

**Rebalancing of riparian vegetation to address areas affected by  
excessive shading –  
Monitoring Report**



**Action C5**

**LIFE09 NAT/IE/000220 BLACKWATER SAMOK**

June 2015

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## Executive Summary

Riparian tree pruning was carried out along 3.11km within a 6.46km length of river bank.

Pruning concentrated mostly on Willow and Alder.

Pruning concentrated on more heavily shaded areas, where incident sunlight was reduced by tree cover.

Pruning works avoided areas with high Freshwater Pearl Mussel densities.

Cuttings from these pruning exercises (willow pruning and coppicing) were used to plant other reaches of river where riparian cover was limited or absent.

Pruning work was carried out after careful planning and agreement with the local angling club and the Duhallow Angling Centre of Excellence, to ensure that angling concerns were taken on board. The exercise also permitted the opening of new angling areas taking angling pressure away from more sensitive areas in terms of Freshwater Pearl Mussel.

## Background

Tunnelling of a river channel is the overshadowing of the water body by river edge vegetation. Tunnelling is usually caused by the sudden change from one land practice to another (e.g. cattle to sheep or result of drainage works) where the succession of trees normally associated with established old forestry canopy does not occur due to the narrow extent of the riparian zone and adjacent land practice (Igoe, 1999). The resulting dense stands of plants, mainly trees, can have a significant effect on and aquatic plants (O'Grady, 1993), aquatic macroinvertebrates and freshwater fish.

The rates of both photosynthesis and respiration in macrophytes, especially submerged species, are directly related to temperature (Menendez & Penuelas, 1993). Thus, many aquatic plants are sensitive to over-shading as the resulting cooler waters limits their ability to photosynthesise (Raynor & White, 2010). As a result, stretches of river with very dense riparian vegetation can lack healthy aquatic vegetation in the channel. Macrophytes provide habitat for a variety of aquatic macro-invertebrates (Thomasz & da Cunha, 2010; Strayer & Malcom, 2007), which in turn provide foraging habitat for many fish species. Macrophytes are an important source of potential macroinvertebrate prey for juvenile salmon (Caraco & Cole, 2002; O'Grady, 1993). One study found that tunnelling by unmanaged riparian vegetation can lead to a potential 70% reduction in the production of Atlantic salmon stocks (O'Grady, 1993).

Thus, the aim of Action C5 was to reduce tunnelling along selected stretches of river to increase the numbers of grazing aquatic macroinvertebrates that are a primary food source for juvenile Atlantic salmon. This can contribute to improved conditions for other species of fish and the mammals and birds that prey on them (Raynor & White, 2010).

Action C5 of the DuhallowLIFE Project involved the pruning and coppicing of trees along 6.84km of riverbank. This involved removing trees and heavy limbs for sites which were deemed to have insufficient light reaching the channel and the pruning of limbs from trees where there was potential for future tunnelling.

## Site Description

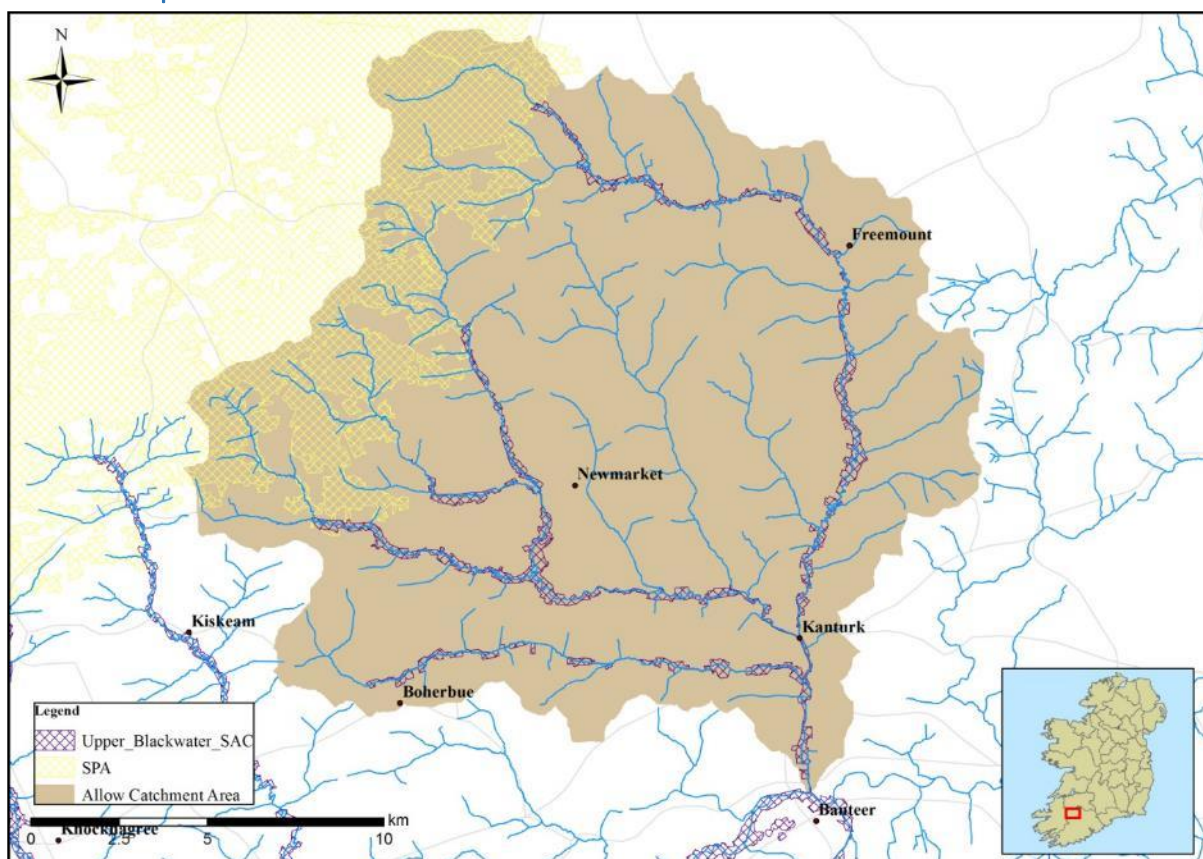


Figure 1 River Allow catchment area targeted by the DuhallowLIFE Project (LIFE09 NAT/IE/000220 Blackwater SAMOK)

The River Allow catchment is 310km<sup>2</sup> (Figure 1). The three major rivers that drain the catchment are the Allow, Dalua and Brogeen. The main agricultural land use in the catchment is pasture with dairying and sucklers forming the majority of farming practices.

The majority (70%) of the soils in the Allow catchment are deep, poorly drained mineral soils. Blanket peat covers approximately 5% of the catchment, mostly in upland reaches. Mineral alluvium is associated with the river channels, while shallow well drained mineral soils make up the remaining soil type in the catchment (EPA/Teagasc, 2006; Tedd, 2014).

The River Allow catchment rivers (Allow, Dalua, Brogeen, Glenlara and Owenkeale) form part of the Blackwater River (Cork/Waterford) Special Area of Conservation (Natura 2000 site code: 002170). These tributaries provide important habitat for Freshwater pearl mussel *Margaritifera margaritifera*, Atlantic salmon *Salmo salar* and European otter *Lutra lutra*, all of which are listed in the Annex II of EU Habitats Directive.

The upper reaches of the Allow catchment contain the Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle Special Protection Area, which was designated as such for Hen Harrier *Circus cyaneus* (listed in Annex I of the EU Bird's Directive).

## Methods

- Three Sites which were viewed to cause a tunnelling effect on that section of river (before and after photographs were taken of the sites) were selected for the removal of large tree limbs.
- Four Rural Social Scheme (RSS) participants were trained in the use of chainsaws to remove these limbs.
- Pruning and coppicing of smaller trees and limbs were conducted as pre-emptive works to sites deemed to be imminent problems. Additional growth in these sites would either cause tunnelling or would slow the flow of the river enough to pose a flood risk.
- Before any works were conducted all relevant landowners were consulted to ensure full cooperation and communication.
- As required by Section 40 of the Wildlife Act 1976 and amended by the Wildlife (Amendment) Act 2000, all limbing and coppicing were done within the prescribed season.
- All health and safety considerations were discussed prior to works, and procedures were put in place to avoid any unnecessary risk.

## Results & Conclusions

In total, riparian tree pruning was carried out along 3.11km of a 6.46km length of river bank (Figure 2). The before and after photos (spanning a 3-year period from 2011 to 2014) show the extent of trees and branches removed from the banks of the Allow, Brogeen and Dalua Rivers (Table 1). The selective removal of trees and shrubs can result in a dappled effect that allows light to penetrate the water. This encourages photosynthesis of macrophytes while keeping temperatures low (Forest Service, 2000).

The successful reduction in tunnelling can be expected to contribute to overall stream health as a decrease in shading increases the occurrence of vascular plants (Hrivnák, *et al.*, 2010). In stream vascular plants are an important component of freshwater food chains, particularly as they serve as refuges for macroinvertebrates. An additional spinoff from the work has been an improvement in the river from a recreational point of view. Much praise has been directed towards the project from both the farming and angling community as these works have improved angling facilities in the catchment.

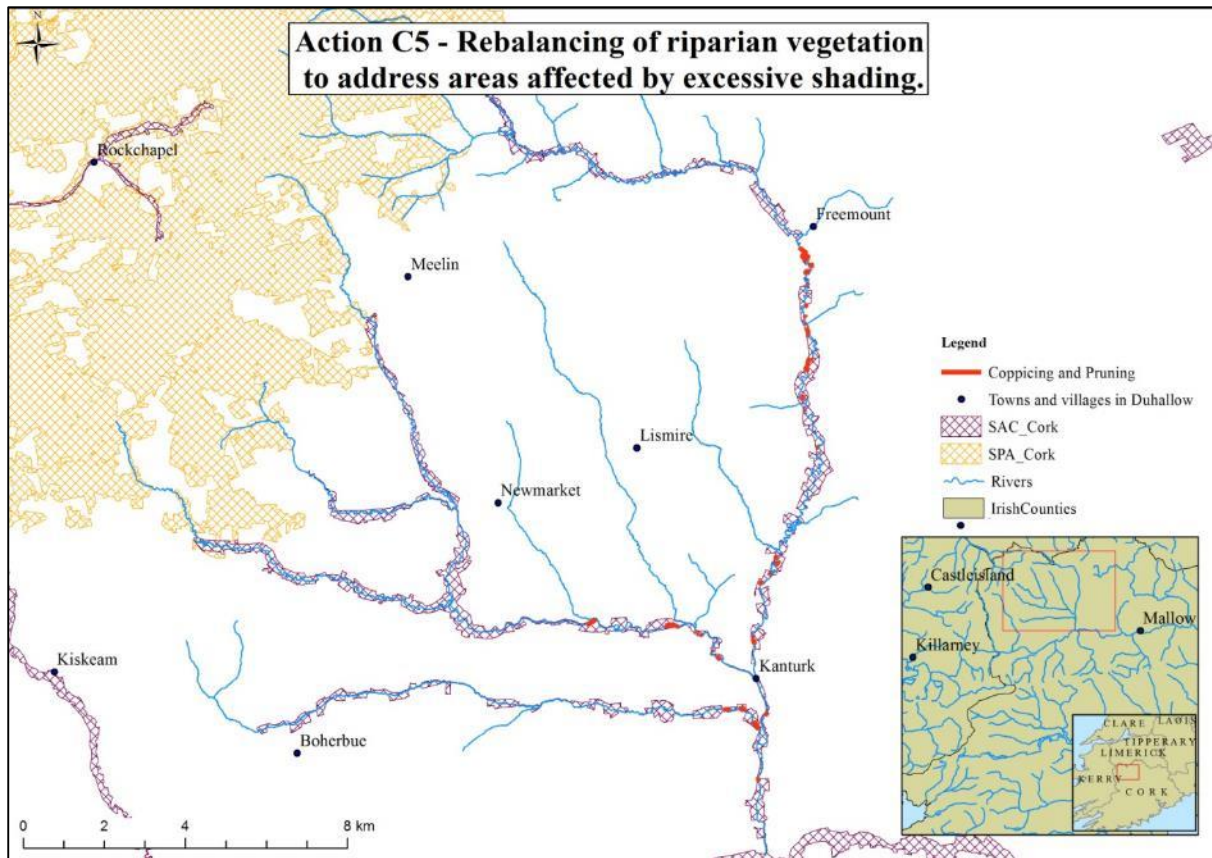


Figure 2 Extent of coppicing and pruning conducted along the Allow, Dalua and Brogeen Rivers.

Table 1 Sites along the Allow, Dalua and Brogeen Rivers where coppicing and limbing were conducted (before and after).

Before	After
Allow (ITM: 539317, 610073)	
<p>May 2011</p>	<p>Feb. 2014</p>
Brogeen (adjacent to Kanturk Castle) (ITM: 538188, 601804)	



A lot of the works carried out with regard to reducing over-shading were pre-emptive. Willow trees planted by DuhallowLIFE and Inland Fisheries Ireland (Gillespie, 2015) run the risk of over shading and blocking the river. Pruning the limbs of these willows reduced this risk as well as providing slips and stakes for planting elsewhere in the catchment.

Future work should continue to monitor the extent of current and potential tunnelling along these rivers, and management may need to be adapted in the face of climate change. River temperatures are sensitive to changes in climate and water temperatures are expected to rise in the near future (Webb & Nobilis, 2009). Vegetation density in riparian areas can influence shade and water temperature (Leinenbach, *et al.*, 2013). Hence, if shade is entirely removed water temperatures may rise and negatively affect fish and other aquatic species (Sweeney & Newbold, 2014). Thus ongoing monitoring and timely pre-emptive action are critical for healthy rivers.

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## Appendix



Figure 3 Bankside view of coppiced and removed trees along the Brogeen



Figure 4 Trees cut down in the process of Action C5 were stockpiled and used to construct log piles for Action C7



Figure 5 Otter log pile (Action C7) built with timber cut-offs from Action C5



Figure 6 Bankside view of removed trees along the Dalua River



Figure 7 Pruned tree limbs were collected and used for Action C6