravels available giving context to the plot generated displaying substrate condition. (CO – cobble; GP – gravel/pebble; SI – silt).

# Management implications

- When pressures are mitigated, rivers can re-naturalise over a relatively short timeframe
- Instream vegetation is a key component of river function and the river's ability to support a diverse range of flora and fauna
- Longer periods between maintenance are recommended allowing natural river processes to reset. Increased velocities in the wetted channel enable the river to curb vegetation growth
- Shorter periods between maintenance encourage excessive vegetation cover, reducing conveyance capacity
- Effective implementation of the OPW's Environmental Drainage Maintenance protocol's ten steps including berm management and selective vegetation removal should be encouraged (Brew & Gilligan, 2019)




Proportion of linear emergent (e.g. reed canary grass and burr reed) increased at the stabilised channel margins whereas the proportion of branched broad leaved emergent (e.g. water cress and fools water cress) has reduced by the end of this survey period.




Fine silts have reduced from 50-70% in pre-survey period when maintenance was routinely occurring, to approximately 30% of total substrate in 2020.

## Further information:


**Project website:** https://www.fisheriesireland.ie/what-we-do/research/environmental-drainage-maintenance-research-programme-edmrp
**IFI publications:** https://www.fisheriesireland.ie/publications search for EREP Annual Report 2022, 2020, 2018, 2017
**OPW Environmental Management:** https://www.gov.ie/en/policy-information/5fc871-environmental-activities/
O'Briain, R., Shephard, S., McCollom, A., O'Leary, C. and Coghlan, B. (2022). Plants as agents of hydromorphological recovery in lowland streams. Geomorphology, 400, 108090. https://doi.org/10.1016/j.geomorph.2021.108090
O'Briain, R., Shephard, S. and Coghlan, B., 2017. Pioneer macrophyte species engineer fine-scale physical heterogeneity in a shallow lowland river. Ecological Engineering, 102, 451-458. https://doi.org/10.1016/j.ecoleng.2017.02.047