



VITAL SIGNS

Pioneering a Palaeoecological understanding of the River Ercht and its catchment

“At their core, the problems we face today are no different from those our ancestors faced:
how to find a balance between what humanity takes from Nature and what we leave behind for
our descendants.” – *The Dasgupta Review*

cateran
EC©
museum

THE CATERAN ECOMUSEUM

The Cateran Ecomuseum is a museum without walls – all our sites are outside. Designed to reveal the hidden history of Cateran Country by the community who live here, it tells the story of its people, places and landscapes, from pre-history to the present day.

Originating in France in the 1970s, Ecomuseums focus on the identity of a place with the term “éco” being a shortened form for “écologie”. Still a relatively new concept, there are around 300 worldwide, mostly in Europe, but there is only one other in Scotland, on Skye.

Set in specific landscapes, they offer:

- an opportunity for local people to share the unique heritage of where they live in a way that is meaningful to them and which preserves the objects, sites and cultural practices they value.
- a holistic nature and culture frame for the interpretation of cultural heritage, quite different to traditional museums' focus on the specific items and objects of their collections, sited inside a building.
- a focus for community empowerment and regenerative tourism.

VITAL SIGNS is part of our current '[Museum of Rapid Transition](#)' programme, which aims to show how the story of our past can help shape the story of our future.

We believe that engaging people with their natural and cultural heritage has huge untapped potential to help both our communities and our visitors take rapid climate action, transitioning to more regenerative ways of living.

Firstly, they are a knowledge and learning resource which can help contextualise what is happening, while supporting the development of practical skills and mitigation strategies to help build adaptive capacity.

Secondly, and very importantly, they are a participative force which can bring people together, challenge the status quo and create spaces – both physically and mentally – to help us imagine that anything is possible.

You can visit and enjoy the Cateran Ecomuseum through a series of pre-designed itineraries. Visit www.cateranecomuseum.co.uk to find out more.





BACKGROUND & INTRODUCTION

It is widely accepted that our planet home is in a biodiversity crisis.

In just a few decades, a large part of the world's biological diversity the result of tens of millions of years of evolution – has disappeared. What is being described as a sixth mass extinction event – driven by our destruction of habitats – is underway.

Added to this, our ever-increasing greenhouse gas emissions are causing global climate change – putting additional stress on the already severely damaged flora and fauna.

Here in Scotland, [The State of Nature 2019 report](#) found that the abundance of species in Scotland is falling at a faster rate than the UK as a whole, due to land management practices, pollution, house building and human induced climate change that have in many cases intensified over the last 5-200 years.

In response to these crises, individuals, communities, organisations and governments around the world are mobilising to prevent, halt and reverse the degradation of ecosystems.

There has never been a more urgent need to revive damaged ecosystems than now.

(UN Decade of Ecosystem Restoration 2021 – 2030)

VITAL SIGNS is part of that global mobilisation - the first stage of a programme of work, which aims to generate greater engagement with and stewardship of the Ecomuseum's river system¹ by local people and visitors.

¹ River Isla, Alyth Burn, Shee Water, Blackwater, River Ardle, River Ericht, and Lornty Burn

Focusing initially on the River Ericht and its catchment, a series of activities took place during 2021, which begin to reveal its past and present ecology – laying the foundations for a better understanding of how the story of our past might help guide the story of our future:

- **A desk-based palaeoecological study** of the River Ericht and its catchment reviewed the landscape and land-use history over the last 10,000 years. This revealed the layers of human and environmental history that shape contemporary landscapes, making them more visible.
- **An assessment of potential sites for future coring** in the catchment area (which would enable sediment and pollen analyses from past eras) identified a number of lowland and upland sites that could be investigated in the next stage of the project. This would yield important information on past ecological and climate changes.
- **A new Geotour was developed** in the Ericht's broader catchment area at Glenshee, which offers insights into the physical evidence left by the last glaciers in Glenshee c11,700 years ago.

Engaging local people in present day environmental observations offered:

- **Tree Surveying** in Craighall Gorge – one of the Ecomuseums last remnants of designated Ancient Forest and a Special Area of Conservation.
- Volunteers recruited by the Ecomuseum were invited to assist the Tay Ghillies Association in collecting data for their **Smart Rivers Project**.
- A **Bioblitz** event on the banks of the Ericht in Blairgowrie – the first ever undertaken in this area – gave local people the opportunity to get to know more about the Flora and Fauna in and around the river today.

In addition to this leaflet, which aims to summarise what we found, a short film was made, which can be viewed [here](#) and a proposal was designed for further stages of work.





THE RIVER ERICHT

The River Ericht is formed from the confluence of the River Ardle and the Blackwater at Bridge of Cally. It runs south for around ten miles before discharging into the River Isla and eventually the River Tay.

The 1791 – 1799 Statistical Accounts (considered to among finest European records of life during the agricultural and industrial revolutions) recorded that *'from its rapidity, (it) has acquired the appellation of the Ireful Ericht... Its channel is very rocky and uneven and it often varies in its depth and breadth. The banks in many places are so low, that it frequently overflows them, and does considerable damage, especially at harvest. In other parts they rise to a great height, are very rugged, and often covered with wood.'*

This excerpt refers to Craighall Gorge – Scotland's second deepest gorge and the site of one of the Ecomuseum area's remnants of designated Ancient Woodland. Its sides *'rise at least 200 feet above the bed of the river; and on the west side, are formed, for about 700 feet in length, and 220 feet in height, of perpendicular rock, as smooth as if formed by the tool of the workman.'* Considered one of the most romantic scenes in North Britain, it is said to have influenced Sir Walter Scott's imagined great house of Tully-Veolan: *'Here hawks nestle, and their young ones have been frequently carried away by falconers from different parts of the kingdom. Here also the natural philosopher and botanist may find ample amusement ... (and)from Keith for about two miles down the river, there is the best rod fishing to be found in Scotland.'*

Its rapid and often turbulent water course, which descends 80 metres (262.4ft) from its headwaters at Bridge of Cally, powered the many textile mills (spinning flax, jute and latterly rayon) that grew up along its banks during the 18th and 19th centuries in Blairgowrie, turning the town into a hive of industry and innovation, while contributing to the transformation of the surrounding landscape.

Today the Ericht is primarily a leisure destination offering a number of riverside walks, including one developed by the Ecomuseum on the [textile mills](#).

The three principal livelihoods that are still supported by the river are angling (for salmon, sea trout, brown trout and grayling), trout farming (for eating and re-stocking lochs in Scotland) and farming (as a local water source).

WHAT IS PALAEOECOLOGY & WHY IS IT RELEVANT TODAY?

Palaeoecology (palaeo means old) includes a range of scientific methods with a common goal: to provide an understanding of how ecosystems and individual species function and change over long time periods – where ‘long’ can refer to decades, centuries or millennia.

Whereas historians use written archives, palaeoecologists rely on natural archives, that is, sediments like peat and lake mud that build up over time and store signals from the environment in that process. Waterlogging in these natural archives reduces decay, so indicators from the environment – in the form of pollen grains, charcoal fragments, plant, fungal and insect remains, minerals, heavy metals and chemical pollutants – do not decompose and are preserved in layers of peat and mud that accumulate over time. These indicators are often referred to as ‘proxies’ because they allow us to reconstruct conditions that we cannot directly observe.

"When we try to pick out anything by itself, we find it hitched to everything else in the Universe."

John Muir

Environmental proxies complement and extend archaeological and historical evidence by providing the environmental and natural resource context within which past settlements and economies functioned. Palaeoecology can also contribute to broader topics, like climate history, and can be used in conservation and environmental management to test the accuracy of the baselines underpinning current conservation, rather than based on supposition about what is ‘normal’ or ‘natural’, or about events and processes that predate monitoring systems and human memory.

Regeneration practitioners recognise that understanding the long-term historic condition of an ecosystem can help define baseline conditions and inform restoration goals. As a result, palaeoecology is an important part of the ecosystem management and restoration toolkit.



WHAT DID THE DESK-BASED STUDY DISCOVER?

Dr Althea Davies, from the School of Geography & Sustainable Development at the University of St Andrews, conducted the desk-based study.

The report set out the broad sweep of change over the last 10,000 years along the course of the River Ericht, highlighting the diversity of landscapes through time and space where upland and lowland environments intersect.

Whilst there are no pollen records from within the course of the River Ericht, because it has a bed of bedrock or glaciofluvial gravel, sand and silt – with no marshy backwaters or oxbows that would be suitable for lake formation or the accumulation of peat – there are palaeoecological sequences from upland and low-lying areas either in or just beyond the catchment of the Ericht.

The quality of these records is variable, but they do allow us to track the establishment, changing composition and subsequent fragmentation of woodland cover, understand how farming altered the landscape and the origins of current features, like woods and fields.



From Tundra to Woodland (c11,700 – 8,500 years ago)

In general terms, the Ericht lies in the region of Scotland that was colonised by mixed deciduous woodland, mainly dominated by oak with hazel and elm. But species composition varied depending on altitude and soil type, and tree cover was by no means continuous.

Peat began to form in water-collecting basins and valley floors as early as 10,500-9,800 years ago, which together with active floodplains and exposed summits and ridges would have created a relatively open landscape consisting of a mosaic of woods, peat and grass or heath.

It is unclear from the palaeoecological evidence whether Mesolithic hunter-gatherers were active in this area. The scale of their impacts on vegetation may have differed little from disturbances such as windthrow, animal browsing or gap-replacement dynamics, where the death of mature or diseased trees created openings in the canopy for other trees to replace them. As a result, any deliberate or incidental disturbance by people may be indistinguishable from 'natural' factors.

From Woodland to Farmland (c6,000 – 3,000 years ago)

The first farming communities became established in a generally well-wooded landscape, which persisted until a feature called 'elm decline' around 6,000 to 5,000 years ago - identified through pollen sampling - signals a transition and permanent shift in the composition of the woods. This was probably caused by a combination of climate change, human impact (e.g. felling, grazing, harvesting 'leaf fodder') and disease (like the fungus responsible for Dutch elm disease in the 1970s). At sites in both Strathmore and the uplands to the north, the elm decline coincided with reductions in the abundance of other tree species, suggesting woodland opening, possibly through felling (an arduous task with stone axes), burning or through persistent grazing, which could have suppressed regeneration.

Records show that arable farming (growing crops) could have been a rather late adoption in the area, around 3,000 years ago, although some scholars suggest that small-scale 'forest farming' might have taken place during the Neolithic period, from around 6,000 years ago.

Many narratives of woodland cover, especially in the Scottish uplands, revolve around negative stories of human clearance and mismanagement. The evidence from around the Ericht shows that this is far too simplistic and misrepresents a complex history.



While the long-term trend in tree cover was generally downward, this took place over millennia, i.e. very many human generations, and occurred in fits and starts. It is likely that there were multiple phases of woodland reduction and recovery between 5,700 and 4,200 years ago, each lasting several centuries and most probably driven by variations in grazing intensity.

Tree composition also changed over time, creating a shifting landscape mosaic. The intermittently increasing open ground was covered in a mix of grass and heath, with heather more common in the hills and grassland more extensive in the low-lying valleys. Both were used for grazing livestock.

Agricultural expansion is recorded across central Scotland during the Iron Age (around 2,800-1,500 years ago) but larger-scale mixed agriculture was not established in Strathmore until the early first millennium AD. There are too few well-dated records to tell whether this late date is representative of the wider landscape.

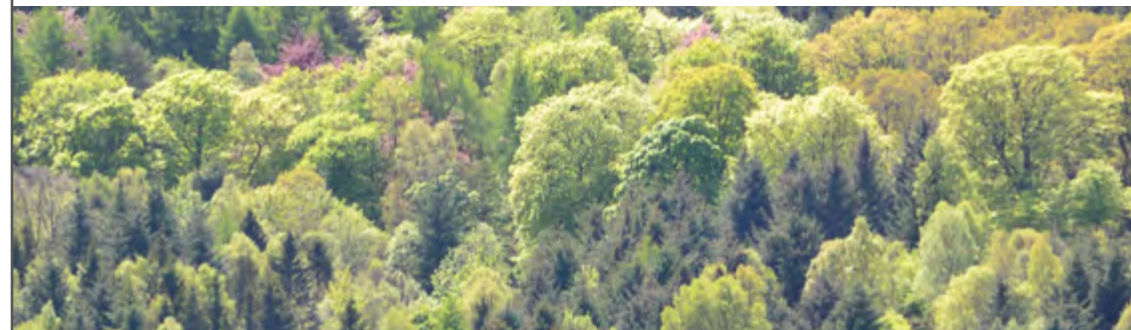
From prehistory to modernity (c600 – 1,000 AD)

The pollen record from the acidic hillslopes at Lair in the northern part of the Ericht catchment area suggests that cultivation was as central to the upland economy from the seventh to tenth centuries AD as it was in adjacent Strathmore and may have been facilitated by a period of relative climatic warmth. The close correspondence between the pollen record of cultivation and radiocarbon dates from the archaeological structures excavated at Lair, which had a dwelling area at one end and byre at the other, raise the possibility that they were used to concentrate manure to fertilise arable fields.

In contrast, other parts of the uplands, such as Carn Dubh, towards Pitlochry, were used only for grazing. This shows that a patchwork of trees and open, grazed and cultivated ground continued through the Pictish and early medieval periods.

Unfortunately, once we arrive at the historic period, when many more written and artefactual sources survive, the palaeoecological record for this area is disappointingly weak. In some places, this is because peat-cutting or drainage have destroyed the sediment. This in itself demonstrates the intensity of human impacts on natural resources. But in other locations, the pollen record has not been analysed in detail or been closely dated, making it difficult to compare the evidence from written and natural archives. All we can glimpse from the available palaeoecology, therefore, is a significant expansion of pastoral grassland – at the expense of tree cover – around Strathmore and the reinstatement of some tree cover, in the form of conifer plantations, from the late eighteenth to twentieth centuries in the Strathardle uplands around Loch Mharaich, 6 km north of the headwaters of the Ericht.

In summary, the study found that both ecosystems and land-uses seem to have been relatively resilient over a long period of time. There is no evidence for abrupt, widespread deforestation or climatically-induced upland abandonment – the two narratives that are often presumed to have taken place in the past, especially in upland ecosystems which are more exposed to climate shifts and more difficult to farm. Indeed, human choices (and the political and economic factors that stimulate these) are the most evident drivers of change in the area.



MAKING PAST & PRESENT KNOWLEDGE OF THE ERICHT'S ECOSYSTEM MORE ACCESSIBLE

The last glaciers In Glenshee

The River Ericht and its ecosystem exist, in large part, due to the fact that its northern catchment lies within the glaciated landscape of Glenshee. This has influenced both the formation of its watercourse and the soils and sediments that the river runs through. For example, Strathmore is a glacial plain whose red loam soil was deposited by a major ice sheet.

Environmental scientist Dr Richard Tipping has designed a self-guided walking itinerary for this project linking many of the landforms that are still visible in the Glen to the glacial processes that created them. You can access the itinerary [here](#).

The itinerary draws attention to physical features in the landscape that are best explained by the presence of ice. It explores how Glenshee was shaped by ice between 20,000 years ago and 11,700 years ago, before the first woodlands. In this way the immense scale and rapidity of past climatic changes is demonstrated. Those climatic changes impacted on the ecology of the Ericht catchment also. Of great significance to the 'Vital Signs' project is the discovery of former lake basins and peat bogs that can describe these ecological changes.

Among these is a small lake at Old Spittal, set within fantastic glacial landforms. The lake is a kettle-hole, its origin dating to the last time glaciers flowed down Gleann Beag. It has at least 4.2 metres of sediment. The oldest sediments will reflect the dramatic changes that occurred towards the end of the last glaciation, when the climate rapidly warmed and then cooled, re-introducing a glacial climate in Scotland. Its exploration in 2022 would provide great insights into a time poorly understood in Glenshee.

Equally important to our understanding of the chronology of glacial events is a peat bog at Westerton of Runavey (NO 134 693) which has been ponded by a moraine, the end of the last glacier to nudge into this side-valley from Glenshee. The earliest peat here will directly date this last glacier, an exceptionally rare opportunity.

Tree Surveying

Craighall Gorge, through which the Ericht runs, is a remnant of Scotland's Ancient Woodland's - defined as land that is currently wooded and has been continually wooded, since at least 1750.



Ancient Woods are important because:

- They include all remnants of Scotland's original woodland; their flora and fauna may preserve elements of the natural composition of the original Atlantic forests.
- They usually have much richer wildlife than that of more recent woods.
- They preserve the integrity of soil ecological processes and associated biodiversity.
- Some have been managed by traditional methods for centuries and demonstrate an enduring relationship between people and nature.
- Woods and veteran trees are ancient monuments whose value to the local community and historians may be as great as older buildings in a parish.
- Once destroyed, they cannot be recreated

“Ancient semi-natural woodland is an irreplaceable resource and, along with other woodlands, hedgerows and individual trees, especially veteran trees of high nature conservation and landscape value, should be protected from adverse impacts resulting from development”.

Scottish Planning Policy on
Ancient Woodland

The Craighall Woods are one of the most important remnants of native forest left to us. They are protected as a Site of Special Scientific interest and also of European significance as a classic example of upland mixed ash woodland associated with a gorge setting.

We know that back in the late 1740s there was almost complete woodland cover on both sides of the Ericht, from Craighall to north of Persie on the Blackwater and right up the Ardlie to north of Straloch. Roy's military maps² from 1747-55 show this and will probably be quite accurate as the rivers follow the military road from Blair to Braemar. These woods are a remnant of the patchwork of woodland that has coexisted with open ground for the last 3,000 years.

In preparation for the **VITAL SIGNS** project, we approached Nature Scot who reported that these woodlands had not been assessed since 2009.

We proposed to undertake a survey of the existing tree cover and natural regeneration within an accessible section of the woodland. Due to extreme rainfall and dangerous underfoot conditions this had to be curtailed, but it is hoped to continue this in 2022.

The survey revealed the absence of elm and the gradual dieback of ash – two key components of the original canopy. Both were dead or dying from human-introduced tree diseases. These key species will ultimately be replaced with self-seeding beech and sycamore, resulting in a very different woodland character. After almost 9,000 years of woodland cover, this area is continuing to experience profound changes which will have a long term impact upon the biodiversity of the Ericht catchment.

Additionally, an area of parkland in the centre of Blairgowrie – the site of a former textile mill - was also assessed for tree cover. Again, ash dieback was very evident, while another key species alder was also showing signs of serious decay. Naturally regenerated trees were dominant along the river bank, including ash, alder and willow, but they are being gradually replaced by longer-lived beech and sycamore – a similar picture to the one in the ancient woodlands of Craighall.



² The Roy Military Survey of Scotland, known to its contemporaries as the 'Great Map', is a uniquely important historical cartographic document. It provides a uniform graphic snapshot of the entire Scottish mainland at a time when the landscape was beginning an era of rapid change.

SmartRivers Project

Over recent years, anglers on the Tay system have raised concerns about decreasing fly life and falling numbers of wild fish, particularly in some spawning areas of the river system's upper reaches. At first glance the river looks healthy, but there are signs that something must have changed. The Tay Ghillies Association (TGA) has decided to sample the river for water quality pressures as part of the Salmon & Trout Conservation (S&TC) SmartRivers project. If they identify issues, the TGA will engage with the appropriate stakeholders to improve the situation.

The TGA is concentrating initial efforts on two important rivers in the Tay system – the Ericht and the Lochay – with a view to volunteers covering all rivers in the system over the next few years.

“For years the TGA has, perhaps, been too silent in its approach to conservation of the beloved salmon... at first glance the system looks healthy enough, but many anglers comment on the lack of fry life, fry, parr and brown trout where there was an abundance many years ago.”

Cohn O'Dea, Chair, Tay Ghillies Association

The Ericht is one of the most important spawning rivers in the Tay system and in recent years has been subject to increased pressures from pollution, abstraction and piscivorous birds. Working with the Tay Ghillies Association, we recruited local volunteers to help sample aquatic invertebrates at a number of points in the Ericht, Ardlie and Shee. The sampling and subsequent analysis highlights the number and types of invertebrates for each sample, indicating possible pollutants and low water level events which impact the habitat of wild fish.

2021 saw the start of the TGA SmartRivers programme with S&TC scientists benchmarking both rivers, each at five locations. Benchmarking took place in April and September. An entomologist analysed the samples and the invertebrate count was then modelled by S&TC. Findings are published for each site.



Happily, all five sites on the Ericht and five on the Lochay were found to be healthy. These will then be compared with the September Benchmarking results to ascertain any change.

The TGA and the Ecomuseum will continue sampling in the same locations to check for any trends from 2022 onwards.

The River Ericht's Atlantic Salmon Story

Atlantic salmon (*Salmo salar*) are found in the temperate and arctic regions of the northern hemisphere. They occur in the rivers of the countries that border both sides of the North Atlantic Ocean, and the Baltic Sea.

As an anadromous species, Atlantic salmon live in freshwater as juveniles but migrate to sea as adults, before returning upriver to spawn.

Atlantic salmon return to their native river, and even the same stretch of the river from which they were born, with amazing accuracy. This means that many 'populations' of Atlantic salmon may exist within the same river.

Spawning usually occurs from November to December, but may extend from October to late February in some areas, particularly larger rivers. About 90% to 95% of all Atlantic salmon die after spawning has taken place. Those that survive may spawn again.

Salmon are an incredibly important part of the ecosystem of rivers. These are astonishing creatures, travelling thousands of miles, coming back to spawn within a few yards of where they were born. Few creatures can match their natural history.

Andrew Graham-Stewart Salmon and Trout
Conservation Scotland



Female fish lay their eggs in gravel depressions known as 'redds'. As a female releases her eggs, an adult male (or mature juvenile) immediately fertilises them. The female then covers the fertilised eggs with gravel.

How long it takes for eggs to hatch (the incubation time) depends on water temperature. Eggs will usually hatch in early spring. The young fish, which still have a yolk sac attached, are called 'alevins'.

The alevins remain in the redd for a few weeks and emerge from the gravel in April or May, having absorbed the yolk sac. Now about 3cm in length, the fish are known as 'fry'.

Once the fish have developed markings on their sides, they're known as 'parr'. The parr will live in the river for two to three years depending on water temperature and food availability. On reaching about 12cm in length, the parr undergo a physiological transformation that lets them survive at sea. The young fish, called 'smolts', continue to change in appearance, becoming silver. These 'post-smolts' begin to leave rivers for the sea in late spring, with most fish gone by June.³

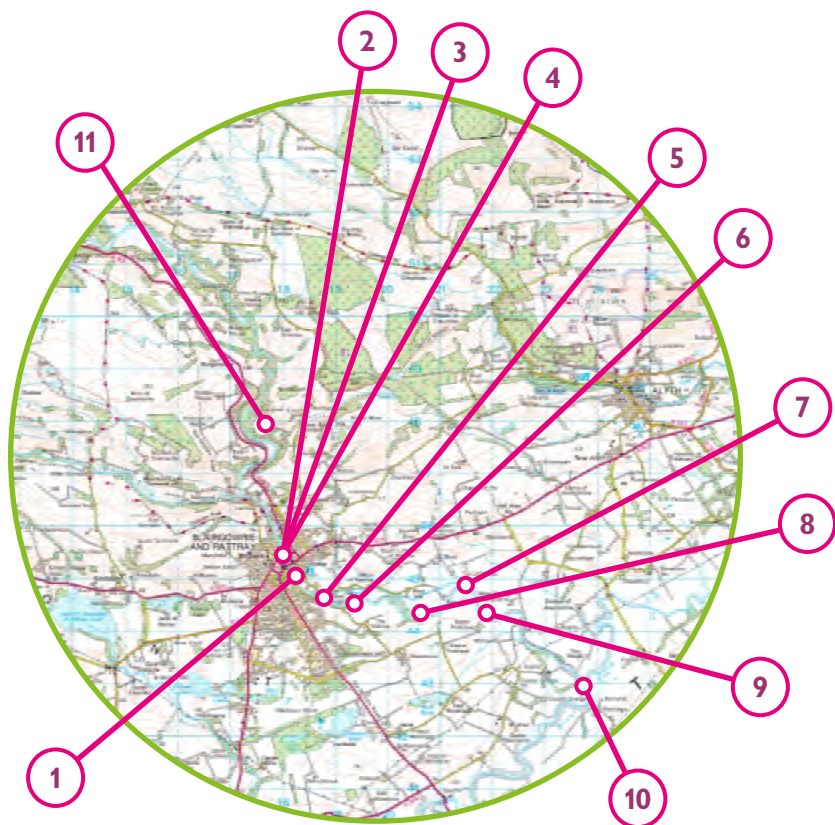
Historical records and contemporary reports tell us that Salmon were once plentiful in the River Ericht. Now their numbers are in steep decline.

“When I was young I remember standing on the Brig o Blair along with crowds to watch thousands of salmon making their way up river. You could “walk across their backs”. A fantastic sight. It was August 1971.”

Andrew Walker

Working with the Bob Mason from the Tay Ghilles Association and Grant Kellie, River Convenor for Blairgowrie Rattray and District Angling Association, this is what they told us about the Ericht's Salmon story today.

³ <https://www.nature.scot/plants-animals-and-fungi/fish/freshwater-fish/atlantic-salmon>



1. South weir (downstream of the Brig 'O' Blair). This is in a poor state of repair due partially to lack of maintenance (it is not clear who is responsible for maintenance of the weirs either side of the Brig 'O' Blair) and also to increased river flows, especially in the winter months. It is possible that these 'spates' are being caused by the milder winters associated with global warming. A fish pass was fitted in the 1950s to allow free passage to migratory fish, both smolts and returning adult salmon.

2. North weir (upstream of the Brig 'O' Blair). Adult salmon have to find their way over this weir, but water abstraction at the lade gates and drier late Springs make this impossible and fish become trapped in numbers in the pools below.

3+4. Lade gates. Salmon smolts become trapped in the lade that begins just north of the Brig 'O' Blair in April and May. These lades were originally built to drive the Textile Mills during the Industrial Revolution. Now, the water in the lade feeds into an Archimedes turbine and a fish farm. But because the lade gates are in poor repair, not enough water goes over the weir and too much diverts into the channel, trapping the smolts.

5. Municipal rubbish dump. Created in 1941 and capped off in 1976 this dump is a common source of pollution into the river, particularly of non-biodegradable plastics from the 1960s and 1970s. The pollution occurs due to erosion of the banks as a result of increased flooding and the reintroduction of beavers, who tunnel into the riverbanks.

6. Sewage works. This ageing plant is no longer able to cope with Blairgowrie's increasing population and there are increasing numbers of sewage pollution incidents, where raw sewage is discharged during low flows causing ecological damage to the river.

7. Lade outfall. Whilst screens are in place to prevent adult salmon entering the lade, unless these screens are regularly cleaned (the responsibility lies with the Tay District Salmon Fisheries Board), they become another trap hazard for smolts. An unintended consequence of the screens, which were fitted in the 1970s, is that they reduce the areas in the river where the salmon can spawn.

8+9. Beavers. The return of Beavers to the Ercht over the last 20 years is creating less stable riverbanks as they often build tunnels and burrows in wider riverscapes, rather than dams. During times of flooding, these tunnels can collapse, depositing gravel and silt in areas where salmon may have spawned previously. Their tree cutting also removes trees, which can provide a wealth of insects for young salmon parr to feed on.

10. Signal crayfish. Introduced to the river many years ago, this crustacean preys on salmon eggs and fry, as well as the insects that feed the young fish. They also feed on dead salmon after spawning, thus denying nutrients to the insects that, in turn, feed the young salmon. Now classed as an invasive species, efforts by the Tay District Salmon Fisheries Board to control them have failed and they can now be found across the entire River Ercht catchment.

11. Fishing pressure. Due to the steep decline in returning adult salmon over the last twenty years, conservation measures have had to been put in place by rod and line fisheries to preserve stocks. The catch and release (C&R) of female fish through certain times of year is one of the vital measures needed to safeguard the salmon's future. However, C&R is voluntary and there is currently no formal way of monitoring the practice.



Bioblitz

A Bioblitz is an event that focuses on finding and identifying as many species as possible in a specific area over a short period of time.

At our BioBlitz, held in September and co-organised with The Conservation Volunteers, scientists and community members, we worked together to get a snapshot of biodiversity the banks of the Ericht just north of the Brig 'o' Blair and in the water.

The study revealed a superficially healthy environment, but one where key species are under threat, not only from introduced species including rainbow trout but also from any future changes to water quality and quantity. The woodland story has already been told, but our study looked at other organisms associated with the river. Perhaps emblematic of the whole story was the finding of an alien American crayfish eaten by an otter: the former species is introduced and causing considerable concern for its effect on fish life, while the latter species indicates a healthy water system supporting key species. We recorded 26 bird species and 2 notable river-based species – the dipper and kingfisher. We also recorded 69 plant species, although none were particularly unusual for a heavily managed environment.



NEXT STEPS

Palaeoecology

The more recent environmental history of the Ericht is poorly understood and has the potential to reveal more about both designed and working landscapes (e.g. the history of ornamental tree planting or changing crops that characterised the arable ground, including flax). This can then be compared and combined with archaeological and written sources, and with resident memories to make the past part of the living landscape and part of conversations about choices for future restoration.

For the next stage of our work, we will commission research to look at filling the gaps in the palaeoecological records that were highlighted in the desk-based study, including investigating how current biodiversity or lack of biodiversity (or 'homogeneity') relates to the effects of past and current land management practices and human consumption patterns.



Findings would contribute to both community-led and statutory ecosystem regeneration strategies, as well as prompting residents and visitors alike to think about how their lifestyles are being coded into still-forming sediment records today – through the accumulation of microplastics in soils and river sediments, for example.

Sites that could be cored and analysed in order to provide this closer insight include Stormont Loch. In the upland catchment area, the greatest potential for new evidence lies in the peats, especially north of the Ericht's headwaters.

Citizen Science

Citizen science is becoming the driving force behind conservation work in Scotland. Nearly 90% of all the species and habitat records collected in the UK come from Citizen Scientists. The data they collect is essential for understanding our environment and making decisions about how to protect and improve it.

“Each part of Scotland can be planned and developed to create sustainable places, where we reduce emissions and restore and better connect biodiversity; liveable places, where we can live better, healthier lives; productive places, where we have a greener, fairer and more inclusive wellbeing economy; and distinctive places, where we recognise and work with our assets.”

(A National Spatial Strategy For Scotland 2045)

In the next stage of our work we aim to build engagement from local people in a range of further data collection activities about the River Ericht's ecosystem and consolidate the partnerships we have begun to make with key organisations such as the Tay Ghillies Association and The Conservation Volunteers.

Regenerative Tourism

Regenerative Tourism encourages people to rethink how they travel for leisure and how they enjoy the places they choose to travel to in ways that 'leave things better' – ensuring those places are available for future generations to enjoy. Our aim is to grow a Regenerative Tourism approach across the Ecomuseum.

One way of doing this is to develop what are called 'voluntourism' experiences, where travellers choose to visit a destination in order to help with biodiversity and ecosystem restoration projects.

In the next stage of our work we will work with local accommodation providers and tourism networks to design voluntourism experiences that offer environmentally conscious travellers the chance to enjoy their stay in the Ecomuseum by contributing to the regeneration of the area's river system.



CREDITS

This first stage of our palaeoecological approach to understanding the River Ericht and its catchment has been made possible by funding from the Gannochy Trust and is part of the CATERAN Ecomuseum's 2021 Museum of Rapid Transition Programme in partnership with Alyth Development Trust.

We would like to extend a special thanks to Dr Althea Davies, Dr Richard Tipping, The Conservation Volunteers, The Tay Ghillies Association, Grant Kellie, John Reynolds, Sam Mercer Nairne, Scott Paterson and Martin Robinson for their help and support.

Photo Credits:

The River Ericht, photo Clare Cooper	Cover	Treescape in the Ecomuseum, photo Clare Cooper	15
Cargill's Leap on the River Ericht in 1961, photo Laing Photographic Collection	3	Aerial Photo of the Glaciated landscape of the Mains of Runavey, photo © Crown Copyright HES	17
Willow pollen, photo Pixabay	4	Ash Die Back on the River Ericht, photo Clare Cooper	19
Birch trees, photo Clare Cooper	7	Benchmarking on the River Ericht, photo Tay Ghillies Association	21
Aerial photo of River Ericht near Blairgowrie in 1985, © Crown Copyright HES	8	A salmon caught on the Tay in 1936, photo Laing Photographic Collection	22
The glaciated landscape of Glen Beag, photo Clare Cooper	11	Salmon Parr, photo Wikimedia Commons	23
Monk Myre Kettle Hole, photo Clare Cooper	12	Bioblitz day on the River Ericht (1 & 2), photos Clare Cooper	25
Bringing in the Harvest in Strathmore in 1935, photo Laing Photographic Collection	14	The Shee Water at the Spittal of Glenshee, photo Clare Cooper	26
		Oak Trees at Park Neuk, photo Clare Cooper	27



Museums are physical manifestations of civilisations' collective memories, inventories of the traces left in us by the past. They are also vital stories of change: in our behaviour, culture, economy and technology. And, by showing us how much we have changed before, museums remind us of our ability to change now and help us learn the lessons of the past to illuminate the paths ahead. They are more important now than ever as we face a challenge unprecedented in scale and speed to prevent the loss of the climate and biosphere which give civilisation a home."

Andrew Simms, Rapid Transition Alliance