

MODIFICATIONS TO THE MAIGUE RIVERS

We have modified river systems throughout civilisation for production (agriculture), protection (flood defence) and navigation purposes. Maigue river modifications include **Channelization, Embankments, Drainage Channels, Outfalls, Weirs, Locks, Dams, Sluices, and Crossings**. These features break natural connections by influencing river flow and the relationship between river sediment loads, nutrients, water quality and plant and animal life. For example, dredging and hard embankments upstream increase water levels and the speed of water flow, and this can increase the risk of more frequent and severe flooding downstream

- with severe consequences for towns and villages in the Maigue catchment. Areas of significant flood risk include Adare, Croom, Kilmallock and Charleville. Weirs were originally constructed to control river flow but now act as **Barriers** and put natural habitats at risk. These modifications are known as **Hydromorphological Pressures** and can influence the **Resilience** (recovery) of river ecological systems. Changes in land use and water regime on flow, water level, residence time, connection to groundwaters, water level variation, river bed structure and water

edge features as a result of human disturbance can result in increased sedimentation pressure, which results in ecological change.

RIVER RESTORATION

Barriers such as embankments and dams (hard engineering methods) stop water from spreading and regulate and control the flow of water. **Natural Flood Management** (or soft engineering) including tree planting and wetland restoration reduce the amount of water reaching the river, and the time it takes to do so, as well as providing wildlife habitat. River restoration involves work to return a river to a more naturally functioning system. An understanding of what controls a river system is necessary to determine what a river needs to be able to act more naturally.



HOW TO FIND OUT ABOUT THE MAIGUE RIVERS

The following is a non-exhaustive list of online resources with hyperlinks to help you find out more about the Maigue Rivers and catchment area.

- [Shannon Estuary South](#) - The Maigue is part of Shannon Estuary South
- [EPA Monitoring Data for the Maigue Rivers](#) - Sub-catchment data can be found here
- [EPA Catchments](#) - Data on water and catchment features, protected areas, water status and pressures
- [Historic Environment Mapviewer](#) - Historical maps can be useful to see how the Maigue rivers have been modified in the past
- [Water Levels in the Maigue](#) - Real time water level data (click on water body column and filter using river name)
- [Flood Maps](#) - Flood risk and flood management information
- [Local Authorities Water Programme](#) - Support for local communities who wish to get involved in the care of their local waters
- [Maigue Rivers Trust](#) - Work with local communities to ensure that the rivers and lakes of the Maigue catchment can achieve their full potential both environmentally and recreationally
- Angling Groups on the Maigue - [Kilfinane & Kilmallock Anglers Association](#), Camogue Angling Club, Croom Anglers, [Bleach Lough Anglers](#), and [Irish Angling & Social Club Lough Gur](#)

Reports

- [Status of Fish Stocks in the River Maigue Catchment](#)
- [Maigue river catchment Characterisation](#)
- [River Maigue Catchment: Instream Biodiversity, Crayfish & Otters](#)
- [Social and Environmental History of the Maigue River](#)
- [Assessment of Habitat Quality and Future Directions for Enhancement of the River Drumcomoge](#)
- [Maigue Riparian Report Wetland Survey Ireland](#)
- [Assessment of Habitat Quality and Future Directions for Enhancement of the River Drumcomoge](#)

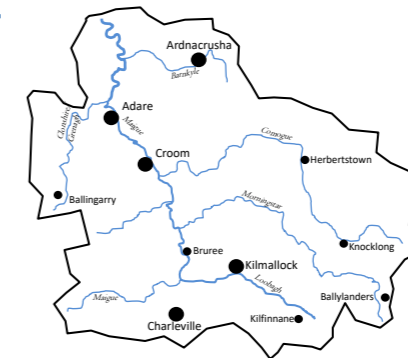
UNDERSTANDING THE MAIGUE RIVERS



This factsheet introduces the Maigue rivers and catchment area in County Limerick. The information will give a basic understanding of how the rivers work and the influences of the land that surrounds the river.

THE CATCHMENT

A **Catchment** is the area of land from which surface and underground water flows into streams, rivers and wetlands. The Maigue catchment encompasses 1,300km of river channel, drains a land area of 1122km² and contains key feeder streams (**Tributaries**), Loobagh, Morningstar, Comoge, Clonshire/Grenagh, and Barnkyle, which join together to form the main Maigue channel. The mostly low-lying catchment area is bounded by natural features such as the Mullaghareirk Mountains to the west, the Ballyhoura Hills and Galty Mountains to the south east, and the Slievefelim, Arra and Slieve Bernagh Mountains to the east/north-east. Water from these upland source areas (**Headwaters**) flows into, and collects in, the lowest areas in the landscape forming rivers with characteristic **Upper, Middle** and **Lower Course** features. The system of streams and rivers of the Maigue is called a **Drainage Network**. The river transports fresh water, sediment and other materials in a northwards direction where it empties (**Discharges**) into the salt water of the Shannon estuary. Extensive deposits of river



sediment (**Alluvium**) are typically found along the outer edges of river channels at the river-estuary mouth or terminus, particularly in the region north of Adare where there are extensive (**Delta**) mudflats.

- Catchments vary in size from small (Loobagh) to large (Maigue)
- The catchment is made up of a 'jigsaw' of smaller tributary (sub) catchment areas
- Each catchment differs in size, shape, drainage pattern and geographic features

The upper, middle and lower courses of the Maigue rivers each have their own characteristic features from steep waterfalls to meanders and floodplains and finally estuarine mudflats.



1. The Catchment
2. River Features
3. Natural Processes & Controls
4. Modifications to the Maigue Rivers
5. River Restoration
6. How to find out more about the Maigue river



RIVER FEATURES

Rivers are complex and dynamic systems with natural controls at different geographic **Scales** (from large catchment areas, to tributaries, reaches or sections, to channel cross-sections) and along their pathways from source to sea. Rivers are dependent on their permanent environmental settings (e.g. geology, slope) and transient environmental conditions (e.g. rainfall, **Velocity** or speed of water flow). It takes time to become familiar with how rivers behave. First, we understand rivers at different geographical scales (**Catchment, Reach, Local**) and there are some general trends along the river path common to most rivers.

Catchment Scale – the entire Maigue

Meteorology - rainfall and temperature control water flow, sediment load and discharge to the Shannon estuary

Hydrology - movement of water from the atmosphere, to land and then into the river following a rainfall event

Topography - the lie of the land affects the flow pathway, floodplain development and channel width. Channel slope controls land runoff to the river, speed of flow and sediment carried in the river water

Land use - agriculture, forestry and residential use of the land affects water quality, sediment supply and flood responses

Reach Scale – a section <10km (e.g. a tributary of the Maigue)

Reach - a section of river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope

Location - upper, middle or lower position in the catchment

Riparian - river bank vegetation marking the transition from land to water

Flow regime - discharge (speed - velocity) of the river in response to rainfall events

Sediment regime - sources of eroded sediment from land and how it moves through the river

Ecology - the natural plants, animals and habitats and problematic invasive species

Floodplains - an area adjacent to the river that is regularly covered with overflows and seasonal floods

Human Modifications - artificial features including weirs, embankments, fences, drains and bridges. These modifications in/

adjacent to the river channel have upstream (e.g. fish migration) and downstream impacts

Fishing - Anywhere a fishery exists in freshwater there is a right to fish (there are five angling clubs in the Maigue catchment area)

Local Scale

Channel morphology - depth, shape, layout, cross-section.

Historical and current day morphologies have changed. A good example of this is seen...

River access is mainly in towns and villages. It is important to consider weather conditions, river accessibility, safety and restrictions e.g. nesting or spawning seasons, when undertaking walks in the vicinity of the Maigue Rivers

Access - the Maigue rivers flow through private property and permissions for access must be obtained

Land ownership - contact the land owners and seek permissions for access to the river

River Sediment

Sediment - may include soil and rock particles, living organisms, organic debris, chemicals and pollutants

Erosion - sediment is detached from rocks/land/soil by erosive weathering and runoff by flowing water

Transport - sediment is transported (pushed, carried) by water. More flow means more sediment

Deposition - Settling or deposition of sediment occurs when water flow slows down

Sediment load - The total load includes all particles moving as **Suspended Load** (in the water column) and **Bedload** (on river bottom).

NATURAL PROCESSES & CONTROLS

An understanding of natural processes and controls in the Maigue river catchment, and the connections between the land, water, habitat, plants and animals is important. Once you understand how your river should function naturally you can identify the issues associated with river modifications.

Hydromorphology

The natural function of a river is to transport water and sediments, eroding and creating landforms as well as constructing habitats for plants and animals. **Hydromorphology** or physical river characteristics determine the rate of movement of water and sediments through the catchment drainage network. The river erodes, transports and deposits sediment from the headwaters in the upper reaches of the catchment (e.g. Ballyhoura Mountains) to the lower downstream river and estuary. Erosional (**Degrading**) conditions occur in headwaters while depositional (**Aggrading**) conditions occur in the lower courses. Natural morphological characteristics such as waterfalls, pools, pinch points and intact bankside vegetation (**Riparian**) are key controlling features which exert vertical and horizontal control and thus connection between the river channel, its river bank and its floodplain. River processes act along the vertical (longitudinal) profile of the river influencing plants and animals while horizontal (lateral) processes influence seasonal migration (expansion, contraction) of the water channel. These **Land-Water Connections** are vital for healthy river and ecosystem quality.

Riparian Vegetation

River, lakeside, coastal and wetland vegetation is known as **Riparian** vegetation and includes ground plants, thorny scrub and trees. The riparian zone is the transition (**Ecotone**) between terrestrial and aquatic environments. Riparian plants and animals can **Bioengineer** (ecologically enhance) habitats. Rooted riparian vegetation helps stabilise river banks providing protection (**Buffer**) from the powerful force of flowing water. The vegetation in this riparian buffer zone intercepts, reduces and slows the quantity of run-off from the land. The riparian zone also traps sediment

moderating the river sediment load and controls water temperature, creating optimal conditions for cold water fish such as trout and salmon.

Ecology

The Maigue rivers have a high diversity of habitats from headwaters to terminus with **Spatial** (geography) and **Temporal** (time) variability and differences in physical, chemical, and biological characteristics. Organisms exist in food chains and food webs of varying complexity. Land runoff of soil **Organic** (plant and animal) debris and sediment loads support the river food web. **Rooted Plants** are largely immobile, and will respond to local changes in sediment and water depth. In contrast, fish and river insects (**Invertebrates**) are highly mobile, and generally reflect and respond to whole river conditions. Wildlife in the river have adaptations to withstand river currents and enable upstream movements for reproduction (**reduced body size, streamlined body shapes, body gripping structures**), while some depend on the presence of other plant or animal species for their own survival, such as the **Freshwater Pearl Mussel** who depends on salmonid fish to complete their reproductive cycle.

River Plantlife

Periphyton - algae attached to aquatic vegetation, rocks, gravel and wood

Floating-leaf plants - found near-shore or in sheltered areas, rooted or floating roots

Submergent plants - rooted and growing underwater from shallows to deeper waters; leaves may be floating

Emergent plants - roots may be underwater but grow and flower at water surface (can reduce water velocity)

Phytobenthos - green algae, diatoms, cyanobacteria or blue-

green algae (grow on the bottom/sediments)

Animal Life

Zoobenthos - shrimp, worms, sponges, molluscs (live on bottom/sediments)

Invertebrates - insect group (e.g. caddisfly, stonefly, mayfly, beetles) non-insect group (e.g. leeches and worms)

Fish - the best known group of aquatic organisms

- **Salmon** live only in very clear well-oxygenated deeper water
- **Eel** - are widely distributed in the catchment after migrating across the Atlantic ocean
- **Perch** - a non-native species in Ireland, introduced sometime after the 12th century
- **Lamprey** - are eel-like jawless fish who play an important role in river ecosystems and have high conservation value
- **Minnow** - also known as 'pinkeens' are a small fish that feed on algae
- **Crayfish** - a native shellfish species and food for trout and eels, are found widely distributed in the main Maigue channels

Fish in the Maigue Rivers

Seventeen fish species have been recorded from the estuarine and freshwater areas of the Maigue catchment. **Brown Trout** are the principal non-migratory fish in the catchment. Historically, the Maigue was renowned as a **Salmon** and **Eel** fishery. **Arterial drainage** (drainage of the main river arteries to reclaim water logged lands) in combination with deteriorating water quality heralded a decline in the river habitat and fishery. Shallow waters in particular have enormous significance for fish in terms of spawning grounds, nurseries and feeding areas. Alterations in land-water connections and access to spawning areas are critical features affecting fish populations.

