



LANDSCAPE CHARACTER ASSESSMENT

TAYSIDE LANDSCAPE EVOLUTION AND INFLUENCES



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Title Page Photographs, clockwise from top left:

Castle Island, Loch Leven ©Louise Clark/NatureScot

The Lawers burn at Ben Lawers National Nature Reserve. ©Lorne Gill/NatureScot

Dundee. View from Dundee Law. ©Lorne Gill/NatureScot

Farmland and the River Earn ©Lorne Gill/NatureScot

This document provides information on how the landscape of the local authority area has evolved. It complements the Landscape Character Type descriptions of the 2019 dataset.

The original character assessment reports, part of a series of 30, mostly for a local authority area, included a “Background Chapter” on the formation of the landscape. These documents have been revised because feedback said they are useful, despite the fact that other sources of information are now readily available on the internet, unlike in the 1990’s when the first versions were produced.

The content of the chapters varied considerably between the reports, and it has been restructured into a more standard format: Introduction, Physical Influences and Human Influences for all areas; and Cultural Influences sections for the majority. Some content variation still remains as the documents have been revised rather than rewritten,

The information has been updated with input from the relevant Local Authorities. The historic and cultural aspects have been reviewed and updated by Historic Environment Scotland. Gaps in information have been filled where possible. Some reports have been combined where original LCA area coverage was very small.

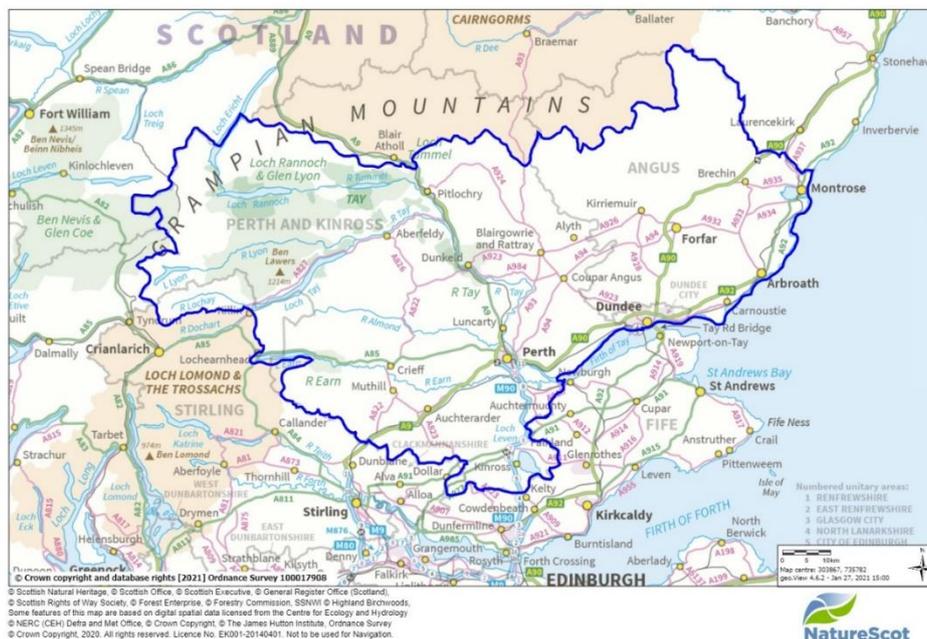
The new documents include photographs. They do not include the maps or sketches from the original LCAs, but these are still available from the [NatureScot Information Library](#). Additional information can be obtained from the websites of;

- [British Geological Survey](#) www.bgs.ac.uk
- [Historic Environment Scotland](#) (Historic Land use Assessment, Gardens and Designed Landscapes, historic features and their designations, etc). www.historicenvironment.scot
- NatureScot website especially [Landforms and Geology](#) (more specifically the “Landscape Fashioned by Geology” series) and [About Scotland’s Landscapes](#) soils; wild land; landscape character; designations etc.) www.nature.scot
- The relevant local authority, which will have information on landscape policies, etc.

The content of this document was drawn from the background chapter information in the “NatureScot Review 122 – Tayside landscape character assessment”, 1996, Land Use Consultants.

If you have any comments, please email LCA_REVIEW@nature.scot

1. INTRODUCTION/OVERVIEW



Area covered by this report.

The Tayside Region in eastern Scotland comprises the unitary authorities of Angus, Perth & Kinross and the city authority of Dundee. It can be seen as consisting of two broadly distinctive geomorphological areas separated by the Highland Boundary Fault, a geological fault which separates the Highlands and Lowlands of Scotland. It stretches from the Loch Lomond and Trossachs National Park and Rannoch Moor in the west to the North Sea in the east. The Cairngorms National Park borders the north of the area, and Loch Leven lies on the southern edge.

North of the Highland Boundary Fault, generally harder rocks have resulted in higher elevations despite being subject to similar glacial processes as to the south of the Fault. Much of this area is covered in either moorland or blanket bog, indicating higher rainfall and less fertile soils. Where valleys have been created or enlarged by glaciation, the more fertile soils occurring on drift deposits support agriculture.

To the south of the fault line are broad, flat, fertile straths corresponding with areas of softer sandstone, eroded during glaciation. The fertile soils which now cover these areas are the result of glacial drift deposits and eroded material carried down by rivers from the Highland glens.

The coast varies from steep cliffs to wide bays and to low areas with raised beaches. These raised beaches are covered by marine deposits originating from periods of former higher sea levels. The estuaries, especially Montrose Basin, form an important tidal habitat for wildlife, especially birds.

The large river systems help to shape the landscape and land use. The River Tay catchment supports hydroelectricity in the west of the area and intensive arable farming to its east.

The flat, low-lying Loch Leven Basin is in the southernmost part of lowland Tayside. Loch Leven itself is a large but relatively shallow freshwater loch. The area has widely recognised geological, archaeological, cultural, historical and ecological interest of regional, national and international importance.

The two ranges of hills south of the Highland Boundary Fault, the Ochils and Sidlaws, are igneous intrusions. As a result of tilting, these hills now form south facing dip slopes and north facing scarp slopes.

This area has a population of around 416,000, of which almost a third lives in the Dundee City area. The population of the Perth and Kinross authorities has increased by 12.4% over the last 10 years, above the Scottish rate of 7.1%; Angus has increased at below the rate of Scotland (5.7%), whilst Dundee's population has decreased slightly. These rates look likely to continue.

Dundee is the largest settlement in the area. Perth and Forfar were the historic county towns for the areas now known as Perth & Kinross and Angus. Other significant settlements in the area are Aberfeldy, Arbroath, Blairgowrie, Brechin, Carnoustie, Crieff, Dunkeld, Kinross, Kirriemuir, Monifeith. Montrose and Pitlochry, with many small rural villages and hamlets. The main land use is agricultural with pastoral and hill farming in the upland and marginal areas and arable common on the flat valley plains. The area is known for its soft fruits production and poly tunnels are now a common site throughout these areas.



Farmland in Strathmore ©Lorne Gill

2. PHYSICAL INFLUENCES

Geology

Tayside Region is an extensive area which overlies two of Scotland's major geological units; the Grampian Highlands and the East Central Lowlands of the Midland Valley. These two units are separated by the Highland Boundary Fault, which crosses Scotland from Loch Lomond in the south-west to Stonehaven on the north-east coast.

The lowlands comprise that part of the region which lies to the south of the Highland Boundary Fault. The Highlands area is the land north of the Highland Boundary Fault.

Tayside Lowlands

South and east of the Highland Boundary Fault, the lowlands form part of a structural rift valley, called the Midland Valley. The valley lies between two fault lines of the Highland Boundary Fault and the Southern Upland Fault, which runs between Dunbar and Girvan. Both faults were initiated during the period of Caledonian mountain building in early Palaeozoic times. A prolonged period of tectonic uplift was terminated when the centre of a gigantic arch of up-domed rocks began to crack along lines of weakness. These fault lines followed the north-east to south-west Caledonian grain. The result was that a large strip of land 80 km wide was lowered to create basins in which Old Red Sandstone Carboniferous and Permian rocks were later deposited. This tectonic instability also caused a great deal of volcanic activity in the area. The two ranges of hills within the lowlands, the Ochils and the Sidlaws, are the result of north-east lava flows of this time, Stirling being the centre of volcanic activity in the area.

The lowlands are, therefore, largely composed of resistant igneous rock overlying softer sedimentary rocks. The igneous rocks were formed by the volcanic activity mentioned previously. The sedimentary rocks are predominantly Lower Old Red Sandstone. These rocks were formed from the deposition of material eroded from the West Highlands and Mounth Highlands to the north, and other detritus. This material was carried south by the powerful rivers of the time. As these rivers crossed what is now the Highland Boundary Fault, their flow would have been checked by the change in gradient where they met the flatter land of the Midland Valley, depositing the material into a large alluvial plain.

The different rock types of the lowlands – the hard igneous and softer sedimentary – result in markedly different topography. This marked contrast can be seen around Strathearn and Perth. A characteristic of this area is the contrast in form between the hard rock landforms of the igneous Ochils and the soft rock features of Strathallan-Strathearn lowlands. This contrasting topography was shaped by glacial erosion.

The western boundary of Tayside, at the western end of Strathallan, crosses the summit of Uamh Beag at 662 metres. This hill range has survived due to it being of a more resistant composition than the surrounding sandstones. Uamh Beag is composed of Old Red basal conglomerates known as the Dunnottar Group. This group also forms the distinctive foothills which run from Blairgowrie to Edzell, which will be discussed later.

Perth has a strategic location where the Tay breaks through the hard volcanics of the Sidlaws. The city has historically capitalised on its surrounding geological structure. The softness of the water of the Tay, due to the low amount of calcareous mineral, promoted Perth as a centre for bleaching, dyeing and whisky bottling.

Upstream from Perth, mills connected with cotton, linen and jute industries were established along the Tay, Ericht and Almond valleys in the 18th Century. These mills exploited the cataracts and rapids formed where rivers cross the resistant igneous dykes which intrude through the sandstone in these parts.

The structural history of the tract of land to the south east of Perth, where the Tay channel widens as it approaches the Firth of Tay, is of note, for it represents the best example in Scotland of a true rift valley. The Ochils and Sidlaws, being of the same rock type, are opposing limbs of an anticline known as the Tay Anticline. The steep north-east facing slopes of the Ochils and the equally steep Braes of Carse, are parallel fault lines along which the highest point of the anticline has been down-faulted. The lava hills share a rough landscape with sloping features due to different erosion rates. The volcanic rocks were covered by the Upper Old Red Sandstone which now outcrops along the Firth of Tay to Dundee. Extending from the Sidlaws, Dundee area has intrusions, pipes and sills forming hills like Dundee Law.

To the north of the Carse of Gowrie, the Sidlaws rise sharply from the flat carse. The Sidlaws are generally lower than the Ochils, reaching around 455 metres. This is due in part to the Ochil-Sidlaw lava flow becoming less thick as it moved further away from its point of origin near Stirling. Because of their base-rich rocks, the soils of the Sidlaws, like those of the Ochils, contain important nutrients such as calcium, phosphorous and potassium. The resultant effect on vegetation is a greater extent of montane grasslands on these hills than is found on the more acidic soils of the granite Highlands north of the fault.

Strathmore is a sandstone vale approximately 13 kilometres wide. It corresponds largely to the outcrop of Lower Old Red Sandstone. Due to down-faulting and harder rock types to the north and south, Strathmore is lower than the more resistant grits and schists to the north and volcanics to the south. Strathmore is, therefore, an example of land formed by 'differential erosion', where denuding processes (including ice sheets) have been able to lower less resistant sedimentary sandstones more effectively than the more resistant metamorphic and igneous rocks, exacerbating the effect of down-faulting.

The solid geology of the area has had a strong impact on the character of Strathmore in the sandstone towns such as Kirriemuir. Here, the town centre is almost entirely built from red sandstone with slate roofs, creating a strong local identity. Within the Old Red Sandstone are some extremely hard formations, such as the Dunnottar Group of Old Red basal conglomerates previously discussed in relation to Uamh Beag. As mentioned, the foothills running north-east from Blairgowrie, including Tullo Hill and the Hill of Alyth, are also comprised of this group. These hills are separated from the Highland Boundary Fault and the Mounth Highlands by a discontinuous linear valley. This valley was also formed by a process of differential erosion. In this case a narrow outcrop of less resistant Ordovician faulted wedges and Ordovician rocks have been eroded.

The Coast

The coast of the region is composed of successive cliffs and bays. This pattern results from the alternating igneous and sedimentary rocks within the Old Red Sandstone succession. The cliffs are formed from the harder basalt lavas, igneous dykes and Old Red conglomerates. The lower coasts and bays correspond to the softer areas of sandstone.

The coastline is generally low with few significant topographic features. North of Arbroath, the presence of igneous basalts and Upper Old Red Sandstone introduces a number of coastal features characteristic of differential erosion by maritime processes. Deil's Heid sea stack and the blow hole of Graylet Pot are two such features. The village of Auchmithie sits atop spectacular conglomeratic cliffs.

North of Auchmithie, the Ochil-Sidlaw lava group reaches the North Sea. The coastline cuts across the various outcrops resulting in a series of bays and headlands. The headlands of Red Head and those south of Montrose correspond with igneous outcrops resulting in some spectacular basaltic lava cliffs. A number of promontories along the coastline have seen people exploit these geological features in order to occupy and adapt them as defensive domestic sites in the Iron Age. The cliffs at either end of Lunan Bay correspond to an outcrop of resistant Lower Old Red Sandstone.

Beaches and dune systems, for example at St Cyrus, and estuarine basins like Montrose Basin are important wildlife habitats as well as destinations for visitors.



St Cyrus National Nature Reserve. ©Lorne Gill/NatureScot

The Highland areas

The Highland areas lie to the north-west of the Highland Boundary Fault. They were metamorphosed from sedimentary rocks during the Caledonian Orogeny - the period of mountain building which took place around 400 to 500 million years ago. Lengthy periods of denudation have reduced these mountains to the stumps seen today.

Within the region, two main groups of rock groups outcrop: Moinian and Dalradian. Both run roughly parallel to the Highland Boundary fault. These two groups differ in age, diversity and composition of constituent rocks.

The Moinian rocks are the older of the two and occur in the north-west of the region. This area has yielded to denudation in a largely uniform manner, resulting in plateau lands. These are characterised by uniform landscapes such as at Drumochter, and their blanket bogs.

Rannoch Moor is one of the best examples of such a peat bog. It is also interesting for its geological significance as a granite outcrop. Despite the fact that granite is an igneous rock often considered resistant to erosion, and that the high Cairngorms are also granite, Rannoch Moor is a low-lying basin. The reason for this apparent paradox is due to the nature of the surrounding rocks: the quartzites, quartzose mica schists and the volcanic rocks of Glencoe. All these neighbouring rocks offer greater resistance than the granite of Rannoch Moor. Once a shallow upland basin had formed, therefore, the ice sheets of the Pleistocene times would have removed the thick accumulations of disintegrating rock for the natural amphitheatre of today. Two other significant granite intrusions also occur in the north of the region, Beinn Dearg and in the Mounth Hills west of Glen Clova.

The Dalradian rock group, by contrast, is much more diverse in both composition of rocks and thickness of strata. It occurs to the south of the Moinian Assemblage and forms the southern edge of the Highland Boundary Fault. The boundary of the Moinian and Dalradian Assemblages is marked for a substantial length within the region by the Iltay Boundary Slide. The boundary between the two is complicated by over-folding and thrusting as well as being severed by major north-north-east tear faults. Such tear faults often resulted in the formation of belts of shattered rock which have subsequently been denuded due to their weakness. Glen Tilt, the central section of Loch Tay, Loch Ericht and Loch Laidon in Rannoch Moor are all the result of this faulting process.

The boundary between the Moinian schists and Dalradian rocks is perhaps most obvious where the River Garry crosses the boundary south of Calvine. The landscape changes abruptly from the open moorland by Drumochter to the wide basin of Atholl. The effect of this change to less resistant calcareous limestone is also apparent in the soils and vegetation, where the extensive Blair Castle Estate is situated amongst large trees and fertile farmland.

East of Rannoch Moor is the Rannoch/Tummel Valley. Unlike Lochs Ericht, Laidon and Tay, Loch Tummel and Loch Rannoch are not fault-guided. This means that, taken in its entirety, the valley runs contrary to the main underlying geological structure, crossing various rock types. Other examples of this are Loch Errochty and Loch Lyon. Various theories as to how this discordant condition came about have been suggested. Where perhaps it is most

interesting, however, is in its geomorphological manifestations, or the resultant topography it produces. The change along the length of the valley, from wide loch-filled alluvial basins to narrow rock sections, is the result of harder Schiehallion quartzites crossing the valley. A similar condition can be found with river valleys such as the River Garry where it crosses the complex Dalradian formations at Killiecrankie. The Falls of Tummel and the Pass of Killiecrankie are both formed by harder quartzites crossing the river's path. The implications on the drainage of the area is discussed below.

Glaciation

The tract of land from Breadalbane to Aberfeldy is dominated by Ben Lawers, Glen Lyon and Loch Tay. This area is considered important as a transitional area between the more heavily glaciated Western Highlands, outwith the region, and the less deeply eroded Eastern Highlands, including the hills above the Angus Glens. This area also represents the eastern extent of the last major ice advance, the Loch Lomond Readvance. The outwash from this last ice-front has been carried into a number of broad, flat terraces. In the area around Fortingall, Kenmore and Aberfeldy, these terraces have had an important impact on land use over the last few millennia, providing flat, fertile glacial drift plains suitable for agriculture and human exploitation that has resulted in a rich archaeological record.



Loch Tay from Ben Lawers National Nature Reserve. ©Lorne Gill/NatureScot.

One of the main processes affecting the Rannoch - Tummel Valley is radial ice dispersal. The valley is one of 15 major glacial troughs in the south-west Grampians. The process results from the radial dispersal of ice from Rannoch Moor.

Where the valley patterns did not accommodate ice dispersal, then glacial 'breaching' occurred, where-by new valleys were created. The Loch Ericht Valley is an example of one such valley.

The different rock types of the lowlands – the hard igneous and softer sedimentary – result in markedly different topography. A characteristic of this area is the contrast in form between the hard rock landforms of the igneous Ochils and the soft rock features of the Strathallan-Strathearn lowlands. This contrasting topography was shaped by glacial erosion. Ice sheets moving east towards the Firth of Tay truncated the spurs of the Ochil north slopes and pushed lobes of ice into the valley of Gleneagles. The steep-sided form of this valley is testament to the resistance of igneous rocks to erosion. The softer sandstones of Strathallan and Strathearn were eroded more easily. The divide between these two valleys was substantially lowered in this way.

While ice sheets were responsible for significant amounts of erosion within the lowlands, the principal process was that of deposition. This took the form of till (or boulder clay) laid down by moving ice sheets and the spread of fluvio-glacial deposits (kames, eskers and outwash terraces and channels) as the ice sheets melted. Also, at the end of the last Ice Age, sea levels rose, flooding large parts of the Tay estuary and Strathearn, creating the raised shorelines that are visible today, together with the carseland deposits of sedimentary material.

The main drift geological features of the lowlands are the glacial plains of Strathearn, Strathallan and Strathmore and the post-glacial raised beaches of the Carse of Gowrie and Buddon Ness. The glacial plains and the Carse contain some of the richest farmland in Scotland. The red loam soil of Strathmore is a direct result of the drift geology. The Carse of Gowrie has a foundation of uplifted marine clay so, prior to drainage, it was poor marsh land, unsuitable for farming.

The most significant of the processes which produced the widespread bright red drifts is the movement down the vale of a major ice sheet. Another source of superficial material is the locally restricted south-easterly advances of ice which brought grey ground-moraine and fluvio-glacial outwash from the Mounth Highlands.

A characteristic drift feature in the Strathmore area is the extensive 'sandur' or plains of outwash at the mouths of most of the Highland Glens, formed as the glaciers retreated into the Highland glens, and meltwater deposited material that had been scoured by the ice. To the south of Blairgowrie the moors, woods and golf course mark the presence of the gravely soils of a sandur.

Hydrology

The hydrology of the region appears to be largely discordant: drainage across the region being generally north-west to south-east, against the grain of underlying structure which runs south-west to north-east. This discordant condition is believed to be the result of ancient east-flowing rivers continuing their flow over an emerging land mass in which the greatest uplift was in the west. This gentle uplift was accompanied by local warping. As the consequent streams developed upon successively emerging coastal platforms, they continued to extend

themselves towards the sea, but always down the steepest slopes. The rivers incised themselves across the underlying structural lines. Thus, the drainage of the area used to be accordant with former coastlines, but became gradually more discordant over time.

The River Tay catchment covers two thirds of the region and is fed by seven other significant rivers, including the Earn, Almond, Tummel, Garry and Isla. There are a number of natural and altered lochs with in that system, some of the largest of which are Loch Tummel and Loch Rannoch.



The River Tay at Dunkeld, Perthshire. ©Lorne Gill/2020VISION

Further examples of discordant drainage are found in the eastern part of the region in the Angus Glens. Here, the rivers which occupy Glen Esk, Glen Prosen, Glen Clova and Glen Shee all flow against the structural grain, south-east towards Strathmore.

There are two large loch basins in the lowland area of Tayside. Loch Leven lies within a large natural depression surrounded by higher ground to the east of Kinross in southern Tayside. This natural bedrock depression is underlain by the Upper Old Red Sandstone, offering less resistance to erosion than the surrounding rocks of the area. As well as being one of the largest natural water bodies in the UK, it is also a significant site for water birds and has been a focus of historical and archaeological activity for several millennia. The Montrose Basin is a large tidal inlet just inland from Montrose, forming part of the estuary of the River South Esk which flows into it from the west. The basin is also known for its importance to migrating birds, including breeding eiders.



Panorama of Loch Leven NNR. ©Lorne Gill/NatureScot

Climate

The climate of Tayside is typical of the British Isles, dominated by Maritime air masses, which are characterised by lack of extremes, and occasionally influenced by Continental high pressure systems providing greater extremes in temperature and reduced wind speeds. Located in the east of Scotland, and predominantly at quite low altitude, it generally receives less rainfall and more sunshine than areas along the west coast, although this is less pronounced in the more mountainous areas inland in the Highlands.

Within the area some two-thirds of the strong winds, greater than force 5, are from a south-westerly direction. The proportion of winds from this direction increases as wind speeds increase. Average rainfall is approximately 1000mm, although more rain generally falls in the west of the area than the east, and substantially more falls on areas of higher ground such as the Highlands and the hills of the Lowlands. The summer rainfall is especially low in the east and south of the area.

The upland areas to the west have significantly lower January temperatures, with an average of 1-2 degrees Celsius. The sudden transition from lowland to highland is perhaps most marked in winter, when snow covered peaks form the backcloth to lowlands of green and brown. The Ochils also show lower temperatures than the surrounding lowland. The Tayside area has some of the highest July averages in Scotland (19-20 degrees Celsius) but again this is significantly lower in the upland areas which have average temperatures 5 degrees Celsius lower.

The variety of Tayside's landscapes, associated with the combination of highland and lowland terrain, provides a wealth of seasonal interest. The changing tapestry of the arable lowlands is complemented by the more subtle changes of pastures and moorlands, with the colours and patterns of both lowlands and uplands very much informed by the way that humans have cultivated and adapted the landscape over millennia. The vibrancy of autumn colours in the woodlands, heaths and bracken is renowned in this region and attracts many visitors. The migrations of wildfowl which fill the autumn skies with awesome formations are also evocative. Locally, the juxtaposition of high and low ground also generates a number of characteristic features: long shadows across the valleys, low mists and the varied distribution of frosts.

Soils

Soils within the area can be divided broadly into two groups: low lying land around Loch Leven; and those of the higher ground and surrounding hills. The large area around Loch Leven comprises humus iron podzols with gleys, peaty gleys, and alluvial soils, while at the foot of

the Lomond Hills a small area of valley peat exists. Soils of the higher ground within the valley and on the surrounding hills are dominated by brown forest soils with some peaty/humus iron podzols.

All low level land, with the exception of the area of valley peat at the foot of the Lomond Hills, and the surrounding lower hills are recorded as Grade 3.1 and 3.2 on the Macaulay Institute Soil Survey of Scotland. These are "soils suitable for arable cultivation" and capable of producing a narrow range of crops with good yields and/or moderate yields with a wider range of crops. Poorer parts within this area are commonly grass leys reflecting the increased growth limitations for arable crops and the degree of risk involved in their production.

Brown soils derived from glacial drift and Old Red Sandstone dominate in the lower land areas with alluvial soils closer to the rivers around Tay, Strathallan and Crieff. Strathmore is covered in a thick layer of glacial drift which dictates the soil type (a fertile red loam) and land uses.

One of the most intensively farmed areas is the Carse of Gowrie. However, this has not always been quality agricultural land. Prior to the agricultural improvements and drainage in the 18th Century, the Carse was marshy, due to its foundation of uplifted marine clay. The number or names prefixed 'Inch' or island mark the dry areas prior to drainage: Inchtura, Inchyra, etc. The Carse of Gowrie, unlike the carse clays of the Forth, never had a covering of peat on its surface. There is, therefore, no history of peat cutting in this area, but this has resulted in a rich heritage of clay-building.

Mineral Podzols cover much of the valley floors as they descend to the lowland, these consist of fluvial glacial sands and gravels, sandur plains, and are poorer in agricultural capacity but can support grazing. Gleneagles Golf Courses are located on an area of these soils and the undulating and hummocky gravel soils are well suited to this land use. When uncultivated, these soils are dominated by gorse and heather but pine also grows well.

All other parts of the area are generally Grades 4.2, 5.2 and 5.3, "land suited only to improved grassland and rough grazings" as one or more limitations render the land unsuitable for arable cropping (e.g. adverse climate, wetness, floods, steep slopes, soil defects, or erosion risks).

Blanket bog and peat are widespread in the Uamh Bheag and Beinn Bhreac areas. Where blanket bogs have formed, unlike lowland raised bogs, they have done so independently of ground water. They are more dependent upon high rainfall and atmospheric humidity. The blanket bog has thus become a typical vegetation type or 'climactic' formation in this high rainfall area. A base of peat, peaty gleys and peaty podzols soils has been created by the vegetation and drainage in these areas.

The highest areas and exposed slopes have montane soils with limited vegetation, for example Ben Lawers.

3. HUMAN INFLUENCES

Humans have been present and manipulated the physical landscape in Britain since soon after the retreat of the last Devensian ice sheets around 10,000 years ago. While the greatest changes have occurred within only the last 200 years as a result of the Industrial and Agricultural Revolutions, the landscape seen today is the product of several millennia of human and animal activity.

Aerial surveys have identified significant archaeological potential in areas that had previously received little attention. The majority of archaeological sites are arguably minor features in the landscape due to their small-scale, buried or ruined condition. These are, nevertheless, an important cultural resource representative of wider patterns of human activity or of symbolic religious meaning which extends across large areas. Conversely, there is a minority of significant archaeological sites and monuments which are distinctive and often enigmatic features in the landscape. These include major earthwork structures, cairns, barrows and upstanding stone monuments.

Whilst Tayside may not be as well known for its upstanding lowland archaeological sites as other parts of Scotland, due in part to the intensity of land use over the past few hundred years, it nevertheless makes up for it with its upland or highland sites - there is a wealth of interest widely distributed throughout the region that represents several millennia of cultural activity. Thousands of archaeological sites have been identified, and several hundred have been recognised as being of national importance and are designated as scheduled monuments. Aerial surveys have also identified significant archaeological potential across the region, and along with Fife and the Lothians the area is known for its extensive cropmarks, indicating sub-surface archaeological remains.

History

Mesolithic Period (7000-4000 BC)

The earliest evidence for human settlement in the Tayside area during the Mesolithic era, barely survives in the form of buried middens of shellfish and flint fragments, examples include middens unearthed at Broughty Ferry in the 19th Century, and the Stannergate in Dundee, thought to date to around 6000 BC. Human societies of this period are thought to have been groups of hunter gatherers, moving around the land as nomads. This is likely why so little evidence of them remains. Despite a lack of evidence to date, the north side of the Tay Estuary and the wildfowl over-wintering sites in the Montrose Basin are landscapes that were likely to have attracted these early hunters due to the available food source, and therefore it is reasonable to expect that this is where evidence of the Mesolithic is most likely to be found.

Neolithic Period (4000-2500 BC)

Around 6000 years ago, a society settled in Scotland who farmed the land for the first time. Far more evidence of people during the Neolithic period remains in the region when compared to the Mesolithic. They cleared areas of woodland for crops, built houses and enclosures for animals, and had a society where a focus on ritual led to the construction of many stone circles and cairns. Many are still upstanding to this day such as at Balgarthno by Dundee and

Colealie in Glen Esk. This was the period when the most visually impressive stone circles in Scotland, (such as Callanish on Lewis), were built, demonstrating fairly sophisticated engineering and organisation.

Ritual and funerary monuments in the form of chambered cairns, cairns, cists, standing stones, stone circles, henges and inscribed stones are found throughout the region, but with concentrations in the valleys, lowlands and mid-altitude slopes, generally where soils were lighter but access to water and communication routes was possible. These monuments represent the more resistant remains of human activity in the second and third millennia BC. These ritual and funerary sites were essential foci for the ancient communities who used them for generations. The use of durable stone was important, contrasting with the more ephemeral domestic structures of which little trace remains.

Strathtay and Strathearn have numerous pairs of standing stones which typically include one broad and one narrow stone. In addition, there are significant stone circles and other settings of stones at Croft Moraig near Aberfeldy, Fortingall, Scone, Fowlis Wester, St Madoes and Pittance.

Cup-marked stones, also known as petroglyphs, are generally less noticeable, but equally enigmatic. These inscribed outcrops are typically located on valley sides, at strategic vantage points and at the junction of valley routes. Examples discovered within Tayside include Kynballoch/Rattray, Connachan Farm at Sma' Glen, Newbigging and Dalladies.

Cairns or barrows are generally the most prominent landscape features from the Neolithic. They include chambered cairns, which allowed repeated use for communal internment. These structures were usually constructed from local stone and covered with turf. They are recognisable today as irregular mounds which break the natural contours of hills, low ridges and river terraces. Cairns were frequently associated with other ritual monuments as at Clach na Tiompan, on a terrace of the River Almond, where a large chambered cairn is associated with a setting of standing stones. The Fowlis Wester site also contains a cairn, standing stone and stone circle, and commands views over Strathearn to the Ochils. Barrows and mortuary enclosures are also particularly prevalent in the cropmark record and now survive as buried features visible on some aerial photographs within lowland areas.

Bronze Age (2500-800 BC)

The transition from the Neolithic period to the Bronze Age was characterised by new and extended forms of settlement, increased agricultural activity, standing stones, some rock carving art, pottery and crude metal working.

The Bronze Age peoples are thought to have been migrants who crossed the North Sea to Britain from the lands around the mouth of the Rhine; alternatively, it may have been as much the skills and knowledge that migrated as it was the people. They brought with them the 'magical' knowledge of metal-working. This knowledge brought additional power to those with the skills, leading to a significant change to the previous communal Neolithic society. The Bronze Age sees the development of a hierarchical societal structure of ruling classes, warrior

caste, farming peasantry and slaves. The development of specialism, such as stone work, metal work and farming meant that trade also become established during the Bronze Age.

Remains of Bronze Age hut circles and field systems are frequent and extensive over the Tayside area. They are most obvious now on what is marginal land, particularly at the edge of the lowlands and highlands, and high on valley sides such as up Glen Isla at Brewlands Bridge and Burn of Kilry, up Glen Shee, in Strathardle and on upper reaches of the Tay and Earn Valleys.



Glen Isla. ©George Logan/NatureScot

Burial habits in the Bronze Age evolved from using the communal chambered cairns of Neolithic times, to individual burial in stone-lined box graves or 'cists'. A double cist cairn was discovered at West Mains, Auchterhouse in Angus, a highly prominent site which yielded many important discoveries. There was also progression to cremation and burial in small cists rather than the inhumation practised earlier. Again, such sites are numerous over the Tayside area though often known only from aerial photography. Good examples survive at Bell Hillock, Kirriemuir where two urns, a spearhead and jet beads were found inside and on the tops of the Sidlaw Hills. It was common for old burial and ritual sites (such as Neolithic cairns) to be reused over many generations, hence the localised mixture of ritual practices.

Standing stones were a continuing theme during the Bronze Age, though usually not as intricate or extensive systems such as those built by Neolithic peoples, as the habit of ritual monument building was already in decline in late Neolithic times. Frequently, these stones are single, such as on the Hill of Kirriemuir, or in pairs or lines, and are found over most of the Tayside area.

Iron Age (800BC – c.400AD)

Several important factors changed the landscape of the region during the Iron Age. Firstly, there was a period of climatic deterioration which greatly reduced the area of productive land

and caused groups to become increasingly warlike and to make fortifications in order to protect their good land from others. Secondly, the availability of iron allowed the construction of more effective tools and weapons which later allowed more felling of trees and renewed agricultural expansion. A third factor leaving an impression on the land was the period of Roman occupation. The Iron Age saw the development of a more political society where settlements became more concentrated and conflicts over land resulted in the development of fortifications by tribal groups and communities.

The more extensive use of stone for domestic and defensive buildings in the Iron Age has left a more resistant and visible legacy. This legacy mainly manifests itself in the Tayside area in the form of crannogs, forts and duns, and souterrains.

Crannogs are artificially constructed island residences, built at the edge of lochs with defensible structures. Some crannogs were formed of entirely timber superstructures elevated above the water on posts that were held in place by having rocks dumped around their base; other crannogs were formed from existing islands that were modified, and others entailed the construction of artificial islands. Whilst many crannog bases are below the water's surface and consequently are not readily legible, longevity of use meant that many sites that started off as being elevated above the water on posts would, over time and with phases of repair, become islands in their own right. A large proportion of the natural water bodies both large and small in Tayside contain crannogs. The Oakbank crannog on Loch Tay is perhaps the region's best understood example but there are numerous examples of crannogs on the rest of Loch Tay, as well as Lochs Earn and Rannoch, amongst others.

The Iron Age is known for its fort building and more extensive use of hilltops and valley ridges for strategic defences. Forts typically comprise extensive rampart(s) constructed of earth or stone (or a combination of both), often multi-phase, encircling a hill top with a well-defended entrance through them. Interior features are usually more ephemeral and less well preserved, but comprise platforms or scoops where timber buildings and structures would have been located. There is often a distinct hierarchy of sites. Large fortified sites in prominent locations are thought of as the main centres, and these remain as significant landscape features today. Smaller forts and duns form networks around the larger sites. The most spectacular forts are arguably the Brown and White Caterthuns on neighbouring hilltops in the Menmuir foothills. These ring forts enclose areas of 140 x 190 metres (Brown) and 140 x 60 metres (White), the latter uses stone to reinforce its ditches. Other notable forts include Finavon (150 x 36 metres) which has vitrified stone walls through the use of timber lacing, Barry Hill Fort near Alyth, Abernethy Fort, Queens View Ring Fort and Dundurn Fort. These forts all commanded views over and access to ancient communication routes up the glens and straths, while retaining hospitable positions below the levels of severest mountain landscapes. Recent work has also explored a complex network of Iron Age defended sites at the confluence of the Tay and Earn rivers, extending south-west along the edge of the Ochils above Strathallan.

Less commonplace remnants of Iron Age society in Tayside are the brochs. Brochs were constructed in the mid-1st millennium, the greatest concentration of them being in the Northern Isles, Caithness, North and West Highland, and the Inner and Outer Hebrides. Lowland brochs are comparatively few and far between; it is not clear why a small number exist in Tayside, so

far south and so removed from the centre of activity. Those in Tayside appear to date from a later period than in Atlantic North and West. An example of a Tayside broch is at Laws of Monifieth. Recent excavation work on Moredun Top at the confluence of the Earn and Tay has revealed evidence of a broch-like structure on the summit of the hill alongside a multi-phase hillfort, and other recent work between Dunning and Auchterader has again revealed the presence of a broch-like structure on a small summit associated with other Iron Age sites.

In the latter part of the Iron Age, a return to unenclosed agricultural settlements such as at Tealing, encouraged construction of a new feature - the souterrain. Whilst their function is not entirely clear, souterrains are stone-built underground galleries that may have been used for food storage associated with large timber-built houses. A number of fine examples of souterrains have been discovered in Tayside and particularly in Angus. Notable examples include those at Newton, Barns of Airlie, Tealing and Ardestie in Angus, and Newmill, Bankfoot in Perth and Kinross.

Roman Occupation (c.70sAD-c390sAD)

The Roman author Tacitus informs us that his father-in-law, the Roman governor and general of the province of Britannia, Gnaeus Julius Agricola, embarked on a series of campaigns to conquer the remainder of Britain. He informs us that by 80AD, Agricola's armies had reached the Tay and continued in the area in the next few years. Whilst this is a biography rather than an actual account, and some of the remains in the area may relate to the campaigns and building work of his predecessors and successor, it is clear that many of the Roman remains in Tayside date to this general period (referred to as 'Flavian' as it was under the Flavian Emperors of Vespasian to Domitian). Lines of forts were established along a Roman road constructed between Camelon and Ardoch running further east via Strageath to Bertha. Some of these remains are still visible today. Along the Gask Ridge a thick igneous dyke running westwards from Perth to Crieff, lies a Roman road accompanied by forts, fortlets and watch towers. This fortified road indicates Tayside's importance in the early development of such road frontiers in the Roman Empire. Roman Tayside contains the sites of a legionary fortress, plus forts, fortlets, watch tower and temporary camps; particular concentrations are found in Strathearn and Strathmore as part of the Roman conquest and occupation of the productive Midland Valley. The legionary fortress constructed at Inchtuthil, the outline of which is still visible, is the most northerly fortress in the whole Roman Empire. At Ardoch, north of Braco, there are the well-preserved remains of successive turf and timber forts with multiple lines of defences clearly visible. A number of sites have been excavated, providing invaluable information as to the dates of occupation and details of the soldiers and communities who inhabited the area.

After the withdrawal from the Flavian occupation of Tayside, the next Roman period of use came in the mid-second century with the Antonine advance and construction of the Antonine Wall. Outpost forts came as far north as Bertha (by Perth). These were abandoned after a single generation.

The other main period of invasion came in the early 3rd century with the campaigns of the Emperor Septimius Severus and his sons. Some of the largest temporary camps in Tayside are thought to date to this period although there is little firm dating evidence.

Outwith these three main incursion periods, other advances into Scotland are attested in the literary sources but difficult to track down archaeologically. Nevertheless, it remains possible that some of the Roman remains in Tayside date to other Roman phases of campaigning.

One further impact the Romans are thought to have had was to consolidate the previously warring Celtic tribes into a more powerful confederacy – later referred to as the Picts.

Early Medieval/Pictish Period (500AD-1050AD)

Tayside marks the principal southern extent of the Pictish kingdom. References are made to the Picts in Roman literature from AD297 onwards. However, it was not until the 6th Century that the Pictish kingdom was fully established.

Known and identified Pictish monuments are few, reflecting the fact that later settlement obscured Pictish or re-used Pictish remains. Those that have survived tend to be those that are the most distinctive or important. A number of Pictish fortified sites have been identified, some of which occupied earlier fortifications. Dundurn Hill Fort has been identified as a Pictish structure. Forts were also constructed at Abernethy and Norman's Law. Castle Island, the second largest island on Loch Leven was fortified by the 7th Century Pictish king Domnall Brecc. Although only surviving as cropmarks Forteviot hosted one of the most important Pictish royal complexes and sits at the centre of a network of churches and sculpture that can still be seen across the surrounding area.

Types of long-houses are recorded in upland areas of northern Tayside and known as Pitcarmick-type or Pictish Byre-houses. Excavations have dated their use to the later 1st millennium AD, around the 8th – 11th Centuries.

Pictish culture and art was influenced both by its Celtic ancestry and the contemporary Northumberland styles absorbed during the 7th Century through ecclesiastical contacts. Stone carving displaying both influences was flourishing at this time. There are remains of stone carving and erection of 'cross slabs' throughout the region. These slabs were intricately carved with pictograms and abstract geometric designs. They were located in strategic positions possibly to serve as boundary markers or as ceremonial commemorative features. Tayside is particularly renowned for its numerous finely executed smaller slabs from the 9th Century. Many slabs have been incorporated within local museum collections for protection. Several of these have been substituted with facsimiles in the original position and so preserving them as features in the landscape. Notable cross slabs can still be found at Aberlemno in Strathmore, at Cossans, Dupplin at Forteviot and Comnstone near Monikie. The 7th Century also witnessed the rise of Pictish Christianity, the main proponent of this being Columba. Columba's relics were brought to Dunkeld Cathedral by Kenneth mac Alpin in 850, establishing Dunkeld as the head of all Columban establishments in Scotland. This Gaelic influence brought with Christianity was merged with both religious and political ideas from Northumberland. Indeed, for about 30 years from 658 until the battle of Nechtansmere in 685, southern Pictland was under Northumbrian domination. The battle near Dunnichen, east of Forfar, saw a victory for the Picts and an end to southern domination.

The political union of Scots and Picts under the kingship of Kenneth mac Alpin in 843, marked the end of Pictland and the creation of Scotland. The ceremonial and symbolic centre of this new kingdom of Alba was at Scone. Already an important Pictish religious centre and the site of an early church, the importance of Scone within Scottish history is belied by its rural location. After victory by the Scots all Kings of Scots were crowned here, including Robert the Bruce in 1306 and finally Charles II in 1651. On the site of the early church, later replaced by an abbey, there is now a small chapel and a replica of the Stone of Scone (removed in 1296). The abbey was excavated in 2008.

The ecclesiastical importance of the region at this time is highlighted by the creation of religious establishments between the 7th and 13th Centuries at Brechin, Dunkeld, Glamis and Abernethy. These include features showing Scandinavian influences such as ornately carved Hogsback tombstones from the 10th and 11th Centuries. These religious establishments are found at Inchcolm, Meigle and Brechin. St Serfs the largest island on Loch Leven was occupied by a religious order and remained an ecclesiastic centre until the reformation. Little remains now apart from the ruins of a chapel.

Other important Pictish sites within the region are the cross-slabs at Aberlemno and Cossans, both still in their original positions. A possible function was as territorial markers.

A special feature of Tayside Pictish monuments is a group of finely executed cross-slabs smaller in size than normal. A good example of such a slab is the Banvie slab now in the McManus Galleries, Dundee.

Medieval Period (1050AD – 1600AD)

The death of Macbeth, killed in battle by Malcolm III in 1057, opened a new chapter in the history of the region which saw the first significant changes to the landscape since the advent of farming. Although the struggle for domination of Scotland continued between the Kings of the Canmore dynasty and the northern descendants of Macbeth, history shows it was the southern kings who proved superior. The last significant battle ended in defeat for Angus, ruler of Moray, at the hands of David the First at Stracathro in Strathmore. In order to halt subsequent attacks and extend his power to the previous weak areas north of the Mounth, he began a conquest of the north.

Tayside, and subsequently Scotland, became ruled by southern kings with Norman allies. These allies - often land-hungry men - were sent north to create order, assisting the kings in their policies of modernising the country, based on a feudal system. Royal estates were often given as a reward for military service. These new forms of land tenure and lordship formed one of three modernising processes initiated at this time. The other two were the reform of the church and the foundation of burghs.

Several local families also participated in the colonisation of the north. The Earls of Strathearn and Atholl, both of Celtic descent, were on the one hand reluctant to allow foreign colonisation to disrupt their own sphere of influence, whilst being equally glad to receive new lands on similar terms as those same incomers.

The reform of the church took several generations, but was part of the same movement as Anglo-Norman colonisation. The gradual appointment of reform-minded clerics thus followed. At the same time as the reform of the church was occurring, new monasteries of the reformed order were being established, Arbroath Abbey being one. In addition to their often dubious religious significance, these monasteries also brought, indirectly, more earthly benefits. The monasteries were seen as centres of alien culture bringing innovative techniques in crafts, trade and most importantly, agriculture. Being substantial landowners, running their estates for profit with surpluses being sold on for cash or traded overseas for luxury goods, their economic importance in the commercial development of Scotland was great.

The formation of the burghs as privileged trading centres of the time was ultimately a further expansion of royal power. They often served as seats of royal administration. The Burgh of Kinross was created as a burgh of barony for Sir Robert Douglas of Loch Leven and later as a burgh of regality for Sir William Bruce of Kinross, the ownership and status depending on the current political situation

During these advances of the 12th and 13th Centuries, Tayside was one of the more settled and prosperous regions north of the Forth. It was home to many of the royal hunting grounds, residences and estates. The aristocracy was prospering - evidenced by the shift from building in earth and timber to stone and mortar. The early burghs such as Dundee, Forfar and Montrose were also commercial successes in medieval times.

The proliferation of castle building in the late medieval period, after the Wars of Independence, was an indication of a return to a more stable society. Despite the defensive form and embellishments of late 15th and early 16th Century castles and tower houses, they were built more as a statement of social status, pretensions and wealth rather than for security. Examples of such castles exist at Edzell, Balbengo and Melgund Castle near Aberlemno. A clear distinction existed between people to the north and south of the Highland Boundary Fault. To the north lay the Gaelic speaking Highland clans, with an economy based on cattle. To the south lay the Lowland Scots with an arable farming economy. Though Gaelic has since died out, the distinction is evident in the distribution of Gaelic and anglicised place names.

The area was the boundary between highland and lowland Scotland and turbulent as a result. A number of notorious events from the period occurred in this area including at Castle Island which would become the scene of some notorious events in Scottish history. Amongst the most significant during the Wars of Independence with England. Captured by the English at the outset of the war in the late 13th Century, Loch Leven Castle was taken by the Scots during a night raid by a force led by William Wallace, who slew the occupying garrison and their wives. It was successfully held against the English by John Comyn in 1301 and visited by King Robert I in 1313, a year before he would defeat the English at Bannockburn, Stirling, and after he murdered Comyn in Dumfries Priory to claim the throne for himself. The English again tried, and failed, to take the castle five years after Robert I's death in 1334. The earliest parts of the existing tower house and much of the battlements are believed to date from this turbulent period.

Loch Leven Castle is also known for its association with Mary Queen of Scots (1542-1587). In June 1567 she was taken as prisoner to the Castle, having alienated much of her support, where she was forced to abdicate in favour of her infant son, who became James VI. Here she gave birth for the second time, sadly to stillborn twins who are believed to be buried somewhere in the castle. Mary was not to be captive for long: after one failed attempt she finally escaped during May Day celebrations with the help of a number of her supporters.



Loch Leven Castle and Castle Island from Kirkgate, Loch Leven. ©Lorne Gill/NatureScot

The turbulence of the medieval period in Scotland saw the development of many fortified residences in the form of tower houses. These were initially severe defensive structures, tall and of square plan with few and only small windows. The 16th and 17th Centuries saw increasing sophistication as strife diminished. Tower house designs were adapted to become less military and more comfortable as residences Tayside contains numerous such buildings dating from the 15th Century. Their scale and commanding locations and imposing design makes them powerful and romantic features in the Landscape. Fine examples include Huntingtower Castle near Perth, Braikie Castle, Elcho Castle and Edzell Castle. The last is also notable for its walled parterre garden, one of very few tower house gardens in Scotland. Some of the major estates had smaller tower house outposts to prevent or impede cattle thieves from poorer highland areas. The Angus Glens contain a number of these towers, of which Invermark at the head of Glen Esk, is a striking example. This served as an outpost for Edzell Castle guarding against raids from the north. Other small tower houses of note are Hynd Castle, Ballinshoe Tower and Easter Fordel.

Post Medieval Period (1600AD – 1900AD)

The Reformation of 1560 did not bring about an overnight transformation in society. It did, however, bring major changes to the landscape, the most notable change being the destruction of the already declining monasteries. New religious building was limited until the 18th century when increased prosperity of the land and new confidence of religious men saw them investing in their spiritual future.

The 17th and 18th Centuries saw the consolidation and development of estates. At their centres, castles and country houses were built, improved or replaced by more sophisticated buildings. The influence of Europe and the Renaissance was reflected in the adoption of classical architectural styling and in layout of grandiose formal landscapes in the early 18th Century. Between the 18th and 19th Centuries styles changed in favour of the romantic and picturesque, as reflected in the remodelling of castles, country houses and their landscapes. Scots baronial and gothic styling became favoured and the informal landscape ideas of Capability Brown and William Kent in England were introduced in place of the previous formality.

Tayside contains innumerable castles and stately homes which illustrate these changes. Glamis Castle, the seat of the Earl of Strathmore and Kinghorne, is an example of an enlarged and remodelled medieval tower house which now controls an outstanding designed landscape. Kinross House, designed by and for Sir William Bruce in the late 17th Century, represents one of the finest Palladian mansions in Scotland. The extensive portfolio of William Adam includes many fine classical mansions. The House of Dun in Angus is one of his most original designs. Meggernie Castle in Glen Lyon is a modified tower house which now dominates its isolated setting on the glen floor and sits within an Inventory Designed Landscape.

The Angus coastline - of long sandy beaches, rocks, cliffs, caves and deep inlets - was perfect for smuggling. During the 1700's, crews of ships lingering offshore, near Lunan Bay, Usan and Arbroath, often came under suspicion. Angus fishermen were known to be involved, ferrying ashore illicit imports of tobacco, alcohol and other goods. Customs officials patrolled the cliffs but were unpopular in local communities. There was a ready market for anything that could be supplied cheaper by smugglers than by legitimate traders.

A series of changes transformed the landscape of the Highland glens in the late 18th and 19th Centuries. Defeat at Culloden precipitated a change in the way that Highland clans were structured. The major landowners sought to maximise the financial return from their land, and the old crofts were cleared to provide grazing land for sheep and cattle. Crofters, forced off their land, moved to the growing cities, or emigrated, and by the middle of the 19th Century the Highland glens had been virtually emptied. The decaying remains of old field systems, and even the sites of abandoned villages, illustrate the scale and severity of the changes that occurred.

Future dramatic changes were brought by the agricultural revolution. In lowland areas such as Strathmore large areas of land were improved and enclosed by Act of Parliament. New farmsteads were established, often associated with bothies for the farm labourers. Many of

the Angus burghs owed their growing wealth to the markets that were created by the agricultural and industrial revolutions. It was also during this time that many of the large designed landscapes and extravagant houses, such as those at Dunkeld, Blair Atholl, Kinross, Glamis and Taymouth, were constructed. Blair Castle is the centrepiece of a designed landscape which is now essential component of Strath Garry. Taymouth Castle, formerly the imposing seat of the Marquess of Breadalbane, is a major landmark in the valley floor between Aberfeldy and Kenmore. It commands an extensive designed landscape, punctuated by follies that once extended up both valley sides. The Atholl landscape of Dunkeld House was similarly extensive and has locally influenced the setting of Dunkeld. Contrasting with the creation of new policy landscapes was the continued loss of native woodlands as the forests of Scots pine were cleared to provide timber for fuel, construction and boat building. Losses include the Glen Lyon pine woods. New woodlands were established, however, particularly for coppicing.

Between 1781 and 1831 cotton mills were built next to rivers across Scotland. Stanley Mills was built in the 1780's and finally closed in 1989, Stanley village was planned settlement built to house workers.



The Historic Scotland building at Stanley Mills. ©Lorne Gill

Luncarty was built at a similar time to house the workers of an associated bleachworks. Other significant cotton mills include one at Blairgowrie and in Perth as well as Deanston near Doune on the River Forth.

Jute and flax were processed in Dundee and the jute industry continued until the 1970's. Although Perth was a more established port at the start of the Industrial Revolution, Dundee was a thriving port during this time exporting linen. In Kinross over 600 people were employed in weaving by the middle of the 19th Century and Kinross still has a spinning industry, although it is now focused on cashmere.

The importance of Tayside in the history of early tourism in Scotland in the early 19th Century was largely due to its abundance of the wild scenery currently in 'vogue' at the time and the stamp of approval given to the area by Queen Victoria's visits in the mid-late 19th Century. A series of literary tourists, such as Rev. William Gilpin and Thomas Pennant, published accounts of their travels, writing enthusiastically on the 'picturesque' scenery of Highland Tayside.

Two later boosts to tourism in Tayside, and Scotland as a whole, occurred in the mid-late 19th Century with the arrival of the train and the writings of Sir Walter Scott. Paintings and sketches by JMW Turner, often associated with Scott's publications, also fuelled the imagination of the public, especially the Victorian middle classes. Perthshire, in particular, became part of the 'Highlands Tour', popularised by Queen Victoria and a number of writers, poets and artists. Towns such as Pitlochry, Aberfeldy and Crieff experienced considerable growth with the development of grand hotels and elegant villas. Many of the lower parts of the glens are characterised by a wealth of Victorian buildings, most of which adopt the local vernacular, but interpret it in a 19th Century way. The railway opened up access to Perthshire and Angus which was traditionally hard to access being inland, and connected them with Aberdeen and Inverness as well as the Highland settlements in between. Station buildings such as Pitlochry and Perth remain in use as do Station Hotels linked to them.

20th and 21st Century Developments

Forestry

By the 20th Century the native pine and broad-leaved woodlands of Tayside had almost entirely vanished, only small remnants existing towards the north and west of the region. Instead, the landscape was one of agriculture in the lowlands and highland valleys, and hill grazing, grouse moors and limited forestry on the hills.

In 1919, The Forestry Commission was established from the UK's strategic requirements for timber. The Forestry Commission purchased large areas of uplands and estate forests and pursued a policy of maximum timber production from these areas. In the Tayside area this was most pronounced in the Tay Valley, Glen Prosen and Rannoch-Tummel valley. The marginal agricultural land of the uplands of Kinross-shire has been extensively converted to softwood forestry over the last 870 years or so, with new and recent forestry afforestation schemes particularly on the Ochils. The policy of maximum production, leading to large-scale afforestation, was later criticised for its lack of amenity and unattractive appearance. Within the past 30 years, the concept of multi-purpose forestry placing greater importance on nature conservation, landscape values and recreation has been embraced and practised in a more comprehensive approach to forest design. Much of the forestry in Tayside is therefore now more attractive and diverse. The Scottish Government's current policy is to increase woodland

cover nationally. It currently stands at approximately 17% of the land area and the Scottish Forestry Strategy (2006) aims to increase this to 25% by the second half of the 20th Century.



Commercial and native woodland, Dunkeld, Perthshire. ©Lorne Gill/2020VISION

In Angus, where agriculture has a more dominant land use role, forestry is a minor but important part of the rural economy. In 2011 tree cover in Angus was still less than the Scottish average of 17%, at 10%, but this figure had grown at a rate of 150-200 hectares per year in the 20th Century. This expansion rate has now slowed to 70 hectares per year. Perth and Kinross has a higher woodland cover of 16%.

Such large areas of forestry plantations are rare on the steeper slopes (the north slopes of the Cleish Hills being the notable exception). In the lowlands, the fertile soils have meant that commercial forestry has been limited although the peatlands at Portmoak have been subject to softwood planting. Woodland and tree cover on lower hills and in basins are mainly small forests, shelterbelts, parkland and policy planting and, locally, hedgerow trees.

Agriculture

Changes in agriculture have affected the landscape since the beginning of the 20th Century. In some areas boundaries have become larger as holdings have become consolidated, with larger field sizes and removal of old field boundaries. This is particularly characteristic of the Angus *Dipslope Farmland*. Upland agriculture is almost entirely open hill grazing on mainly unimproved or semi-improved and occasionally improved pastures. In the fertile Carse of Gowrie and Carse of Forth soft fruit production is now widespread and poly-tunnels and other structures are common. Angus produces about 25% of the UK's soft fruit and 30% of

Scotland's potatoes. It is one of Scotland's most intensive cropping regions but also contains a significant amount of rough grazing and improved higher ground. Other vegetable and flowers are also grown in the area. Traditionally the upland glens were used for cattle but this is declining, especially dairy, and sheep numbers are also dropping.

Fishing and ports

Tayside, on the East Coast of Scotland, has a rich maritime heritage. Trade with Baltic ports goes back five centuries and the port records of Dundee are some of the oldest in Europe. Many whalers sailed from Dundee and whalers rescued Scott's ship, Discovery, built in Dundee, when it became trapped in Antarctic ice. Richard Clark, who commanded the five Swedish ships which captured Riga in 1612, was the founder of the Swedish noble family of Klerck. From further down the coast, in Inverkeithing, comes Admiral Greig, a Russian naval hero who led Catherine the Great's navy and is buried in Tallinn.

Commercial fishing has been an important industry in Tayside with herring and mackerel and their processing common along the coast. Shellfish fishing is still active in the area, although most landings of fish now take place in the larger ports of Peterhead, Fraserburgh and Aberdeen to the north. The Angus coastline is one of the few remaining areas in Scotland where traditional salmon netting still takes place.

Arbroath built an industry exporting barrels of herring to Königsberg and the town's fishy delicacy, the Arbroath Smokie is still sent worldwide. It now has protection under European Law, meaning it is a protected name and can only be used to describe haddock smoked in the traditional manner within an 8km radius of Arbroath.

Fishing, primarily for salmon and river trout, is popular in this area, especially in rural parts of Tayside. The rivers Tay and Isla, and the many lochs, provide a valuable income for rural estates and increases visitor numbers to the area.

Development

The 20th Century saw massive growth of the main towns such as Dundee, Perth, Crieff, Blairgowrie, Forfar, Arbroath and Montrose. In rural areas, where historically settlements have consisted of small scale townships, village, scattered small hamlets, scattered steadings and houses in open countryside, there has also been expansion of some settlements, steading conversion to housing and some new individual houses. In villages such as Auchterader this expansion is extensive and can have impact on the traditional shape of the settlement. Similarly, the A9 and A/M90 going to Inverness and Aberdeen respectively, were expanded and improved and are now Scotland's main roads to the north. The roads themselves, with the associated cuttings and embankments, and their traffic are prominent features in the landscape. The A9 north of Perth is in the process of being made into a dual carriageway, which will have local landscape effects, and the major Bertha Park settlement expansion to the north west of the city, including a new link road over the Tay, are under construction, expanding urban features out from the city. There are also other major development areas proposed near Dundee, at Dundee Western Gateway, Whitfield and Eastern Dundee.

A high proportion of industry in Tayside is located in Dundee which is also the region's largest settlement. For much of the region and especially in the Tay and tributary valleys, tourism is a major economic generator and while there are many established hotels of a high quality, there has been little pressure to build new facilities during recent decades. There has been some development of alternative forms of accommodation such as timeshare and log-cabin developments.

Renewables

One of the largest solar farms in Scotland has been built at Errol and there is increasing interest in the construction of solar farms to take advantage of the good sunlight hours, particularly through the eastern part of Angus where several solar farms have been built around Arbroath.

There are clusters of wind energy development around Drumderg, the Sidlaws, and other parts of the Ochils (Greenknowes, Lochelbank and Burnfoot group) and further south at Braes of Doune and in the Highland area (Calliacher and Griffin). In Angus the most significant wind farm is Arkhill in the lowland Sidlaw Hills. Across the area there are smaller clusters of 1 – 3 turbines associated with lowland agricultural land use, and these form the majority of developments.

Recently, offshore windfarms have become a development focus and the Inch Cape and Seagreen offshore windfarms would be visible from the coastline if constructed.



Autumnal woodland at Loch Tummel, Perthshire. ©Lorne Gill/NatureScot/2020VISION

Parts of the Loch Tummel Hydroelectric scheme have been in operation for almost 90 years. It operates on a cascade system with 9 power stations, dams and pumping stations attached to lochs as they descend through the catchment, including Loch Ericht, Loch Rannoch and also Loch Faskally, which is entirely man made. The dam at Pitlochry has an accessible fish ladder and visitor centre and water reaching here may have already passed through five power stations generating 245MW of power. Recent hydroelectric schemes have been small-scale, with run-of-river schemes being more commonly installed, such as Allt Mor na Lairige.

Minerals

The Tayside area contains a range of mineral resources. Historically hard rock and sand and gravel have been excavated from the hills and the basin respectively in small-scale quarries many of which are now abandoned. Small quarries were often associated with individual settlements which has led to distinctive townscapes contributing towards local identity. Carmyllie stone was quarried near Arbroath with the bedded sandstone being exported throughout the world often used as paving and locally for roofing before the quarry closed in 1951. Mineral deposits still make a contribution to the economy, providing construction materials and supporting employment. Hard rock extraction continues at Ethiebeaton and Ardownie Quarries, and sand and gravel extraction quarries can be found around Edzell and Brechin.

Due to its geological history Tayside has deposits of lead, copper, arsenic and gold as well as talc deposits but much of it is not commercially viable. Small scale panning for gold is undertaken in the Ochils, but mainly by individuals. Barite (for use in the North Sea oil and gas industry) has been mined near Aberfeldy since the late 1970's and this will continue with a new mine.

Coal is also present in a wide band to the north of the Cleish Hills and the open cast coal site east of Blairingone is the largest mineral operation in the area. Substantial landscape change has resulted from this operation with the loss of pre-existing features, and the working operations and screening bunds and soil/overburden mounds are locally conspicuous.

Many derelict quarries have recolonised with semi-natural vegetation and, bearing in mind their small scale and revegetation, they are largely not intrusive and very local landscape features. The Craigton quarry is larger in scale and in a visually more exposed location. Revegetation is limited on worked-out areas and restoration incomplete. It is the most significant of the existing quarries in the area from both a landscape and visual point of view.

Landcover

Landscape evolution has created a wide variety of 'features' which are now integral to the character of the Tayside landscape, of both natural and human-influenced origin. How these contribute to the regional landscape is outlined in the following section.

Upland/montane habitats

The mountains of Tayside reach altitudes of over 3,000 feet and support a diversity of upland communities. Calcareous schists of the highest peaks support arctic alpine communities which

are rare in Britain. Cliffs and rock platforms harbour lichens, liverworts and many rare montane plants. Flushes, limestone and alkaline fen are also important habitats and are protected under EC regulations. More extensive is the heath and moorland which covers much of the mountain slopes and supports a variety of wildlife, some of which is managed for game. Muirburn (creating blocks of heather at different growth stages through a planned programme of burning or swiping) in these areas creates distinctive patterns in the landcover, visible from far distances. These uplands areas are home to rarer insects, bird and animal life, the most evocative being the golden eagle. Little remains of the high mountain woodlands, although birch, rowan and Caledonian pine are present and have a significant local impact. From distant and lower ground these upland and montane communities create mosaics of muted greens, ochres, browns and oranges, brought to life by the seasonal blooms of alpine flowers, swathes of pink heather, and the autumn russets of ericaceous shrubs, bracken and deer grass.

Valleys, slopes and glens

The sheltered environments of valleys and glens have supported and protected many of the region's semi-natural woodlands which include alder-woods, hazel, ash and elm-woods and oak-woods merging with higher birch woodland. Significant nature conservation values are found in the steeply-sided valleys and gorges where the rich woodlands are frequently called 'dens'. These also contain varied ground flora and often mosses and lichens associated with cliffs and craggy hillsides. On certain more exposed slopes are woodlands of juniper and Caledonian pine, the most renowned being at Glen Artney and Black Wood of Rannoch respectively. The glaucous colours and uncultivated textures of the semi-natural evergreen woods contrast with the deciduous woods and make them distinctive features. Again, the presence of areas of limestone, wet flushes and alkaline fens create a varied and internationally important range of habitats. The presence of capercaillie in Tayside's pine-woods is also particularly notable due to its striking appearance (when seen) and its curiously penetrating mating call.

Lochs, mires and wetlands

Tayside has many lochs, the largest of which is Loch Leven. It is approximately 13.3km² in surface area with a mean depth of 3.9 metres, but this is the result of down draining. In prehistoric times the Loch and associated wetlands probably extended over a much wider area. In historic times evidence suggests that changes to its outline have been relatively small but it was subjected to partial drainage and water level control in the early 19th Century to reclaim land subjected to seasonal flooding and to increase the amount of lettable agricultural land. An Act of Parliament passed in 1827 for recovering and draining land led to the introduction of a cut and sluice which decreased the surface area of the loch by 4km², and moved the shoreline in by 500m. This decreased the water level by 1.4m and increased the size of the islands. The introduction of sluice gates prevented the entry of salmon and sea trout which had formerly migrated into the loch, and the quality of the fishing in the loch deteriorated.

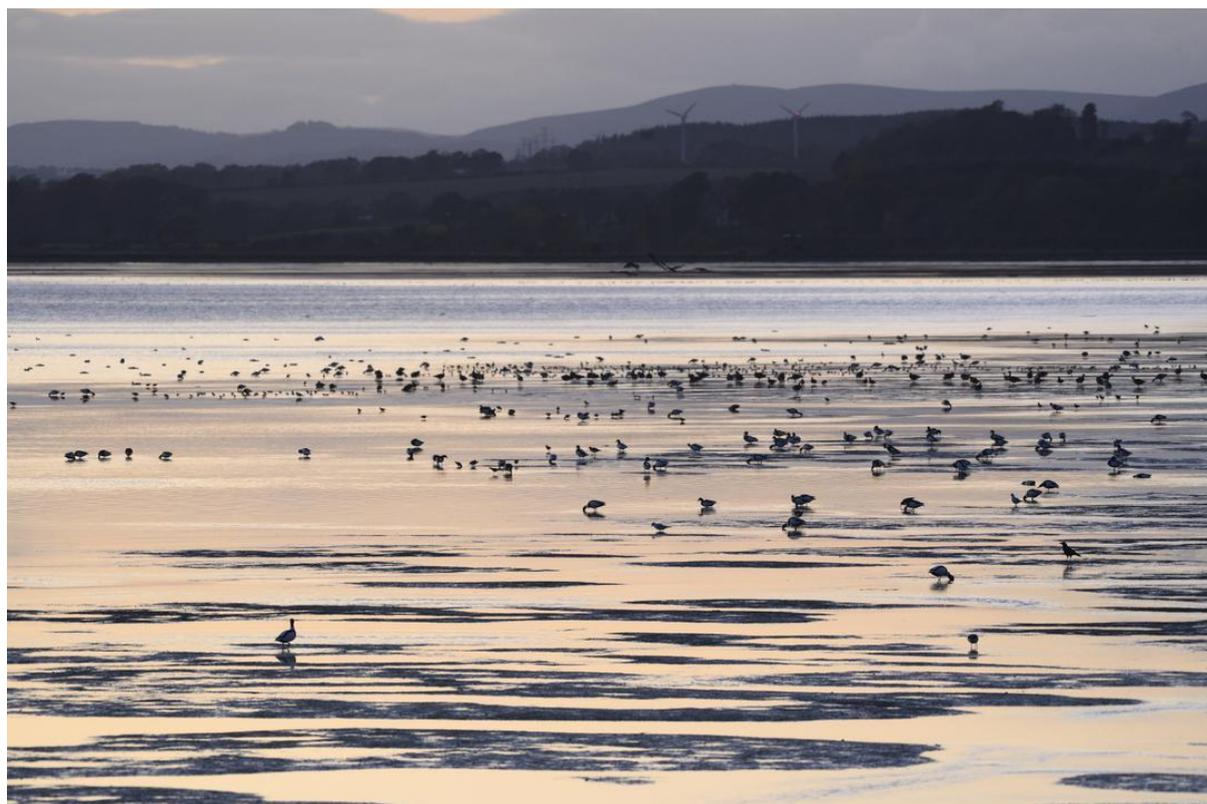
Tayside's many small lochs, mires and wetlands include high, glacially-carved lochans, lochs, kettle holes, mires, bogs and river corridors which support a range of communities. Basin and raised mires are common (e.g. Gleneagles Mire, Forest of Alyth Mires, Dun Moss, Balshando Bog, Forest Muir). These frequently have fringing carr or fen vegetation and have surrounding

areas of wet meadows or woodland. Open water has a diversity of aquatic plants and is internationally important for migrant and breeding wildfowl. Greylag and pinkfooted geese are particularly noteworthy and become significant characteristic features of Tayside's autumn when migrating in formation in their thousands. The Carsebreck and Rhynd Lochs, Drummond Lochs, Loch Leven, the Loch of Kinnordy and the Loch of Lintrathen, are SSSIs of particular interest for both ornithology and botany. Similarly the kettle-hole lochs to the east of Dunkeld - Loch of Craigtush, Loch of Lowes, Loch of Butterstone, Loch of Clunie and Loch of Drunellie - are of considerable natural heritage interest.

Lowland and mid-altitude features

Much of the lower, gentler landscapes are grazed or cultivated; however, there are limited areas where local ground conditions or management practice have allowed the development of natural heritage interest. Many of the wetland features described above are characteristic of the lowlands and mid altitude areas. Grassland and meadow features are equally significant. Tayside has a range of such features: orchid-rich wet flushed meadows (eg. Cairnleith Moss), orchid-rich dry meadows (e.g. Morenish SSSI), northern hay meadows (eg. Brerachan Meadows, Weem Meadow) and many other unimproved grasslands. Less extensive are lowland heaths of which Diltry Moss and Methven Moss SSSIs are examples.

Coastal Features



Wading birds at Montrose basin, Angus © Lorne Gill/NatureScot

Tayside's coastline, while not dramatic, contains a variety of interest which complements that of its hinterland. This includes saltmarsh, brackish reed-swamp, dune systems, low cliffs and links grasslands, and coastal heaths. Associated with these habitats are wildfowl and sea-

birds which are essential components of the coastal character. These include eider ducks, waders, kittiwakes, fulmars, puffins and guillemots. The large tidal Montrose Basin and mudflats of the tidal zone of the Tay Estuary are both designated for their importance as habitats for birds.

Trees and Woodlands

The trees and woodlands of Tayside play a major part in determining people's perception of the region. There are many strong cultural associations with forests, woods and individual trees, and the current mixtures of forests and woodlands have created many areas of scenic value, not least of which is the River Tay (Dunkeld) NSA. Tayside's woodlands have also significant conservation value. However, in consideration of the importance of these features in the character of the landscape, separate descriptions are provided below.

Notable specimens and tree collections

Known and marketed as "Big Tree Country", Tayside has arguably the best known individual trees in Scotland due to a combination of their great age, historic and legendary significance and their dendrological value, as well as some of the best conditions for tree growth in Western Europe. The best known trees, many of which are now popular features for visitors, are:

- Fortingall churchyard yew tree, believed to be 3,000 years old;
- Birnam oak, a massive remnant of early oakwoods thought to be circa 1,000 years old;
- Niel Gow's oak;
- the beech hedgerow of Meikleour planted in 1746 by the Marquis of Landsdowne and considered to be the tallest hedge in the world;
- the Douglas fir at the Hermitage, Dunkeld which is said to be Britain's tallest tree;
- the Dunkeld larches, which include the surviving original European larch imports, and Japanese larch imports by the Second and Fourth Dukes of Atholl; and
- the stand of grand fir near Dunkeld which are the fastest growing trees in Britain.

In addition, there are many notable individual trees and collections within Tayside's Inventory Designed Landscapes. The huge conifers, the result of 15th and 19th Century planting, are particularly important landscape features in many areas, distinguishing 'policies' from great distances. David Douglas, the great Scots plant collector and botanist, came from Scone and many of his early introductions were to Perthshire landowners.

Trees in the countryside

Tree lines and groups in the countryside make powerful statements in many areas. This is particularly so when viewed across flat and rolling landscapes where landform is emphasised and where picturesque silhouettes are possible, for example, in many parts of Strathmore. Beech, oak, lime, sycamore and ash are generally used to form hedgerow tree lines, although beech is predominant. Similar mixes are also characteristic of field corner groups and roadside planting. Riparian trees are also important linear features, often the product of deliberate planting but also of semi-natural origin; these help to define the water course within glens and straths, and create attractive subjects for reflections on the water. Hedgerows, typically beech or hawthorn, are locally important where dry stone walls are absent. These are confined to lowland areas and often associated with areas of deep moraine. These features are commonly

the product of historic estate management. Contemporary changes in agriculture and Dutch elm disease have seen the loss of many such features.

Ancient, old and semi-natural woods

The inventories of Ancient, Old and Semi-Natural Woods for Tayside indicate there to be over 2,300 sites totalling circa 40,000 hectares within the defined categories: Ancient Woodland; Long Established Woodland of Semi-Natural Origin; Long Established Woodland of Plantation Origin; 'Roy' woodland sites and "other woods". These woodlands represent under half the total woodland cover in Tayside. They comprise only a small proportion of native woodlands and are mainly introduced conifer plantations (circa 57%), semi-natural woodlands (circa 25%) and mixed/policy woodlands (circa 12%).



The Black Wood of Rannoch. ©NatureScot

The oldest semi-natural and native woodlands are generally limited to steep and inaccessible areas where they have been afforded protection from early clearance and grazing. The 'dens' woodlands in steeply-sided valleys and gorges are typical of this situation. Alternatively, many old woodlands have survived in accessible areas due to deliberate management for timber products. The extent of birch woodlands is probably far greater than previously recognised due to their ability to spread when grazing pressures are reduced. The main native woodland types remaining in Tayside are:

- acid oakwoods, e.g. Comrie Woods, Cardney Wood;
- oak grading to birch at higher altitude;
- primeval remnants in gorges including ash, wych-elm and hazel, e.g. Pass of Killiecrankie, Den of Airlie, Den of Riechip;

- woods of richer flushed areas including ash, alder and hazel, e.g. Bolfracks Wood, Milton Wood:
- native pinewoods, e.g. Black Wood of Rannoch, Meggernie, Crossbog;
- juniper woods, e.g. Forest of Glenartney:
- lowland native oak woodland remnants, e.g. Methven Woods, Kincardine Castle Wood.

The more extensive woodlands of long establishment are the product of deliberate planting or management. By the 17th Century, the medieval hunting forests (Birnam, Clunie, Dupplin, Forest of Plater) had been largely cleared and the loss of timber was addressed by the estates. Estate woodland planting was accelerated in the 18th Century by the combination of designed landscape establishment and the adoption of early commercial forestry ideas initiated by the Dukes of Atholl. The mixed policy woodlands, which are such important features of Tayside's straths and glens, are a product of this period. The oldest policies generally contain beech, Scots pine, sycamore, lime, oak, yew and sweet and horse chestnut. Later planting included more varied conifers including Douglas fir, noble fir, grand fir, hemlock, arch, western red cedar, spruce and occasionally sequoias. These woodlands now provide robust shelter and space-defining belts; they form distinctive visual boundaries and embrace attractive 'comfortable' landscapes.

Forest and contemporary woodlands

The most extensive woodlands in Tayside are the forests developed largely by the then Forestry Commission since its establishment in 1919, but also by private foresters. The early forests, planted to meet Britain's crisis demand for timber, were often very successfully integrated into the landscape as witnessed by the high quality of the landscape around Dunkeld.

Later planting was driven by a greater desire to increase productivity and, as such, was less well-integrated into the landscape as witnessed by the geometric tines in areas such as the Ochils. Current forestry policy encourages multi-use woodlands of high design, amenity and conservation values. Recent forest plantations and rotations have, therefore, sought to create the more sympathetic integration of forests with landform and land uses. Features of modern forests include carefully designed margins with appropriate deciduous fringes and 'feathering' into the landforms, open space patterns respecting views, wildlife movements and built heritage features, and recreational facilities associated with forest parks, for example Tay Forest Park. The historic association of larch with Tayside makes its fairly extensive use seem appropriate. Its deciduous qualities make it a striking feature of the autumn season when it contrasts strongly with adjacent pine, spruce or firs.

Built Heritage

The built heritage interest of Tayside is rich and varied. It charts the progression from simple to sophisticated buildings and illustrates changes in style and the use of materials throughout the last millennium. The region's geological foundations are expressed in the constituents of its built structures. This forges a strong relationship between buildings and their landscapes which is an essential part of the local landscape character. This vast heritage has, therefore,

a significant influence on the character of the region as a whole and of its component areas. The following paragraphs seek to outline the nature of these built heritage features.

Castles, stately homes and their designed landscapes

Tayside contains a large number of castles and stately homes which illustrate the evolution from severe fortified residences to sophisticated stately homes. Their scale and commanding locations and imposing design makes them powerful and romantic features in the landscape. There are a total of 56 sites in Tayside currently listed within the Inventory of Gardens and Designed Landscapes in Scotland as being of national importance.

These landscapes make major contributions to the scenic diversity and apparent prosperity of the Tayside landscapes. The grandeur of their buildings, the extent and patterns of their policy woodlands and picturesque qualities of their follies, lodge houses and home farms, are all important features. The influence of the estates can also be seen in the broader landscape where planned settlements have been established and where estate-led agricultural improvements have introduced dry-stone walls, hedgerows and tree lines. In some areas the form of the tower house has been used to inspire contemporary housing within the countryside to echo the imposition of the tower on the local landscape.

Historical documentary evidence helps to reveal the way in which the landscape was appreciated in the past and the forces behind the changes in the landscape. Many of these designed landscapes have importance because of their associations with the arts, historical events or well-known personalities. For example Kinross House, built in the 17th Century by William Bruce, Loch Leven Castle, where Mary Queen of Scots was imprisoned, and Blair Adam which hosted Sir Walter Scott on many of his visits to the area which inspired his later work.

Other notable designed landscapes include the Hermitage at Dunkeld, designed as a pleasure garden for the Dukes of Atholl and heavily influenced by the Romantic Movement, including the folly of Ossian's Hall, and Drummond Castle Gardens.

Religious buildings

Medieval Tayside contained numerous monastic houses and two influential cathedrals. The former left a legacy of abbey buildings and ruins of the Cistercian, Tironensian and Augustinian orders. These include the abbeys of Arbroath, Coupar Angus, Scone and Lindores. The Cathedrals of Dunkeld and Brechin are still in use (although partially in ruins) and are important both as landmarks and as ecclesiastical centres. Little remains of earlier religious foundations, the most significant remnants being at Abernethy and Restenneth.

There are also very many post-reformation churches in Tayside. These are generally of Renaissance character; classically restrained and of simple form. Some rural churches have a 'T' plan layout to allow preaching to a 3-sided congregation, whilst avoiding large roof spans. Many churches are built on the sites of earlier chapels: these are invariably strategic or prominent sites. Most churches represent the focus of their towns and villages and are frequently the most visible feature of the settlements from the surrounding countryside.



Ossian's Hall at the Hermitage, Dunkeld,. ©Lorne Gill/NatureScot

Vernacular buildings

Tayside's underlying geology is clearly reflected by the distribution of building materials throughout the region. The different qualities of the local stones determine the colours of individual buildings and towns and the manner in which they were constructed.

The most striking influence is the division between the Old Red Sandstone of Strathmore and the schists to the north of the Highland Boundary Fault. The Old Red Sandstones provide a range of stone suitable for masonry. These are noticeably red/brown in colour, but vary in line and texture. Coarse-grained pink, brown and deep red stones are all evident in Strathmore, lower Strathearn and Strathallan. These are generally used as squared and dressed masonry, in contrast to the schistose rocks further north which yield less easily dressed stone and are consequently used more extensively as rubble. Their predominant colours are light brown-grey, distinguished by the glitter of mica. Small-scale variations reflect the local availability of intrusive rocks, for example, grey and pink granites and dark basalts are distinctive in isolated areas.

Available masonry stones are frequently mixed in practical ways, for example, the more readily dressed granites and sandstones are frequently used as quoins, lintels and sills, framing walls of coarser rubble schists or basalt. White render has been introduced in many areas (but particularly in the Highlands). This serves a practical function in the protection of coarse stonework, but is also the result of stylistic trends instigated by certain landlords. The presence of slate bands has also been important as a source of local roofing materials. The use of pantiles around Kinross and more extensively in Fife has been attributed partially to the local absence of suitable roofing stones. Pantiles were also imported as ballast on ships, exporting coal and iron ore from Fife to the low countries. These local variations in building materials reinforce a sense of place and contribute greatly to the overall character of Tayside's landscapes.

In the Carse of Gowrie, a substantial number of significant historical structures survive that demonstrate the local tradition of mass clay walls or mud-wall. Some of these buildings are 200 years old. The buildings do not respond well to repairs in modern materials and fail rapidly, sometimes catastrophically, if not maintained appropriately. Although few remain the town of Errol contains the largest concentration of the remaining structures.

The oldest surviving domestic buildings in Tayside date generally from the 17th Century. Within settlements these are scarce, but easily recognisable as simple single storey cottages of crude rubble construction. In upland areas there are numerous upstanding ruins from this period: the legacy of Highland clearances. The foothills and lower mountain slopes have notable concentrations of such settlements. These generally comprise clusters of small rectangular buildings with associated walled enclosures constructed, on the whole, of dry stone, and many are recognised as being of national importance and designated as scheduled monuments.

The majority of inhabited vernacular buildings in Tayside date from the 18th and 19th Centuries. Robert Naismith (1989) identifies a range of local building characteristics in the region related to geology and cultural influences. Some of the main characteristics are described below.

Typical buildings in Highland Perthshire and Highland Angus are constructed of schists with the occasional use of granite, whinstone and local sandstones. One and a half storey buildings are most common, frequently with dormers that break the eaves. Elevations are usually symmetrical; the front door and porch framed by windows. Windows are a mixture of 4 and 12 pane sash and cash. The use of horizontal panes is a distinctive feature of the Western Highlands. Squared rubble rybats (polished stone pieces that form the side of a window or door) are typically used around windows and at corners, with random rubble walls sometimes in a contrasting material, for example whinstone. Projecting eaves are common throughout this area as are timber porches. The 'Breadalbane' estate is renowned for its use of rusticated log porches and other timber ornamentations, together with the use of horizontal panes. The Kenmore area provides the best examples, but these can also be found in neighbouring areas. The more polite Victorian architecture is notable for its timber ornamentation; the barge boards on the buildings of Pitlochry and Birnam are particularly fine examples. White and cream renders or paint are fairly common in this area. This is typically contrasted by the use of dark colours on window margins. Interesting examples of rendered buildings are found on the Glenlyon Estate, where a range of neo-vernacular style buildings were constructed at the end

of the 19th Century. These include the Balnald Cottages and the Fortingall Hotel. The latter comprises a thatched set-piece village, inspired by the arts and crafts movements and designed, in part, by James McLaren of the Charles Rennie Mackintosh School.

In the lowland areas, there are notable variations from the north-east to south-west. Around Kinross, buildings are generally more formal and larger scale. They retain the classic proportions so favoured by the Georgian era. They have few dormers and porches and little applied ornamentation. Masonry is typically local sandstone of creamy, grey colours. This is usually regularly coursed, snecked (small squared stones used in a rubble wall to fill spaces between stones of different height) rubble with plain margins and rybats. The main buildings have slate roofs, but the use of pantiles on small building is a distinctive characteristic of this part of Tayside.

The red sandstones of Strathmore have allowed the construction of more highly dressed and tooled buildings, displaying a wide repertoire of masonry skills. There are local variations, however. Dressed coursers are common to south Angus, while further north, red flagstones and rubbles are round. In north-east Angus, the use of Aberdeen bond is distinctive. There are many common aspects to these buildings which include predominantly one and a half storeys, pane casement windows and stone slate and Scots blue slate roofs.



Farm buildings at Tullybaccart in the Sidlaw hills near Dundee. ©Lorne Gill/NatureScot

The predominant rural quality of Tayside is emphasised by the small size of most settlements and the large numbers of isolated buildings/small building clusters in the countryside. Farm complexes are key features, many of which are large estate steadings with courtyard layouts.

Associated with these complexes are tile small circular horse gang mills and lectern style dovecotes. Dry-stone dyke field enclosures are another essential feature of the Tayside landscapes. This legacy of 18th/19th Century agricultural improvements represents an extensive network covering large parts of the lowlands and marking boundaries throughout the mountains. Once again, the local stone is expressed in the differing colours and styles of wall construction.

Another aspect of estate management was the development of planned settlements. Tayside, and particularly Strathmore, has a concentration of such towns and villages established during the 18th and early 19th Centuries. These include Ardlar, Alyth, New Scone, Stanley, Spittalfield, Douglstown, Letham and Friockheim. Some of these settlements were developed as centres for the textile industry. Stanley was conceived as a model textile works and village, operating seven large waterwheels. Douglstown in Angus had the first power driven flax mill in Scotland. Milling using water power was widespread throughout Tayside, capitalising on the abundance of swift flowing rivers. Mill buildings (many of which have now been converted) are, therefore, a common legacy of corn milling and textile production, found both within settlements and in more isolated locations. Barry Mill in Angus is a fine working example of a 19th Century water powered corn mill. Newtyle in Angus was laid out on a grid around the railway station.

Communications, infrastructure and engineering structures

The glens and lowlands of Tayside have been important communication routes for several millennia, allowing passage from the lowlands and central belt of Scotland to the Highlands and the North-East. Many, but by no means all, of these routes are now traced by roads, farm tracks or footpaths. Control over routeways is evidenced in the archaeological record by the presence of forts and duns from the Iron Age, Roman forts from the time of their occupation, and castles and tower-houses from the late-Medieval period. The existing road network is the product of development and improvement since the 18th Century. Some Roman roads occupied the routes of later tracks and roads. Military roads were succeeded by turnpike roads which were in turn upgraded and supported by the development of railways.

The military roads developed after the Jacobite rebellions (initially by General Wade and subsequently by Major Caulfield) laid down a strategic network of well-constructed roads, with bridge crossings over the main water courses. Most bridge structures were unremarkable stone structures; however, special attention was given to the more important river crossings. The Aberfeldy Bridge designed by William Adam is of particular architectural merit. Many of the military roads still exist as tracks, small roads or strategic long-distance routes today.

The Turnpike roads, mainly of the later 18th Century, provided more extensive metalled routes throughout Scotland and particularly in the lowlands and valleys. These roads were run by 'Turnpike Trusts' who levied charges every six miles. Toll houses controlled movements and charges and are features of this era. Toll houses exist at Dunkeld, Crieff, Killiecrankie and at Marykirk Bridge. Numerous bridges were also constructed to accommodate the new roads. Dunkeld Bridge, designed by Thomas Telford in 1809, is one of the finest in the region. Other road bridges of note include the Bridge of Dun, the Marykirk and Perth Bridges designed by John Smeaton. The 'trust' organisation was reflected by a 'house-style' in the design of

milestones, distance plates and directional signs. A number of these features can still be seen at the roadsides, for example, Dundee to Perth milestones carry a single letter and distance figure, while Angus roads have large sandstone block milestones.

The development of the railway lines in Tayside involved some major feats of engineering, both in scale and complexity. Extensive rock cuttings and embankments and many bridges were required. In addition, the railway companies developed many attractive station buildings and associated hotels. The station at Birnam is a particularly good example.

Railway lines used to be much more extensive in Tayside: the town of Newtyle in Angus has extensive embankments and cuttings which are remnants of a previous line, which turned at this point. There are several abandoned lines in Tayside such as in Angus as from Newtyle to Forfar serving numerous settlements like Alyth, Kirriemuir and Meigle. There also used to be a line going through Strathearn and Comrie linking Gleneagles and Perth with Balquidder and Criannlarich, conceived in an era when east-west trade between Dundee and Oban was expanding. The introduction and abandonment of railway lines is also closely associated with the history and formation of various settlements such as Newtyle in Angus.

Latterly, the road network has been enhanced by major engineering projects. This has resulted in new motorways, dual carriageways and associated bridgeworks/earthworks. The major projects include the A9 (in the process of being dualled), M90, A90 and A94. The economic benefits brought by these roads have contributed to the growth of towns along their routes, influencing land use, such as the commercial/housing developments on the edges of Forfar and Kinross.

The last major category of significant engineering features in Tayside is that of hydroelectricity generation. This development, which began in Victorian times, has harnessed the considerable resource of water power through the construction of huge concrete dams, aqueducts and power stations. The main features are associated with the River Tummel and the River Lyon where they have a locally significant impact.

Towns and Villages

Tayside has a distinctive pattern of settlements which reflects both directly and indirectly the physical environment. Within the lowlands there is a clear distinction between inland and coastal settlements. Inland, a series of market towns developed at key crossroads, typically south of the Highland Boundary Fault but close to the mouths of the glens. Examples include Brechin, Edzell, Forfar, Blairgowrie and Crieff. These towns, which are typically nucleated in layout, provided market functions both for the lowland arable economy and the Highland cattle economy. Along the coast towns and villages grew up around the fishing and shipping trades. Examples include Auchmithie, Arbroath, Dundee, Montrose and Perth. Within the Highland Glens, the location of settlements reflects the strategic importance of bridging points and crossroads. Comrie, Aberfeldy, Bridge of Cally and even Pitochry, while providing important market functions, are all sited at important bridging points. The last was amongst a number of towns which saw considerable expansion during the Victorian era as parts of Tayside were included on Grand Tours of the Highlands.

The biggest change to settlement in Tayside came around with the Industrial Revolution. Dundee had grown from a small port in the 11th and 12th Centuries to a large busy port by the end of 14th Century. It imported wine and grain, and hides and wool which developed into a textile industry in the area, initially wool but later linen. By the end of the 18th Century, whaling, leather and marmalade manufacturing brought money to the city and municipal buildings were correspondingly impressive. By 1801 the population was 2600, rising to 90,000 by 1861. Many immigrants were from Ireland and the Highlands, which were struggling with potato blight. This increase meant overcrowding, with regular outbreaks of typhus and cholera. New suburbs were built, and sewers and piped water were introduced to improve living conditions. Parks, such as Lochee Park, The Law and Dudhope Park were built by wealthy industrialists to provide a wholesome destination for their workers. These remain important to this day.

The introduction of the first railway and steam locomotives in Scotland to this area, which were also built in Dundee, indicated the importance of the town at the time and gave Dundee a reputation for innovative engineering.

Linen declined and shipbuilding and jute became more important. Dundee built the last wooden three-masted ship in Britain in 1901, the RSS Discovery, taken to the Antarctic by Robert Falcon Scott. Dundee continued to grow through the economic depression of the 1930's with some of the earliest council houses being built in the 1920's and 1930's with more following in the post war period.

Dundee suffered during the depression but D.C. Thompson, a local printing press and newspaper owner, began printing comics in 1920. These came to include the Dandy and Beano and are still printed today, leading to Dundee being known as the city of 'jute, jam and journalism. Ship building continued through both world wars but decline after that and ceased in the 1980's. The latter part of the 20th Century was marked by high unemployment and industrial decline.

The recent regeneration of the docks area as a tourist and leisure destination. The Victoria & Albert museum, the Discovery Point centre and industrial museums, have increased tourism to the area. The engineering and technical heritage of the area has also been built on, as well as steam engines. Dundee was also the location of early demonstrations of electric light and electric telegraphy in the 1830's by James Bowman Lindsay and James Chalmers invented the adhesive postage stamp in 1837, a smaller invention but revolutionary to the early Royal Mail. The University of Dundee specialises in computing and biosciences, and computer game development is a small but influential industry in the city, building on the comic and technology heritage of the area.

During the Industrial Revolution villages such as Newtyle and Stanley were created to house the workers for the new industries. Newtyle was built as a planned village as part of the first railway in Scotland, the Dundee to Newtyle line. This strange choice of destination is explained by the rapid expansion of Dundee already mentioned and was to provide the town with agricultural produce, and to bring jute and lime into Strathmore. However, it soon became a popular passenger line. Originally the village was a small rural settlement housing rural workers and cottage industry weavers but this had already begun to decline as inhabitants

moved to larger towns, and especially Dundee, for better employment opportunities. The new village was built to stem this flow of workers and factories including a small mill, bone grinding for fertiliser and quarries sprung up around the village.



View from Dundee Law over the city to the Tay. ©Lorne Gill/NatureScot

Stanley Mill was built in 1780 to use the River Tay to produce textiles. It remained in production until 1980. The village was built to provide accommodation for the workers. The nearby weirs now attract paddlesports enthusiasts from across the country.

As transport evolved suburbs were built around the periphery of the main towns in the area, increasing a uniformity identifiable by decade but not location. This continues through Tayside with expansion of smaller towns.

4. CULTURAL INFLUENCES AND PERCEPTION

The landscape is not a purely visual phenomenon, because its character relies closely on its physiography and its history. Hence, in addition to the scenic or visual dimension of the landscape, there are a whole range of other dimensions, including geology, topography, soils, ecology, archaeology, landscape history, land use, architecture, and cultural associations. All of these factors have influenced the formation of the landscape and continue to affect the way in which it is experienced and valued.

The landscape can therefore hold a special meaning for many people as the source of numerous experiences and memories. Many of these are visual, but at times the landscape may also evoke other sensual, cultural and even spiritual responses. This personal appreciation of the landscape leads to the ever increasing demand for access to the countryside and to the enjoyment of the landscape by local residents, workers, visitors, tourists and others who travel through it. It also leads to and justifies the public demand for the protection, sensitive management and enhancement of the landscape.

The Cultural Influence of Tayside

The Tayside area has inspired many writers from Robert Burns, who was inspired by the Birks of Aberfeldy waterfalls, to Sir Walter Scott who described Glen Lyon as the longest, loneliest and loveliest glen in Scotland and spent long periods of time in the area.

Scotland was seen as wild and uncivilised, as could be seen in Shakespeare's Macbeth which mentions Birnam woods within the play. The Birnam Oak is thought to be the only surviving tree from those woods.

This perception was changed by the Romantic Movement, when the castles and larger landowners played host to romantic poets and authors from Sir Walter Scott to Mary Shelly, who spent part of her teens in Dundee. The writing and paintings of this movement, including the painters John Everett Millais and Joseph Mallord William Turner, produced a mania for Scotland in the 19th Century which was well served by the newly build railways and Highland Perthshire became one of the most popular and easily accessible destinations.

Later authors with links to the area include Beatrix Potter, who wrote the first draft of Peter Rabbit while staying in Dunkeld, John Buchan who was born in Perth and refers to the central Highlands in his books and JM Barrie, who was born in Kirriemuir.

Further east there is also a rich literary heritage. Aberlemno Standing Stones are mentioned on the first page of Sunset Stones by Aberdeenshire writer Lewis Grassic Gibbon. The poet Hugh MacDiarmid worked in Montrose as a reporter and editor of a local newspaper and Joseph Lee, from Dundee, wrote poetry from the trenches of the First World War whilst serving with the Black Watch, but also published poetry associated with Dundee area.

Sir Hugh Munro from Lindertis, near Kirriemuir a founding member of the Scottish Mountaineering Club published the first list of Scottish 3,000 feet mountains in 1891. These mountains are now known as "[Munros](#)" and it is a popular hobby to attempt to climb them all.

Sir Charles Lyell from Kinnordy, Kirriemuir is often regarded as one of the founders of modern geology. He is best known as the author of "[*Principles of Geology*](#)" (1830–33), which presented to a wide public audience the idea that Earth was shaped by the same natural processes still in operation today, operating at similar intensities. His contributions also included a pioneering explanation of climate change,

Finally, Dundee was the home of the Beano and Dandy and where many of their characters were first imagined. This more innovative approach to culture would later be reflected in Dundee's computer gaming industry.

Tayside is also seen on screen in Monty Python and the Holy Grail, where Tomnadashan mine is the home of the killer rabbit; film versions of The 39 Steps and recently in the highly acclaimed television adaptation of the Outlander series of books. The last has, in particular, lead to an explosion of associated tourism to filming locations featured in the programme. The beach at Auchmithie features in the 2013 movie "Under the Skin" starring Scarlett Johansson.

The area also has a rich musical heritage. Niel Gow's Oak in Inver is reputed to be the tree under which Niel Gow, a fiddler under contract to three of the Dukes of Atholl, composed many of Scotland's famous strathspeys and reels.

The origins of placenames in Tayside

There is a wide range of origins for place names with in the Tayside area. It signals the transition from the Gaelic speaking Highlands to English and Scots speaking Lowlands. There are also Norse influences at the coast. One of the suggestions for the origins of Montrose is *Moth Hrossay* due to its location near Rossie Island but it is also suggested it could be from the Gaelic *Monad Rois*, the moor headland.

Pictish influences remain - Angus itself is thought to originate from the name *Oengus*, and *Aber*, meaning mouth of a river, is evident in names such as Aberfeldy and Kinnaber (headland at the mouth of the river). *Pit* is from the Pictish for farm and this would be the origin of Pitlochry. Perth derives from the Pictish word for a wood or copse. During medieval times Perth was locally known as St John's Toun, after the central parish, now reflected in the city's football team name of St Johnstone.

Gaelic names are found across the region and a large proportion of the names are Gaelic in origin more to the west of the region, with other influences more common to the south and east. *Auch* or *Ach* is from the Gaelic word for field and the long pastoral history of the area is apparent in Tayside with names like Auchterader (the upland field of the high stream) and Auchtermuchty. *Dun* is from the Gaelic for fort, thus Dunkeld fort in the woods. It is suggested that Dundee comes from the "Dun Deagh", Fort of Diag (a male name), although there are arguments it may also come from "Donum Dei", Latin for Gift of God.

Landscape features are also described by their Gaelic name and an understanding of them can help increase interpretation of the landscape *Ben*, *Creag* and *Meall* all describing different shapes of hills, *Meall* describing a rounded shape. Colours and textures such as *garbh* (rough), *liath* (grey), *buidhe* (yellow) and *gorm* (a blue green colour) add to this, as do *mor* and *beag* (large and small).

Designations

Nature Conservation

Tayside encompasses coastal, lowland, upland and transitional landscapes which support a diverse range of flora and fauna and provide a wealth of geological and geomorphological interest. These are reflected in the designation of over 150 Sites of Scientific Interest (SSSIs) and four National Nature Reserves (NNRs) in Tayside. Several of these are designated as Special Areas of Conservation (SACs), reflecting their international importance including two Ramsar sites, Montrose Basin, and the Firth of Tay and Eden Estuary, recognising the importance of wild birds in these areas. A number of these sites also fall within European conservation designations under the Natura 2000 scheme. Whilst these designated sites represent the most valuable and sensitive resources, there are many other areas of special value for wildlife, some of which are recorded as Wildlife Sites by the Scottish Wildlife Trust. The following paragraphs summarise the distribution of wildlife interests.

The four NNRs cover a diverse range of habitats. Ben Lawers is renowned for its arctic–alpine flora and is the highest mountain in the central Highlands. In contrast St Cyrus and Tentsmuir are coastal; St Cyrus is known for its sand dunes, flower rich coastal grasslands and inland cliffs. Tentsmuir shows a wider variety of coastal habitats - sand dunes, wetland and coastal woodland and mudflats. Loch Leven NNR is centred on the loch at its centre, important for populations of wintering and breeding waterfowl but also has wetlands, woodlands and grasslands different to the upland lochs in the north west of the area.

Scenery

The four National Scenic Areas (NSAs) in the area show similar diversity. River Earn NSA is the smallest and illustrates the conjunction of highland and lowland scenery enclosed by the hills on either side of the river valley, within that deciduous native woodland, designed parklands and plantation contribute to the sense of enclosure and the hilltops are wilder.

The River Tay (Dunkeld) NSA is also small and heavily wooded, with the rivers central to it. The Tay and Braan show distinctive behaviours, the Tay slower and looping and the Braan with rapids and waterfalls. This area shows its management through the vast plantations started by the Dukes of Atholl and the Victorian infrastructure which marks this area as a destination for many early Scottish tourists.

Loch Rannoch and Glen Lyon NSA is much more extensive and contains the NNR of Ben Lawers, as well as Loch Rannoch and Glen Lyon. The mountains are higher and Ben Lawers and Lyon – Lochay are identified as Wild Land Areas (separated by a road), though WLA are not a designation. Breadalbane and Schiehallion to the north of the River Lyon are also identified as a wildland area. Glen Lyon is said to be the longest glen in Scotland and descends from wild mountains around Cashie to a broad Strath with Meggernie Castle set in policy woodlands with the Rover Lyon mirror the change in landscape from wild and uncontrolled to meandering through the floodplain.

Loch Tummel NSA is also at the interface between upland and lowland, and is centred on the Tummel and Garry. The NSA has a sylvan landscape with a number of well-known features, such as the Pass of Killicrankie and the Queen's view. There is evidence of the area's attraction for early tourists and its later use for hydroelectricity.

Cultural heritage

There are 1073 scheduled monuments across Tayside (705 in Perth and Kinross, 356 in Angus, and 12 in Dundee). There are 6015 listed buildings across Tayside (3057 in Perth and Kinross, 2070 in Angus, and 888 in Dundee). There are 56 Inventory Gardens and Designed Landscapes across Tayside (41 in Perth and Kinross, 12 in Angus, and 3 in Dundee). There are 4 Inventory Battlefield in Tayside, all in Perth and Kinross. There are 58 Conservation Areas across Tayside (22 in Perth and Kinross, 19 in Angus, and 17 in Dundee).