

TAYSIDE LANDSCAPE CHARACTER ASSESSMENT



**LAND USE
CONSULTANTS**

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Part I: Evolution of the Landscape

1. INTRODUCTION

ROLE OF THIS REPORT

- 1.1. Land Use Consultants were commissioned in September 1996 to undertake a landscape character assessment of the Tayside region. The aims of the assessment, as set out in the study brief, are to:
- produce in written and map form a detailed assessment of the landscape character of Tayside;
 - provide a tool for Scottish Natural Heritage (SNH) staff to use in their day to day casework, including local planning and development control issues, and in particular to provide guidance on how various types of development or land use changes might best be accommodated within the different landscape character areas identified and their capacity to accommodate these changes;
 - provide information about landscape character for use by planning authorities in the preparation and review of their development plans, in the scoping and production of environmental assessments and in the consideration of other applications relating to changes in land use;
 - consider the likely and existing pressures and opportunities for landscape change and assess the sensitivity of the landscapes to these changes;
 - identify areas of landscape that are or may be under threat and find opportunities for the enhancement of features that contribute to landscape character;
 - develop guidelines indicating how differing landscapes may be conserved, enhanced or restructured as appropriate.
- 1.2. The assessment is to be produced in two phases: These comprise the following:
- (i) Phase I: Report of survey;
 - (ii) Phase II: Planning and management guidance in response to landscape change.
- 1.3. This document comprises a synthesis of the two phases of the study.
-

STRUCTURE OF THIS REPORT

- 1.4. Part I of the report describes the physical and cultural evolution of the Tayside landscape and reviews the principal forces for change which have affected it in the recent past, or which may affect it in the future.
- 1.5. Part II of the report comprises the landscape classification. For each of 20 distinct landscape types, the report describes the current landscape character and the forces for change that are affecting it and sets out a series of management and planning guidelines which are designed to conserve and enhance the distinctive character of the Tayside landscape.

2. EVOLUTION OF THE LANDSCAPE

PHYSICAL INFLUENCES ON THE LANDSCAPE

2.1. The following chapter outlines the main physical processes which have shaped the landscape of Tayside we see today. The physical influences are discussed under the following categories.

- Solid Geology
- Drift Geology
- Hydrology
- Climate

These four interrelated categories are considered in this report as **processes** which form the resulting topography, soil cover and vegetation. Topography, soil cover and vegetation are thus the resultant **products** of these processes. It is, therefore, the interrelation of process and product which can be taken together to mean physical influences.

2.2. 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.

2.3. This chapter describes the physical influences acting on:

- the lowlands; and
- the Highland area.

2.4. 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.

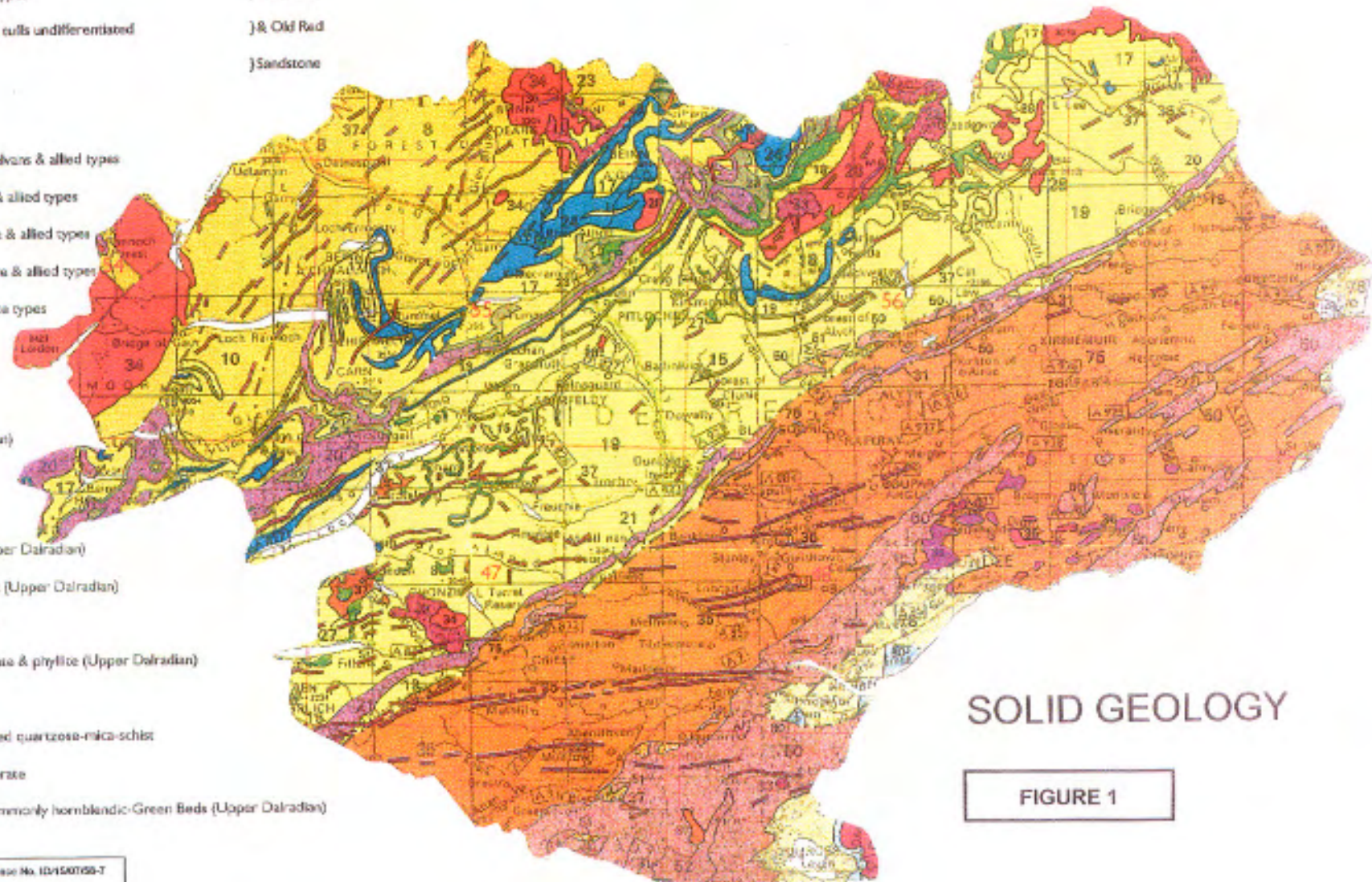
2.5. Three maps are of relevance to this section. **Figure 1** shows the solid geology of the region. **Figure 2** shows its landform and drainage patterns, while **Figure 3** provides a generalised picture of Tayside's landcover.

Tayside Lowlands

- 2.6. South and east of the Highland Boundary Fault, the lowlands form part of a structural rift valley. The valley lies between the two fault lines of the Highland Boundary Fault and the Southern Upland Fault. 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 updomed 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 kilometres 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 the north-east lava flows of this time, Stirling being the centre of volcanic activity in the area.
- 2.7. The lowlands are, therefore, largely comprised 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.
- 2.8. 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. 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, however, were eroded more easily. The divide between these two valleys was substantially lowered in this way.
- 2.9. 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.
- 2.10. The western boundary of Tayside in this area crosses the summit of Uamh Beag at 662m. 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.

EXTRUSIVE	80	Tournaisian & Viséan ('Carboniferous Limestone Series')	} Devonian	} CARBONIFEROUS	
	78	Upper Old Red Sandstone	}		
	77	Middle Old Red Sandstone	} DEVONIAN		
	76	Old Red Sandstone	}		
52	Tuff (including ignimbrite)	}	} DEVOONIAN		
51	Rhyolite, trachyte & allied types	}			
50	Andesite & basaltic lavas & tuffs undifferentiated	} & Old Red			
49	Basalt & spilit	} Sandstone			
38	Agglomerate in neck				}
37	Rhyolite, trachyte, feldite, dykes & allied types				
36	Porphyrite, lamprophyre & allied types				
35	Basalt, dolerite, camptonite & allied types				
34	Granite, syenite, granophyre & allied types				
33	Diorite & allied intermediate types				
32	Gabbro & allied types				
31	Ultrabasic rock				
DALRADIAN	26	Limestone (Upper Dalradian)			
	24	Limestone			
	23	Graphitic schist & slate			
	22	Black shale with chert (Upper Dalradian)			
	21	Slate, phyllite & mica-schist (Upper Dalradian)			
	20	Slate phyllite & mica-schist			
	19	Quartz-mica-schist, grit, slate & phyllite (Upper Dalradian)			
	18	Quartz-mica schist			
	17	Quartzite, grit, interstratified quartzose-mica-schist			
	16	Boulder bed and conglomerate			
15	Epidoce-chlorite-schist, commonly hornblende-Green Beds (Upper Dalradian)				

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SOLID GEOLOGY

FIGURE 1

- 2.11. 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.
- 2.12. Upstream from Perth, mills connected with cotton, linen and jute industries were established along the Tay, Erich and Almond valleys. These mills exploited the cataracts and rapids formed where rivers cross the resistant igneous dykes which intrude through the sandstone in these parts.
- 2.13. 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 downfaulted. The volcanic rocks were covered by the Upper Old Red Sandstone which now outcrops along the Firth of Tay to Dundee.
- 2.14. 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 granitic Highlands north of the fault.
- 2.15. Strathmore is a sandstone vale approximately 13 kilometres wide. It corresponds largely to the outcrop of Lower Old Red Sandstone. The fact that this sandstone coincides with an area of lowland is due partly to previous downfaulting along the Highland Boundary Fault. It is also because the softer sandstones are sandwiched between more resistant grits and schists to the north and volcanics to the south, leaving it relatively vulnerable to erosion. 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 downfaulting.
- 2.16. Within Old Red Sandstone, however, are some extremely hard formations, such as the Dunnottar Group of Old Red basal conglomerates previously discussed in relation to Uamh Beag (para 2.10). 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 Downtonian rocks have been eroded.
- 2.17. Where the solid geology of the area has had a strong impact on the character of Strathmore, is in the sandstone towns such as Kirriemuir. Here, the town centre is

almost entirely built from red sandstone with slate roofs. This creates a strong local identity.

- 2.18. 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.
- 2.19. The coastline is generally low with few significant topographic features until Arbroath. 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.
- 2.20. 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. In contrast, Lunan Bay corresponds to an outcrop of resistant Lower Old Red Sandstone.
- 2.21. 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.
- 2.22. The Carse of Gowrie, however, 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 of 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 cover of peat on its surface. There is, therefore, no history of peat cutting in this area.
- 2.23. As mentioned previously (para 2.15), it is the drift geology of Strathmore which today dictates the land uses and soil type - a fertile red loam. Strathmore is covered in a thick layer of glacial drift which was produced by several processes.
- 2.24. 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.
- 2.25. 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 gravelly soils of a sandur.

- 2.26. Where the ice sheets left extensive sandur plains, or other drift features such as kame and kettle topography, the land use of the fertile straths changes also. Examples can be found in Strathmore, north of Glamis and in Strathallan around the Gleneagles Hotel. In both instances, flat farmland changes to undulating and hummocky well-drained gravelly soils. These are often covered with gorse, heather or pine. Some, such as at Gleneagles, are now used as golf courses as they are generally unsuitable for agriculture, being too steep and/or the soils too acidic for any agricultural use other than rough grazing.
- 2.27. The hydrology of the lowlands is interesting as it largely ignores the underlying structures. Whilst these structures generally run south-west to north-east, the drainage of the area is predominantly from the west or north-west. The Rivers Tay, Earn and Almond all exhibit this pattern to a greater or lesser degree. This discordant condition is believed to be the result of ancient east flowing rivers continuing their flow over an emerging landmass 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 thus 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 Highland areas

- 2.28. The Highland areas lie to the north-west of the Highland Boundary Fault. They were metamorphosed from sedimentary rocks during the Caledonian Orogeny - the gigantic 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.
- 2.29. Within the region, two main groups of rock outcrop: the Moinian Assemblage and the Dalradian Assemblage. Both run roughly parallel to the Highland Boundary Fault. These two groups differ in age, diversity and composition of constituent rocks. The Moinian Assemblage is the older of the two and occurs in the north-west of the region. This area has yielded to denudation in a largely uniform manner, resulting in featureless plateau lands. The Dalradian Assemblage 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. Three significant granite intrusions also occur in the north of the region, at Rannoch Moor, Beinn Dearg and in the Mounth Hills west of Glen Clova.
- 2.30. The Moinian Assemblage is characterised by uniform landscapes such as at Drumochter and Rannoch Moor, and their blanket bogs. These blanket bogs have formed, unlike lowland raised bogs, 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 'climatic' formation in this high rainfall area.

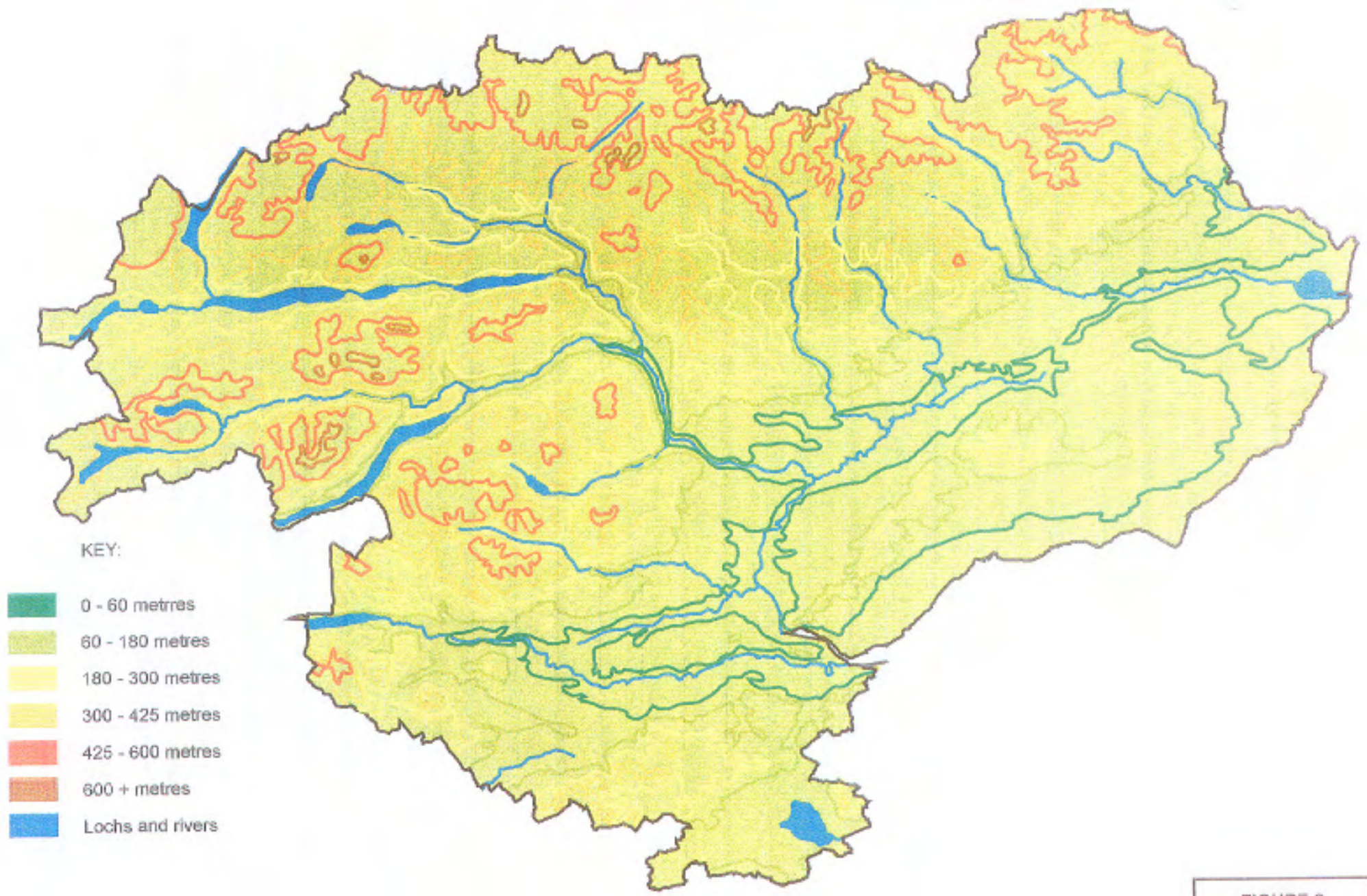


FIGURE 2

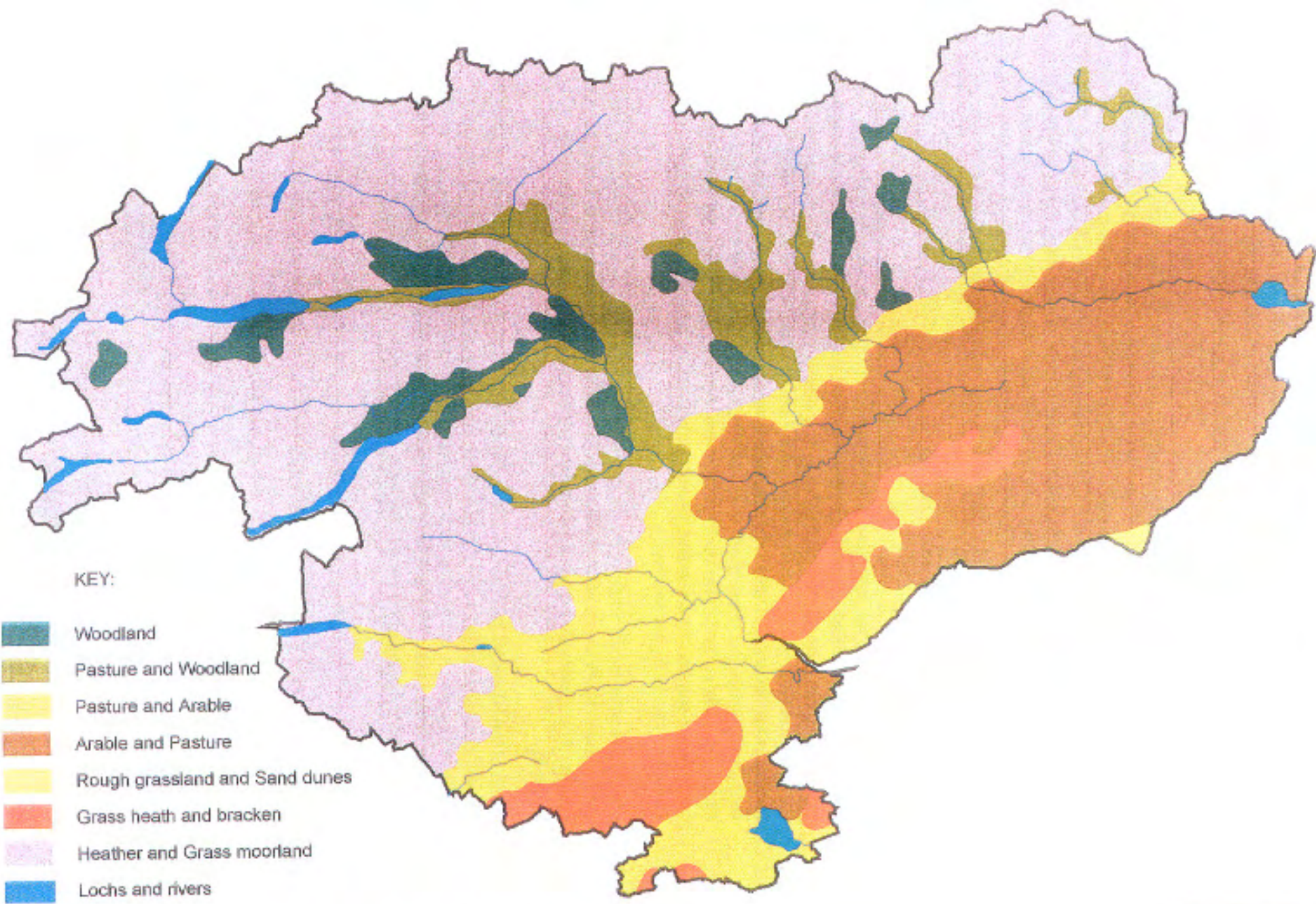
TOPOGRAPHY AND DRAINAGE

- 2.31. Rannoch Moor is one of the best examples of such a peat bog. It is, however, 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, quartzites, quartzose mica schists and the volcanic rocks of Glencoe. All these neighbouring rocks offer greater resistance to denudation 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.
- 2.32. East of Rannoch Moor lies the Rannoch/Tummel Valley. This valley can be discussed in relation to two significant geological/hydrological processes characteristic of this Highland area, discordant drainage and radial ice-dispersal.
- 2.33. Unlike Lochs Ericht, Laidon and Tay, Loch Tummel and Loch Rannoch are not fault-guided. This means, therefore, 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 can come 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.
- 2.34. 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.
- 2.35. The other main process 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.
- 2.36. Where the valley patterns did not accommodate ice dispersal, then glacial 'breaching' occurred, whereby new valleys were created. The Loch Ericht Valley is an example of one such valley.
- 2.37. 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.
- 2.38. The boundary of the Moinian and Dalradian Assemblages is marked for a substantial length within the region by the Itay Boundary Slide. The boundary between the two is complicated by overfolding 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.

- 2.39. The boundary between the Moinian schists and Dalradian rocks is perhaps most obvious, however, 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.
- 2.40. West of here, 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, providing flat, fertile glacial drift plains suitable for agriculture.

Summary

- 2.41. The Tayside Region can, therefore, be seen as comprising two broadly distinctive geomorphological areas, separated by the Highland Boundary Fault. The topography of the entire region is largely the product of similar glacial processes acting upon the varying underlying geological structure. To the south of the fault line the broad, flat, fertile straths correspond with the soft areas of 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 flat lands by the coast are raised beaches and are, therefore, covered by marine deposits originating from periods of former higher sea levels.
- 2.42. The two ranges of hills south of the fault, the Ochils and Sidlaws, are igneous intrusions. Having been tilted, these hills now form south facing dipslopes and north facing scarp slopes. The coast varies from steep cliffs to wide bays and low areas with raised beaches.
- 2.43. North of the Highland Boundary Fault, generally harder rocks have resulted in higher elevation, despite being subject to similar glacial processes as the south of the region. 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.



GENERALISED LANDCOVER

FIGURE 3

- 2.44. A broad distinction can be drawn between the eastern and western halves of the Highlands. A more stable climate and lower turnover of ice in the eastern half resulted in less erosion of the Mounth than the more vigorously eroded and, therefore, more rugged western Highlands.
- 2.45. 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. The River Tay catchment covers a large proportion of the region and is fed by seven other significant rivers. In the north-east, the North and South Esk both drain towards Montrose. In the south, the Leven flows east to Fife.

HUMAN INFLUENCES ON THE PHYSICAL LANDSCAPE

- 2.46. 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, the landscape seen today is the product of several millennia of human and animal activity.

Mesolithic Period (7000-4000 BC)

- 2.47. The earliest, and only good, 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, thought to date to around 6000 BC. The human societies of this period are thought to have been groups of hunter-gatherers, moving around the land as nomads. This is probably why so little evidence of them remains, for they did not need to build substantial structures to live in, and had no fixed areas of land to defend from others. The middens unearthed at Broughty Ferry in the 19th century, and the Stannergate in Dundee, are further evidence of human settlement in Tayside during the Mesolithic period. Indeed, it is easy to speculate that, despite a lack of evidence, the north side of the Tay Estuary and the wildfowl over-wintering sites in the Montrose basin, would have attracted these early hunters.

Neolithic Period (4000-2500 BC)

- 2.48. Around 6000 years ago, a society settled in Scotland who farmed the land for the first time. Far more evidence for people of the Neolithic period remains in the region, for they cleared areas of woodland for crops, built houses and enclosures for animals, and had a ritualistic society which has left stone circles and cairns still standing. This was the period when the most impressive stone circles in Scotland, such as Callanish on Lewis, were built, demonstrating fairly sophisticated engineering and organisation.
- 2.49. Evidence for this society survives as stone circles at Balgarthno by Dundee, Coleallie in Glen Esk, mortuary enclosures such as at Inchtuthil and Strone Hill by Lintrathen, and also tenuously as crop-markings on aerial photographs. During the Neolithic period, the dead were placed in communal chambered cairns and these are numerous over the whole of the region and particularly on valley sides.

Bronze Age (2500-700 BC)

- 2.50. 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.
- 2.51. 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. Confusion still exists as to whether they settled peacefully with the Neolithic inhabitants or sought to overpower them. What is clear is that they brought with them the 'magical' knowledge of metal-working. The additional power which such knowledge gave to those who possessed it brought 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. Desire for both the knowledge and materials for metal-working also gave a different form of power: economic. Trading was, therefore, established during the Bronze Age.
- 2.52. Remains of hut circles and field systems are frequent 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 and on upper reaches of the Tay and Earn Valleys.
- 2.53. Burial habits in the Bronze Age evolved from using communal chambered cairns such as used in Neolithic times, to individual burial in stone-lined box graves or 'cists'. Also, there was a progression of 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.
- 2.54. 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 (700 BC-500AD)

- 2.55. Several important factors changed the landscape of the region during the Iron Age. Firstly, around the junction with the Bronze Age, 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.
- 2.56. Hill forts, such as the White and Brown Caterthun forts at Menmuir in Angus, are thought to date from around this period, as are a number of Duns such as the Kings Seat fort north-west of Dunkeld, and numerous crannogs on Lochs Earn, Tay and Rannoch.

- 2.57. An unusual remnant of Iron Age society in Tayside are the brochs. Most brochs in Scotland were constructed between the 2nd century BC and the 2nd century AD, the greatest concentration of them being in the Northern Isles, north and west mainland Scotland. The reason that a small number exist in Tayside, so far and so removed from the centre of activity, is still open to conjecture. One theory relies on the fact that the Tayside brochs appear to date from a period between the Flavian and Antonine Roman incursions into Scotland. They may, therefore, represent the southerly advance of colonists into a land previously depopulated by the Romans. The best example of a Tayside broch is at Laws of Monifieth.
- 2.58. 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 (or 'earth house') - which were used as food stores and litter much of Angus.

Roman Occupation (c.83AD-215AD)

- 2.59. In 78AD, 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. By 80AD, his armies had reached the Tay. In 82-83AD, Agricola marched into Strathearn and Strathmore. Lines of forts were established between Camelon and Ardoch and further east via Strageath to Bertha, all following the line of a Roman road, still visible today. This second line of forts and signal stations follow the Gask Ridge, a thick igneous dyke running westwards from Perth to Crieff. The importance of Tayside to Roman studies lies in these well-preserved fort lines. These forts comprise one of the largest concentrations of temporary Roman camps in Britain. This indicates Tayside's importance as one of the frontiers of the Roman Empire.
- 2.60. One further impact the Romans had was to consolidate the previously warring Celtic tribes into a more powerful confederacy - the Picts.

Pictish Period (500AD-1050AD)

- 2.61. Tayside marks the 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.
- 2.62. 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. 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.
- 2.63. Due to its southern location Tayside was also strongly influenced by 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.
- 2.64. 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. At Scone, Kings were inaugurated and the hub of political activity lay.

- 2.65. 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. 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.
- 2.66. 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)

- 2.67. 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 I at Stracathro in Strathmore. In order to halt subsequent attacks and extend his power to the previous weak areas north of the Mounth, David I began a conquest of the north.
- 2.68. 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.
- 2.69. Before moving on to discuss the other two, it should be noted that 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.
- 2.70. 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.
- 2.71. 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.

- 2.72. During these advances of the 12th and 13th centuries, Tayside was one of the more settled and prosperous regions of the Kingdom north of the Forth. Tayside was home to many of the royal hunting grounds and home to many royal 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.
- 2.73. 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.

Post Medieval Period 1600AD-1900AD

- 2.74. The Reformation of 1560 did not bring about an overnight transformation in society. However, several burghs were early converts to Protestantism. Reformation 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 increasing prosperity of the land and new confidence of religious men saw them investing in their spiritual future.
- 2.75. 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.
- 2.76. Further changes were brought by the agricultural revolution. In the lowlands, the agricultural revolution brought equally dramatic changes. In areas such as Strathmore large areas of land were improved and enclosed by Act of Parliament. New farmsteads were established, many 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. 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.

- 2.77. The importance of Tayside in the history of early tourism in Scotland in the early 19th century was largely due to both 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.
- 2.78. 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. 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 classically 19th century way.

20th century developments

Agriculture/Forestry

- 2.79. By the 20th century, the native pine and broad-leaved woodland 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 and limited forestry on the hills.
- 2.80. 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 policy of maximum production, leading to large-scale afforestation, was later criticised for its lack of amenity and unattractive appearance. Within the past 20 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 should appear more attractive and diverse by the 21st century.
- 2.81. In the lowlands, the fertile soils have meant that commercial forestry has been limited. Agricultural landscapes have changed little since the beginning of the century though boundaries have become larger as holdings have become consolidated. In the highlands of Tayside, much of the land has been designated for conservation purposes as Sites of Special Scientific Interest (SSSIs), Environmentally Sensitive Areas (ESAs) or National Scenic Areas (NSAs), and as such has encouraged farmers to use sensitive farming practices and maintain the scenic and ecological values of the landscape.

Construction

- 2.82. This century has seen massive growth of the main towns such as Dundee, Perth, Crieff, Blairgowrie, Forfar, Arbroath and Montrose. Similarly, the A9 and A90 going to Inverness and Aberdeen respectively, have been expanded and improved and are now Scotland's main roads to the north.
- 2.83. A high proportion of industry, other than tourism, in Tayside is located in Dundee which is also now 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 time-share and log-cabin developments.

3. KEY FEATURES OF THE TAYSIDE LANDSCAPE

INTRODUCTION

- 3.1. The processes of landscape evolution described earlier, have been responsible for the creation of a wide variety of 'features' which are now integral to the character of the landscape. The scale and diversity of Tayside generates a potentially huge list of noteworthy features of both natural and man-made origin. This chapter seeks to convey how these features contribute to the character of the landscape, by describing key examples and attributes rather than attempting to draw an exhaustive list.
- 3.2. The features are described under the following broad categories.
- Nature Conservation
 - Trees and Woodlands
 - Archaeological Features
 - Built Heritage
 - Seasonal and Climatic Features
- 3.3. **Figure 4** shows areas designated within Tayside for their natural heritage importance.

NATURE CONSERVATION

- 3.4. 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 SSSIs and 4 National Nature Reserves (NNRs) in Tayside. Several of these are designated as Special Areas of Conservation (SACs), reflecting their international importance. 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 general distribution of wildlife interests.

Upland/montane habitats

- 3.5. 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 and 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. 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

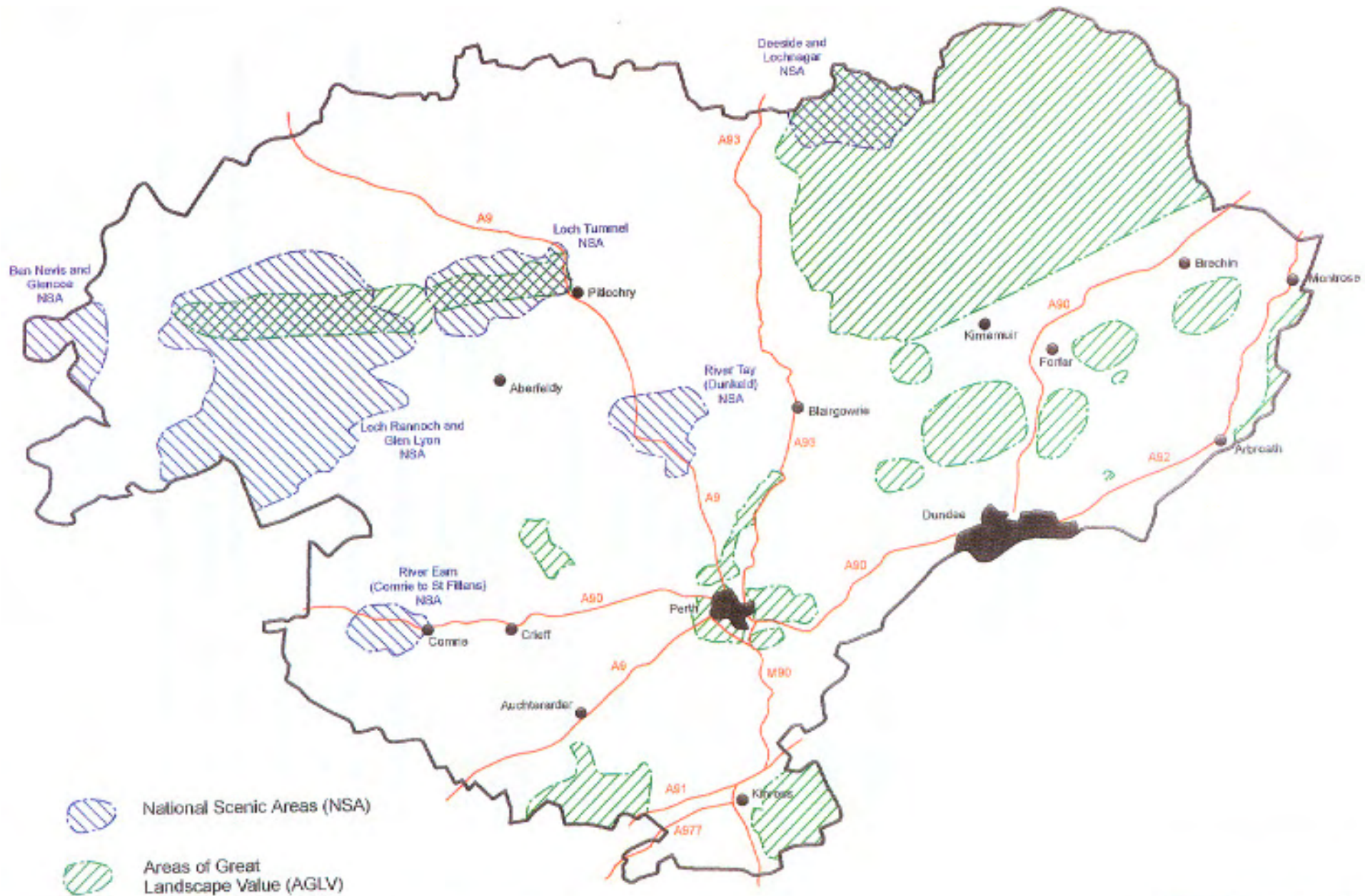
and have a significant local impact. From distant and lower ground, these upland and montane communities create mosaics of muted greens, ochres, browns and oranges, brought to life by the seasonal blooms of alpine flowers, swathes of pink heather, and the autumn russets of ericaceous shrubs, bracken and deer grass.

Valleys, slopes and glens

- 3.6. The sheltered environments of valleys and glens have supported and protected many of the region's semi-natural woodlands which include slope 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 curious penetrating mating call.

Lochs, mires and wetlands

- 3.7. The visual impact of Tayside's largest lochs is undeniable; however, it is the many small lochs, mires and wetlands that hold the majority of natural heritage interest. These waterbodies 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 Craiglush, Loch of Lowes, Loch of Butterstone, Loch of Clunie and Loch of Drunellie - are of considerable natural heritage interest.



LANDSCAPE DESIGNATIONS

FIGURE 4

Lowland and mid-altitude features

- 3.8. 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 (e.g. Cairnleith Moss), orchid-rich dry meadows (e.g. Morenish SSSI), northern hay meadows (e.g. 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

- 3.9. Tayside's coastline, while not dramatic, contains a variety of interest which complements that of its hinterland. This includes saltmarsh, brackish reedswamp, 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.

TREES AND WOODLANDS

Introduction

- 3.10. 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 as mentioned above; however, in consideration of the importance of these features in the character of the landscape, it was deemed appropriate to provide separate descriptions.

Notable specimens and tree collections

- 3.11. 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:
- (i) Fortingall churchyard yew tree, believed to be 3,000 years old;
 - (ii) Birnam oak, a massive remnant of early oakwoods thought to be circa 1,000 years old;
 - (iii) Niel Gow's oak;
 - (iv) the beech hedgerow of Meikleour planted in 1746 by the Marquis of Landsdowne and considered to be the tallest hedge in the world;
 - (v) the Douglas fir at the Hermitage, Dunkeld which is said to Britain's tallest tree;

- (vi) the Dunkeld larches, which include the surviving original European larch imports, and Japanese larch imports by the Second and Fourth Dukes of Atholl;
- (vii) 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 designed landscapes. The huge conifers, the result of 18th 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

- 3.12. 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 landforms are 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

- 3.13. The inventories of Ancient, Old and Semi-Natural Woods for Tayside's districts (Nature Conservancy Council, 1986a, b & c), indicate there to be over 2,300 sites totalling circa 40,000 hectare 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%).
- 3.14. 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.
- 3.15. The more extensive woodlands of long establishment are the product of deliberate planting or management. By the 17th century, the medieval hunting forests (Birmam, 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 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, larch, 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.

Forestry and contemporary woodlands

- 3.16. The most extensive woodlands in Tayside are the commercial forests developed largely by the 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, however, was driven by a greater desire to increase productivity and, as such, were less well-integrated into the landscape as witnessed by the geometric lines 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, therefore, 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.



Photo: SNH

← Along the Rivers Tay and Almond the natural weirs formed by bands of harder rock were exploited for water power. Mills can still be seen on the Tay, here at Stanley.

→ The hard rocks have also created sections of narrow gorge. Perhaps the most well known is here at Killiekrankie north of Pitlochry.



← On smaller rivers and burns, resistant rocks have created dramatic waterfalls such as here at the Falls of Acharn.

→ Native woodlands are an important feature of several glens, here in Glen Esk. A range of initiatives are designed to allow regeneration of these woods.

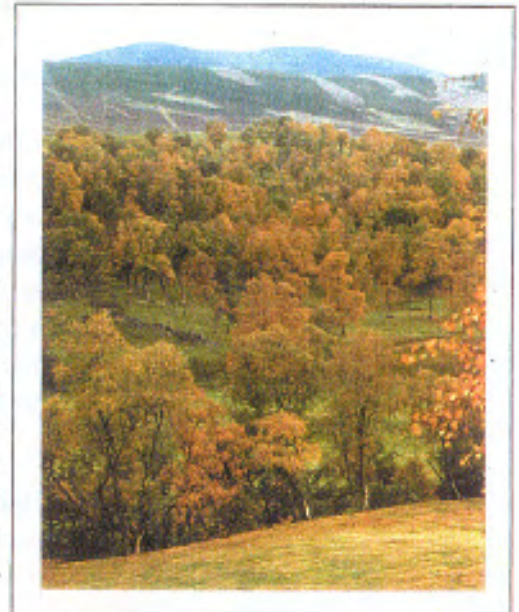


Photo: SNH

← The Highland summits and plateaux support a range of upland and sub-alpine habitats. Heather moorland, managed from grouse and deer, dominates large areas, turning the landscape purple in late summer.

FIGURE 5

FEATURES OF THE LANDSCAPE

ARCHAEOLOGICAL FEATURES

- 3.17. Tayside lacks the renowned concentrations of upstanding archaeological remains found in other parts of Scotland, for example, Kilmartin Glen, Argyll. In part this reflects the intensity of land use, particularly in the fertile lowlands. There is nevertheless, a wealth of interest widely distributed throughout the region, which represents several millennia of cultural activity. Thousands of sites have been recorded including hundreds of Scheduled Ancient Monuments. Recent aerial surveys have also 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 which are often representative of wider patterns of human activity or of symbolic/religious meaning which extends across large areas. For this reason, their influence should not be belittled. 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. The following paragraphs seek to illustrate by examples the nature of Tayside's archaeological resource.

Burial and ritual monuments

- 3.18. 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, therefore, important, contrasting with the more ephemeral domestic structures of which little trace remains.
- 3.19. 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, Fowls Wester, St. Madness and Pittance.
- 3.20. Cup-marked stones 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/Ratray, Newbigging and Dalladies.



Tayside is famous for its soft fruit. Fields of raspberries and currants create patterns reminiscent of a French vineyard landscape.



Photo: SNH

Potatoes have become an important cash crop within Strathmore. Many farms have developed specialist processing and storage sheds.



Photo: SNH

A range of crops adds interest and variety to the landscape. Here spring daffodils are grown in Strathmore. Later large parts of the valley once again turn yellow as the oil seed rape flowers.



Photo: SNH

Sheep farming remains an important activity in many of the upland parts of the region - here in Glen Isla.



Photo: SNH

Beef and dairy farming is important too, particularly on the rich pastures along the Highland foothills, here near Blairgowrie.

FIGURE 6

FEATURES OF THE LANDSCAPE

- 3.21. Cairns or barrows are generally the most prominent landscape features from the Stone and Bronze Ages. They include chambered cairns, which allowed repeated use for internment and cairns under which burials were interred in stone cells (cists). 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. Another spectacular cairn was discovered at West Mains, Auchterhouse in Angus, a high prominent site which yielded many important discoveries.

Early settlements and fortified sites

- 3.22. 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. Few Bronze Age settlement sites are readily identifiable, although aerial surveys have highlighted patterns of hut circles and field systems from the first millennium BC, as soil marks and crop marks. The Drumturn Burn site is one of the best such examples.
- 3.23. The more extensive use of stone for domestic and defensive buildings in the Iron Age has left a more resistant legacy. The main archaeological interest relates to souterrains, crannogs and forts from this period.
- 3.24. Souterrains are stone-built underground galleries used for food storage associated with large timber-built houses, some of which were integral structures. 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.
- 3.25. Crannogs are artificially constructed island residences, built at the edge of lochs with defensible causeway access structures. Many crannog bases are below the water's surface and consequently are illegible to most people. The Oakbank crannog on Loch Tay is perhaps the region's best example of this feature.
- 3.26. The Iron Age is renowned for its fort building and more extensive use of hilltops and valley ridges for strategic defences. These forts combined extensive earthworks with stone walls and timber structures. Large fortified enclosures were created at the main centres and these remain as significant landscape features. The most spectacular forts are arguably the Brown and White Caterhuns on neighbouring hilltops in the Menmuir foothills. These ring forts enclose areas of 140 x 190m (Brown) and 140 x 60m (White Caterhun), the latter use stone to reinforce its ditches. Other notable forts include Finavon (150 x 36m) 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. The foothills of the Mounth Highlands were particularly well-

defended as reflected in the many fortifications in the form of forts, fortlets, linear earthworks. These were superseded by fortifications in later generations.

Roman features

- 3.27. Tayside represented part of the Roman frontier during Agricola's advances. This resulted in the construction of many military installations as both permanent and temporary outposts. Tayside contains sites of legionary fortresses, forts, fortlets, watch tower and temporary camps; particular concentrations re found in Strathearn and Strathmore as part of the Roman defences for the productive Midland Valley. A legionary fortress was constructed at Inchtuthil, the outline of which is still visible; at Ardoch, north of Braco, is an exceptionally well-preserved site of a turf and timber fort where the square concentric rings of defences are clearly visible. Watch towers were constructed along Roman communication routes, sites on the Gask Ridge and in Sma' Glen are visible as circular earth forms, the remnants of the watch tower bases.

Pictish monuments

- 3.28. Dark Age monuments are few, reflecting the fact that later settlement obscured Pictish or re-used Pictish remains. 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. The main legacy of Pictish settlement is, however, their 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 to serve, it is believed, as boundary markers or as ceremonial/commemorative features. Tayside is particularly renowned for its numerous finely executed smaller slabs from the 9th century. Most 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 Cornstone near Monikie.
- 3.29. Later features which reflect Scandinavian influences are the ornately carved Hogsback tombstones from the 10th and 11th centuries. These are found at Inchcolm, Meigle and Brechin.

BUILT HERITAGE

- 3.30. 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 this 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.



Much of the Tayside landscape is historic. Here in Glen Almond the earthworks associated with a Roman signal station are still visible.



Centuries of strife between the Highland and lowland clans are reflected in the proliferation of castles along the Highland Boundary Fault - here at Huntingtower.



The development of landed estates had a profound influence on the landscape. Here an ornate gatehouse marks an entrance to the Atholl Estate.



Photo: SNH

Policy woodlands, often comprising exotic and ornamental tree species often surround and signal the presence of historic houses.



Traditional farm buildings are often sited to maximise shelter, constructed from stone and slate. A typical round horsemill is visible at this Glen Shee farm.

FIGURE 7

FEATURES OF THE LANDSCAPE

Tower houses and fortified residences

- 3.31. 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, Loch Leven Castle, Elcho Castle and Edzell Castle. The latter 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.

Castles, stately homes and their designed landscapes

- 3.32. 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.
- 3.33. Tayside contains innumerable castles and stately homes which illustrate the above 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. Blair, the quintessential Scots Baronial Castle, was in fact remodelled by David Bryce from an earlier Georgian mansion, also incorporating parts of an earlier castle. Blair Castle is the centrepiece of another superb designed landscape which is an essential component of Strath Garry. Meggernie Castle in Glen Lyon is a similarly modified tower house which now dominates its isolated setting on the glen floor. 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. The list of notable stately homes is too large to address in this report; however, a shortlist of the most prominent (excluding those mentioned above) includes Aberuchill Castle in Strathearn; Balmanno Castle near the Bridge of Earn; Blair Adam near Kelty; Brechin Castle; Camperdown House, Dundee;

Castle Menzies near Weem; Cortachy Castle at the foot of Glen Clova; Drummond Castle near Crieff; Fingask Castle near Rait; Grantully Castle near Ballinluig; Guthrie Castle near Forfar; Kinfauns Castle near Perth; Kinnaird Castle near Brechin; Methven Castle near Perth; Murthly Castle near Dunkeld, Ochtertyre near Crieff, and Scone Palace.

- 3.34. The above properties all have notable designed landscapes which are listed within the Inventory of Gardens and Designed Landscapes in Scotland (Land Use Consultants, 1987). There is, however, a total of 45 current inventory sites in Tayside, which in themselves represent only a limited, select proportion of the total number. A further 130 sites have been identified by the Garden History Society as being worthy of study or possible inclusion within an extended inventory. These landscapes make major contributions to the scenic diversity and apparent richness 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.

Religious buildings

- 3.35. 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.
- 3.36. There are, of course, innumerable 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. Numerous 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 these settlements from the surrounding countryside.

Vernacular buildings

- 3.37. 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 coloration of individual buildings and towns and the manner in which they were constructed.
- 3.38. 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 brownish-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 in 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.

- 3.39. 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 ruins. These generally comprise clusters of small rectangular buildings with associated walled enclosures constructed, on the whole, of dry stone.
- 3.40. 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.
- 3.41. 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 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.



Simple Victorian interpretations of the Scots vernacular are found throughout the region - here constructed in grey stone and slate.



A mixture of pink and grey granite blockwork in this Highland farmhouse.



Fortingall is a local curiosity, its thatched cottages reminiscent of a Devonian village. It represents one of a number of estate villages, each with a distinctive and coherent design.



At villages such as Auchmithie, simple working houses were constructed from sandstone and slate, sometimes limewashed.



Hydroelectric power has left its mark in the form of dams, enlarged lochs, pipelines, turbine houses (as here on Loch Rannoch) and pylons.

FIGURE 8

FEATURES OF THE LANDSCAPE

- 3.42. In the lowland areas, there are notable variations from north-east to south-west. Around Kinross, buildings are generally more formal and larger in 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 rubble with plain margins and rybats. The main buildings have slate roofs, but the use of pantiles on small buildings is a distinctive characteristic of this part of Tayside.
- 3.43. 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 found. 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.
- 3.44. 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 the 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.
- 3.45. 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 Ardler, 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.

Communications and engineering structures

- 3.46. The glens and lowlands of Tayside have been important communication routes for several millennia. Many, but by no means all, of these routes are now traced by roads, farm tracks or footpaths. Several are marked by archaeological sites or ruined castles. The existing road network is the product of development and improvement since the 18th century. Military roads were succeeded by Turnpike roads which were in turn upgraded and supported by the development of railways.

- 3.47. The military roads developed after the Jacobite rebellions (largely by General Wade) 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.
- 3.48. The Turnpike roads 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 road sides, for example, Dundee to Perth milestones carry a single letter and distance figure, while Angus roads have large sandstone block milestones.
- 3.49. 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.
- 3.50. 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, M90, A90 and A94.
- 3.51. 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 village

- 3.52. 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 Angus Glens. Examples include Brechin, Edzell, Forfar and Blairgowrie. 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 Pitlochry, while providing important market functions, are all sited at important bridging points. The latter 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.

SEASONAL AND CLIMATIC FEATURES

- 3.53. The variety of Tayside's landscapes, associated with the combination of highland and lowland terrain, provides a wealth of seasonal interest. The changing tapestry patterns of the arable lowlands is complemented by the more subtle changes of pastures and moorlands. 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. 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. 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. These seasonal factors and many more are all essential parts of Tayside's character.

4. FORCES FOR CHANGE

AGRICULTURAL CHANGE

Background

- 4.1. Historically, agriculture has been one of the principal influences on the evolution of the landscape of Tayside, shaping land uses, settlement patterns, and influencing much of the detailed grain of the landscape, particularly in the lowlands and glens. Recent decades have seen many changes in agricultural practice, many of which have had visible effects on the landscape. However, changes in policy and the introduction of schemes encouraging more environmentally sensitive farming practices, presents the opportunity to halt or reverse some of these changes. The importance of agriculture in maintaining the landscape should not be underestimated since without a viable farming community many characteristic landscapes would deteriorate.
- 4.2. Agriculture has generally followed national trends over the last 40 years, driven largely by agricultural policy. In the post-war years, the emphasis on farm productivity brought about many changes to the structure of farms which included field management, drainage schemes, the expansion of cultivated areas and the loss of traditional farm features. Since the 1970s, these changes have been partially reversed through more environmentally sensitive farming practices tailored to the European agricultural policies.
- 4.3. Agriculture in the region has generally followed broader trends within the whole country in the last 40 years or so: amalgamation of farms and a decrease in labour. In the 1970s, money was provided by the government to improve farm structure. This involved the large-scale drainage and improvement of pasture, and of arable areas. Semi-natural grassland and heather were lost through this agricultural intensification. Hay-making has declined since the 1970s and silage has increased. As farms were made more productive, many of the traditional features were lost.

Changes in upland farming

- 4.4. On higher ground and rougher pasture, sheep rearing is the main agricultural activity. As with most other food production in the EC, this is substantially supported by subsidy. Farmers within the Less Favoured Areas (LFAs - generally those parts of the region to the north of the Highland Boundary Fault) are given additional compensatory payments for the difficulties faced by farming in these areas. Such payments are aimed at improving the viability of hill farming and helping to reduce the depopulation of upland areas as people move out of farming. In many areas private forestry has been the main alternative land use as agriculture has declined. Hardship payments, along with the favourable exchange rate that British farmers have temporarily enjoyed since sterling left the ERM, has left farmers in the region in a reasonable position. However, hill farming does remain economically marginal in many cases, and is sensitive to changes in domestic and international monetary policy, since by the very nature of this farming, any change in support policy could have a dramatic impact on the sector. This may be unlikely in the near future, but remains a potentially very important force for change in the

landscape. Forestry is the main viable alternative land use, and it is supported by EU and national policies that seek to increase timber production and reduce agricultural surpluses.

Changes in lowland farming

- 4.5. Lowland farming in the region comprises arable cultivation, beef cattle, sheep and pig rearing, with some soft fruit production. Farm units tend to be large and heavily mechanised, taking advantage of the gentle topography and better soils. In the last 50 years, there have been a number of changes in the nature of agricultural activities and in particular, the components of rotations. Sugar beet, once produced for a local market, is no longer grown, potato production has increased considerably over the last 10 years, while the recently introduced oil seeds are currently expanding. The increased productivity of lowland farms has been supported by the erection of large agricultural buildings: potato, machinery and overwintering sheds. Hedgerows and tree lines have become largely redundant as post-and-wire fences now constitute the main physical boundaries. The incremental loss of mature trees and hedgerows has, therefore, not been compensated by new planting on most farms.

Changes in the landscape: regional trends

- 4.6. Agricultural policies also seek to achieve more extensive farming systems to reduce agricultural over-production. Since the mid-1980s, the government has sought to make farmers have more regard for the landscape and nature conservation of their land through various schemes and initiatives. The ESA designation for Breadalbane has provided the opportunity for grant funding towards a range of farm conservation works. Under this scheme 'Farm Conservation Plans' are produced by the farmers for ratification by the Scottish Office Agriculture, Environment and Fisheries Department (SOAEFD). These have provided the framework for conserving many important characteristic features such as meadows, dry-stone walls, hedgerows, farm wetlands, etc.



A number of traditional farmbuildings have been converted for alternative uses. This must be undertaken with care (as in the above example) to avoid unnecessary 'suburbanisation' of the countryside.



Incremental changes can add up to substantial change. Here the loss of a hedge, with its trees has opened up the landscape while the incorporation of concrete kerbs has introduced suburban influences to the countryside.



Some estates have managed and replanted field boundary trees, particularly where they form avenues along roads. These create Strathmore's traditionally rich landscape.



Elsewhere, boundary trees have been removed, creating an open, prairie-like landscape in which modern farm buildings are often particularly prominent.



Modern farming techniques sometimes introduce novel landscape features such as these linear bales, wrapped in black plastic.

FIGURE 9

FORCES FOR CHANGE

- 4.7. The opportunities presented by the ESA designation have, until this year, been limited to the designated area, to the detriment of all excluded areas. This situation may change, however, with the planned introduction of the Countryside Premium Scheme (CPS) which will provide the opportunity for grant funding towards a broad range of countryside conservation works across the region (outside the ESA). It is to be hoped, therefore, that the beneficial effects of this scheme will soon become evident and that it will be a positive force for change in the landscape.
- 4.8. Farm diversification has not made a significant impact within Tayside, although the development of farm/estate based tourism is locally evident, especially in the upland areas. This is mostly related to caravanning and camping, with some recreational developments typically 'activity holiday' facilities such as 4 x 4 courses, shooting or riding schools. It is conceivable that demands for such facilities may continue, but it is unlikely that this will be a significant force for change in the landscape.

Changes in Agriculture

Summary of Key Landscape Issues

The main landscape changes related to agriculture that need to be addressed in future policies and management strategies are:

- ***how policies and funding can best sustain a viable farming community and at the same time ensure the conservation and enhancement of the landscape;***
- ***how redundant agricultural buildings can best be conserved;***
- ***how important landscape features such as hedges, hedgerow trees and walls should be maintained;***
- ***how best to exploit the change in agricultural policies and to encourage a move to more environmentally sensitive farming practices;***
- ***how best to enhance and restore patterns of agriculture that reflect the landscape character;***
- ***how best to accommodate modern agricultural practices and buildings within the rural landscape.***

General planning and management guidelines

Pastures

- Many of the pastures in the lowlands and more sheltered glens are semi-improved or improved, creating the lush grazing. The improvement of pastures has often been at the expense of wildlife rich grasslands and meadows, except within the ESA where grants are available for the conservation of such features. Whilst improved pastures are characteristic, encouragement through financial assistance to farmers from appropriate bodies to maintain, conserve and enhance herb rich meadows as a feature, should be considered from both a landscape and wildlife point of view. In both cases this would improve diversity in pastoral landscapes. The ESA scheme currently provides opportunities for grant support for such measures. The proposed CPS might do likewise for areas outside the ESA.

Heather moorland

- The mosaic of heather moorland in the landscape as a result of active management through muirburn, creates a distinct and attractive appearance. Such practices help to maintain habitats for ground nesting birds such as grouse and capercaillie, whilst ensuring a good supply of young heather for sheep. This management practice also prevents natural regeneration of woodland and can, therefore, artificially prevent the development of upland woodland/dwarf woodland. There is a need, therefore, to examine how heather moorland management could best meet both sporting/agricultural interests and landscape/wildlife interests through combinations of muirburn, natural regeneration and reduced grazing pressures.

Farm woodlands and trees

- Farm woodlands and trees are important features throughout Tayside, but become key space defining elements in the flatter lowland landscapes. The general decline of these features over the last 50 years provides considerable scope for planting new farm woodlands, and for establishing or repairing tree lines. The Farm Woodland Premium Scheme (FWPS) and the Woodland Grant Scheme (WGS) are useful grant-aid mechanisms for such work, although planting individual trees and tree lines may require alternative means of support such as the CPS. The latter are particularly important in the Broad Valley Lowlands (e.g. of Strathmore, Strathearn and Strathallan) where they determine the main patterns and visual boundaries. The introduction/restoration of hedgerow trees, roadside trees and farm woodland copses and belts should, therefore, be promoted. These should be predominantly broadleaves and used to re-establish the 'lost' fields patterns and to integrate new woodland blocks and intrusive farm developments.

Farm Buildings

- Although farm buildings enjoy permitted development rights in principle, local planning authorities are able to influence the siting, design and materials of new structures through the negotiation procedures. In very flat landscapes, such as by the coast and lowland straths, any vertical developments become very obvious, and if of any considerable breadth, these structures can be visible from considerable distances or can become blocks on the skyline. In small-scale intimate landscapes, large structures can again become very prominent, detracting from the nature of the surrounding landscape. Particular concern is the combined effect of the erection of major new agricultural sheds (often light coloured) in a landscape where the screening effect of woodland is decreasing.

Livestock

- The present livestock densities and lack of fenced woodland are preventing natural woodland regeneration. This is particularly noticeable in many of the Angus glens where semi-natural birch woodlands stand derelict and are unable to regenerate. In the upland areas, the selective grazing habits of sheep have also left the rougher grasses to dominate. Deliberate measures to reduce grazing densities may be worthy of exploration in certain upland areas, where regeneration and enhancement of wildlife values may be desirable without the need for extensive fencing. Generally, however, the current stocking densities appear acceptable in the landscape and fencing to promote regeneration is a most appropriate option. Livestock make a significant contribution to the region's landscape. Current stocking densities and balance between sheep/cattle are acceptable in the landscape, but fencing is required to allow woodland regeneration.

Field boundaries - walls

- Dry-stone walls are a key feature of the agricultural landscape, whose variations in materials and style reflect a local distinctiveness, for example, the difference between schist bouldered walls of the glen and red sandstone walls of the lowlands. The expertise for this craft exists locally, and should be used to maintain the local traditions in wall styles. Mortaring is often seen by farmers as essential to the longevity of the dyke's lifespan, but this can detract from its appearance.
- Wall repair should be further encouraged using local knowledge and craftsmen. Roadside walls and others in prominent locations should, ideally, receive priority treatments. Mortaring should be avoided or applied discreetly.

Field boundaries - hedges

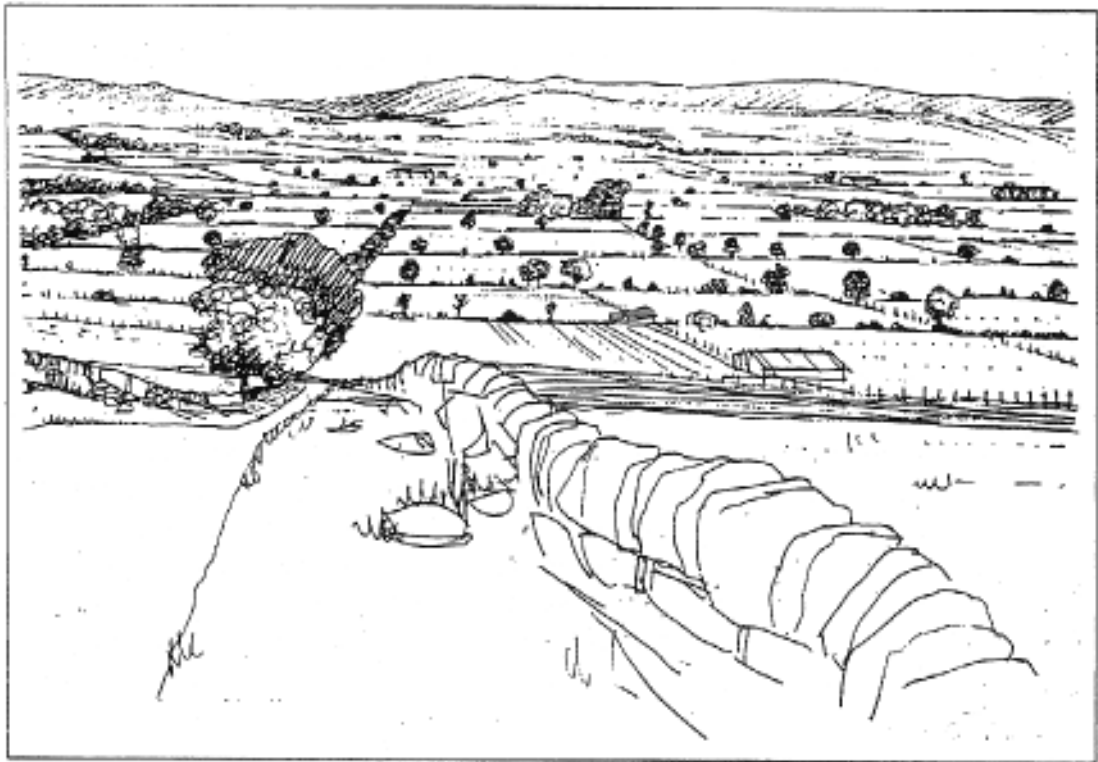
- Hedgerow boundaries are also important in this agricultural landscape, often creating a sense of enclosure and emphasising the contrast between lowlands and uplands. However, loss of hedgerow and replacement by post-and-wire fences has had a significant adverse effect on some of these landscapes. Further hedgerow losses, through field amalgamation or poor maintenance, should be strongly discouraged.

There may also be opportunities for hedgerow recreation or restoration. It is important to refer to the tradition for different materials/species in field boundaries within an area. In arable areas where there may be resistance to hedgerow restoration, in which case efforts should be concentrated along road and other boundaries. Alternatively, measures to compensate for lower yields/differential ripening around field margins should be explored.

Implementation

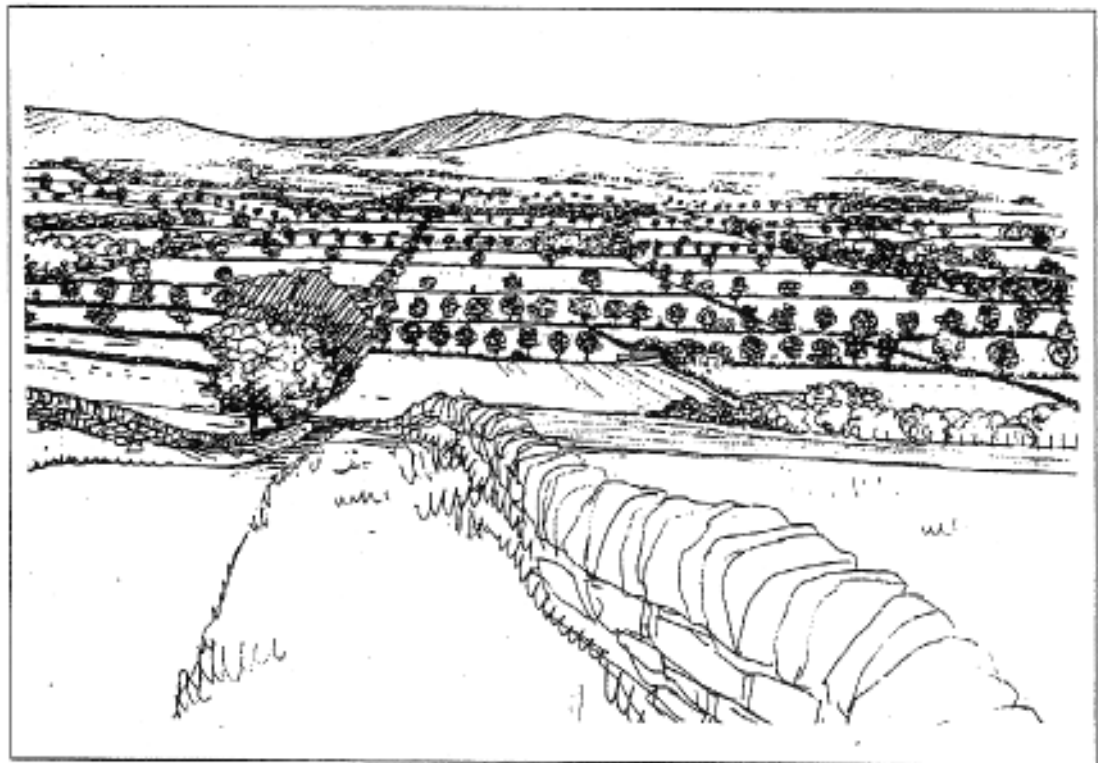
- Agriculture's central role in both shaping and maintaining the landscape means that retaining a healthy and viable farming community is essential. Large parts of the agriculture of the region, particularly in Highland areas, are dependent on subsidy. It is important that the various forms of funding are co-ordinated and complementary and that the environmental effects of policy changes are fully assessed. It is, therefore, important that farmers and landowners are involved in the process of 'countryside management'. Equally, agriculture in many parts of the lowlands is prosperous, creating the economic conditions under which farmers and landowners should be encouraged to manage the legacy of woodland and other features in an appropriate way.

- The sketches on pages 50 and 51 illustrate the possible effects of implementing management options to deal with changes in agricultural practices. Examples are given for two different landscape character types ('Broad Valley Lowlands' and 'Highland Foothills'). These landscape character types are discussed in greater detail in Part II.



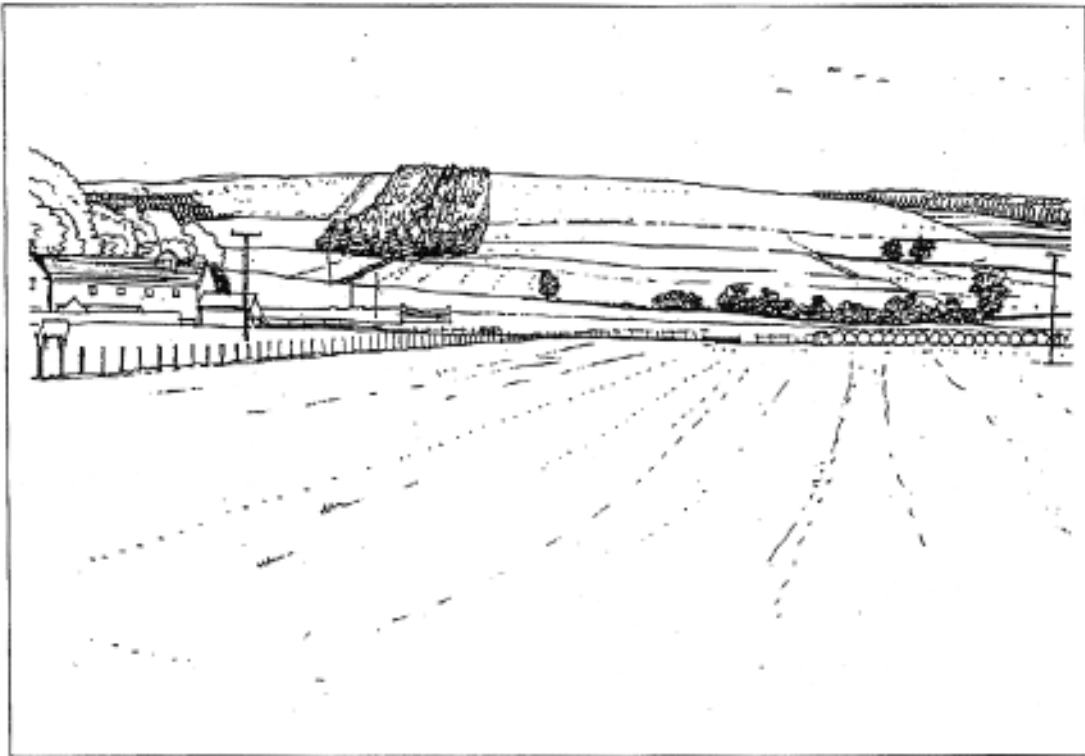
Broad Valley Lowlands

Decline of hedgerows and incremental loss of tree lines is diluting the strong character of these pattern/space-defining elements.



Management Option

Restoration of hedgerows and reinstatement of tree lines, combined with new farm woodland to screen potato sheds, would significantly strengthen and enhance the landscape character.



Highland Foothills

Geometric blocks of forestry and general lack of integration between upland and lowland features.



Management Option

Restoration of hedgerows and field boundaries and reinforcement of access roads by tree lines; extension of farm woodlands and broad-leaf shelterbelts to provide link with conifer plantations.

FORESTRY AND WOODLANDS

Background

- 4.9. The development and expansion of forests in Tayside is one of the most significant changes in the landscape over the last 75 years.
- 4.10. The Forestry Commission was established in 1919 with a remit to build up the country's critically depleted strategic reserves of timber. Initially, a target was set for 2 million hectares of productive woodland by the year 2000. After the Second World War, emphasis was increasingly placed on potential socio-economic benefits from forestry: rural employment and import substitution. By the 1960s, demands for rural access led to an increase in the recreational use of state forests and the development of public access and facilities. During the 1980s, the concept of multi-purpose forestry developed which placed greater emphasis on integrating recreation, conservation and landscape objectives into the traditional timber production objective. The latter was fuelled by adverse reactions to early 'blanket' afforestation and by the increasing opportunities afforded by maturing forests.
- 4.11. Between 1919 and 1980, the Forestry Commission was the main forestry developer. During the 1980s however, private forestry rapidly increased, encouraged by tax relief. This incentive ended in 1988 and resulted in a marked change in private forestry development. The Forestry Commission was restructured in the early 1990s into the Forestry Authority and Forest Enterprise. These encompassed two clear aims: the latter is responsible for state forest management, while the Forestry Authority is responsible for regulating state and private forests.

Changes in forest landscapes

- 4.12. Tayside has extensive mature forests; some of these originated in the 17th and 18th centuries as estate forests when the area around Dunkeld acted as the Cradle of the Scottish Forestry Renaissance by the "Planting Dukes" of Atholl; others are the products of Forestry Commission and private developments this century. Sitka spruce is the predominant timber species due to its productivity on low quality sites and suitability for timber processing. As a result, some larger upland forests are often lacking in diversity, although larch is widely used and firs are locally distinctive. Future timber harvests will create significant short and long term changes to these forest landscapes. The Forestry Commission's policies towards forest and woodland design have been developed and refined considerably over the last 20 years. Guidance now requires that new forest plans are sympathetic to landform, provide a greater proportion of open space and of broad-leaf/other conifer species. In addition, the design of felling coups is required to add greater age diversity to the forests. All these measures should result in the marked enhancement of many commercial-forest landscapes, in terms of visual amenity, ecological diversity and recreational potential.
- 4.13. Tayside has currently circa 12% of its area under forest and woodlands and whilst the region has several large forests, it has scope for new woodlands and forests. The Tayside Indicative Forestry Strategy (IFS) provides a framework within which new forestry proposals can be considered and provides guidance to potential forestry

developers (Tayside Regional Council, 1997a). The IFS is based on an assessment of the region's environmental constraints and sensitivities. It identifies forestry planting opportunities in the following categories: Preferred Areas; Potential Areas and Sensitive Areas. This categorisation suggests that interest in forestry development may be targeted in foothill areas and the less dramatic/less sensitive uplands (i.e. Highland Foothills, the Sidlaws and the Ochils). The whole concept of IFS is currently under review at present, though this will also present an opportunity to improve the way IFS may be used.

- 4.14. New woodlands and forests have considerable potential to enhance the landscape through a combination of measures. They can create new resources, provide timber and shelter and accommodate recreation. Landscape character can benefit through the creation of stronger spatial patterns; the provision of linkages between isolated and currently incongruous woodlands; the integration of conifers with broadleaves and the creation of more scenic and wildlife diversity in the landscape. The above beneficial changes can only be achieved through careful design that responds to the characteristics of the locality. Potential negative changes which should be avoided are:
- (i) the loss of visual diversity and opportunities for views due to the creation of imbalance between agriculture and forestry;
 - (ii) the loss of 'wilderness' or semi-natural landscape in remote upland areas where no commercial forestry currently exists, though the opportunities for expanding the native woodland resource in such areas need to be explored;
 - (iii) the obscuring of cultural features/patterns in formerly pastoral landscapes, e.g. the loss of dry-stone walls, shielings, upland rigs and ancient communication routes.
- 4.15. A recent trend has been towards the re-establishment of native woodlands in the upland areas (predominantly Caledonian pine). To date, this has focused on the less productive upland areas where there is less interest in grazing and sporting uses.



Visitor accommodation also includes chalet and log cabin developments. While these have the potential to integrate with the landscape, often they are constructed in geometric lines with little screening or interest.



Photo: SNH

The lochs are popular for a range of activities including fishing, sailing, windsurfing and power boating. There is potential for noisy activities to disturb the otherwise tranquil nature of the lochside landscapes.



Photo: SNH

Past forestry practices resulted in areas of dense, geometric and often single species planting. Current practice means that many existing plantations will be enhanced in the future.



New forestry planting should result in more sympathetic patterns of woodland which emphasise and enhance rather than hide the landscape.



Here in Glen Errochty, deciduous woodland frames pastures and provides a buffer around the conifers.

FIGURE 10

FORCES FOR CHANGE

- 4.16. The government has renewed its commitment to increasing the national forest cover. There are now more incentives towards planting woodlands on better land on the fringe of uplands and in the lowlands. The productivity of the lowland arable areas is likely, however, to limit the planting of farm woodlands except in pockets of poorer land. This may have the effect of planting wet, rough or steep ground where wildlife interest may be significant. It is likely, therefore, that the main focus for Woodland Grant applications may be the Foothills and Igneous Hills (Ochils and Sidlaws) categorised by the Tayside IFS as 'Preferred Areas', although this will depend on the complex interaction of the government's incentives. These areas are within close proximity of main settlements in the region and are, therefore, highly visible and heavily used for recreation. In addition, they contain a wealth of cultural heritage features which may be affected by forestry proposals. The Igneous Hills have, however, suffered degradation through a range of urban fringe developments and from some unsympathetic forestry schemes; there is, therefore, potential to mitigate some of these detrimental influences through new woodland and forest planting. Much has been achieved already through co-operation by forest managers and interest groups such as the "Friends of the Ochils".

Changes in policy woodlands

- 4.17. Tayside contains a wealth of designed landscapes, country houses, castles and their estates. These vary in scale and grandeur, but combine to project an image of affluence for the region as a whole. The policy woodlands make important contributions to the local landscape character and in many areas help to integrate newer adjacent forests into the landscape. Many of the policy woodlands originated over 200 years ago and have undergone a combination of rotational replanting and changes in management styles and objectives. Although maintaining the same boundaries, several woodlands have changed from diverse mixtures of broadleaves and conifers to predominantly coniferous plantations. Alternatively, the policy woodlands have suffered from inadequate management and consequently lack the age diversity required to perpetuate their presence. The implications of the above are that the richness of Tayside's landscape may ultimately be prejudiced through the loss of change in character of these important features. There is an increasing interest in preserving the heritage value of these woodlands.

Changes in semi-natural and ancient woodlands

- 4.18. Pockets of ancient and semi-natural woodland exist throughout the region, adding diversity to local landscapes and wildlife. Many of these most significant areas are protected as SSSIs; however, the register of Ancient and Semi-Natural Woodlands (Nature Conservancy Council, 1986a, b & c) does not take account of woodlands of less than 2 hectares. These small woodlands make valuable contributions to the landscape, but many are not adequately monitored or managed. Designation as an SSSI requires a list of Potentially Damaging Operations to be drawn up, which effectively protects the nature conservation and landscape value of the site. Further to this, the Forestry Commission, through the Forestry Authority, have produced a set of guidelines on the management of semi-natural woodlands (see References). Some of these woodlands remain threatened, or potentially threatened, by grazing pressure, grey squirrel encroachment and general lack of management, though the future outlook for these woods is probably better now than it has been for the last 200 years.

Changes in Forestry and Woodlands:

Summary of Key Landscape Issues

The main landscape changes related to forestry and woodlands that need to be addressed in future policies and management strategies are:

- **how forest dominated landscapes might be enhanced by future rotations by the application of the Forestry Commission's Environmental Guidelines tailored to their individual characteristics (see 4.19.);**
- **where and how 'wildland' or semi-natural characteristics should be preserved and enhanced;**
- **ensuring that significant elements of the cultural landscape are recognised in forest plans;**
- **ensuring that sites of local nature conservation interest are safeguarded and acknowledged in forest and woodland plans;**
- **ensuring that the scale and types of forest and woodland appropriate to the landscape character are encouraged;**
- **ensuring that the management of policy woodlands for visual amenity/historic design authenticity is encouraged;**
- **ensuring that all semi-natural and ancient woodlands are adequately monitored, managed and protected;**
- **encouraging the expansion of the productive woodland resource base in a way which does not compromise the inherent natural and cultural heritage values of the area.**

Forestry Commission Guidelines

- 4.19. The Forestry Commission and Forestry Authority produces a range of guidance documents related to many aspects of management and design. These seek to ensure that the social, environmental and economic benefits of forests and woodlands are realised for the community at large. The guidelines include *Forests and Water* (1993), *Forest Landscape Design* (1994), *Lowland Landscape Design* (1992), *Forest Nature Conservation* (1990), *Community Woodland Design* (1991) and *Forest Recreation* (1992). These documents represent not only invaluable guidance information, but are, more importantly, essential components of the regulatory process. Grant and Felling Licence applications must demonstrate (to the Forestry Authority) compliance with these guidelines. The guidelines are, therefore, important tools, the results of which can be recognised in the recent improvements of forest landscapes throughout the UK.

- 4.20. The Forestry Commission's guidelines are universally applicable, but like any general guidance require to be tailored to the specific circumstances of the site/area in question. The latter part of this report identifies the characteristics of different landscape types and, where appropriate, identifies the key character considerations for forest/woodland design that should be addressed at the time of applying Forestry Commission's guidelines.

General planning and management guidelines

Commercial forestry

- Patterns of open space in new forests should be developed to avoid the lack of open ground that some of the older 'blanket' forests visually and physically implied. This is particularly important in Tayside where mountain recreation is widespread.
- New large-scale forest proposals should identify and acknowledge the cultural heritage values of landscapes by maintaining patterns of open space which allow the historic and ancient landscapes to be interpreted. This would probably require additional research into the ancient and historic landscapes and particularly into the relationships between ancient patterns of movement, settlement, farming practice and ritual or religious behaviour. This is especially required in the Foothills, Lowland Hills and Igneous Hills where concentrations of archaeological sites exist.
- The location and design of new forests should seek to avoid obscuring the denser patterns of stone dykes, and where practicable, should leave the dykes as legible features in open ground without encroaching or using them as plantation boundaries. Opportunities for incorporating dykes within the new patterns of open space should also be pursued. Measures should be undertaken to maintain walls peripheral to forests, where they still fulfil an important visual function, e.g. beside public roads.
- The definition of 'wildland' or semi-natural areas could be used as a planning guide in response to a range of upland development pressures including wind farms, pylons, radio masts and forestry. It is recommended that further studies be undertaken to define appropriate wildland areas. The definition of such areas should involve an assessment of intervisibility which identifies visual boundary lines and peripheral zones of visual influence around wild land areas as a basis for planning policies.
- The open 'wild' character of these areas is partially a product of human land management in which sheep farming plays an important role. Discontinuation or decreases in grazing might allow natural woodland regeneration. This would potentially create a new type of wild landscape which should be considered in similar terms, as regards protection from development.

Upland Fringe

- Woodland and forestry proposals for Upland Fringe areas should seek to integrate lowland woods with upland forests. This should employ transitions from broadleaves to conifers and should provide linkages with existing shelterbelt patterns and riparian woodlands. Generally, broad-leaf lower margins should be introduced and field patterns preserved.

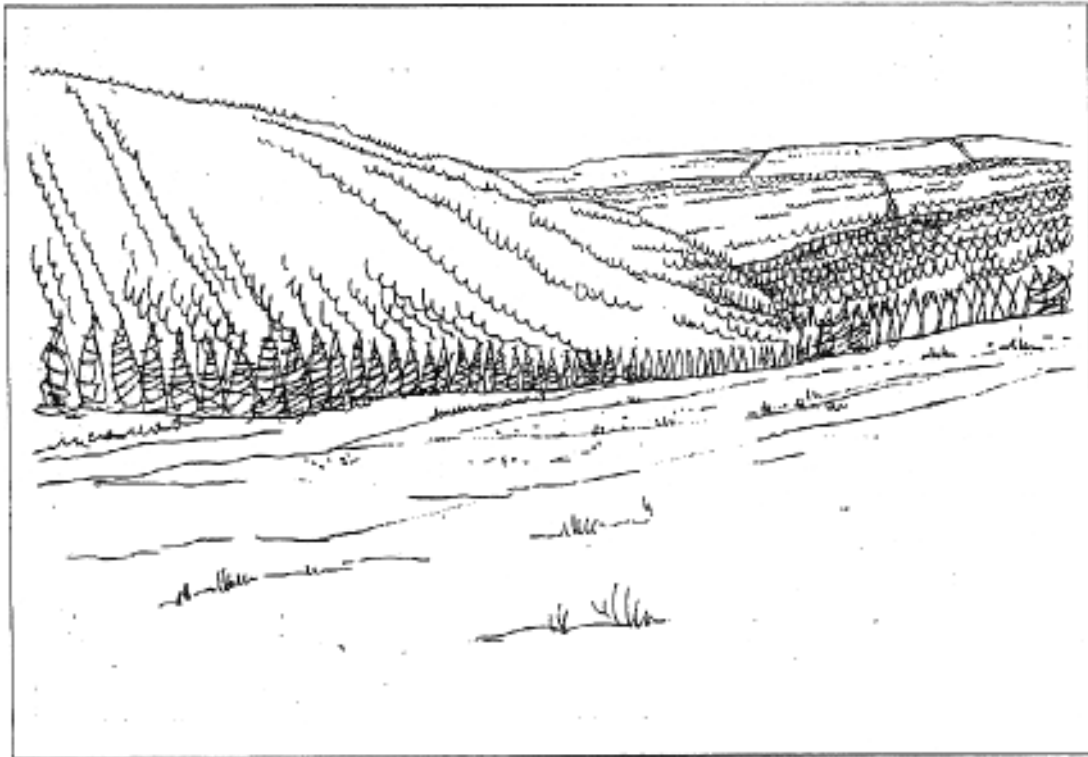
Policy Woodlands

- There is a need to further support the management of historic designed landscapes in both the production of informed management plans and the physical implementation of the works. The special contribution of policy woodlands may be lost if they become managed for solely commercial objectives, though there is already considerable liaison between the Forestry Authority, Scottish Natural Heritage and Historic Scotland to ensure such woods are managed appropriately. The exotic mixes of specimen trees are particularly important characteristics: towering conifers, beech, oak, limes and horse chestnuts are especially significant in Tayside. Policies and grants to support their management and replacement should be promoted.

Semi-Natural and Ancient Woodlands

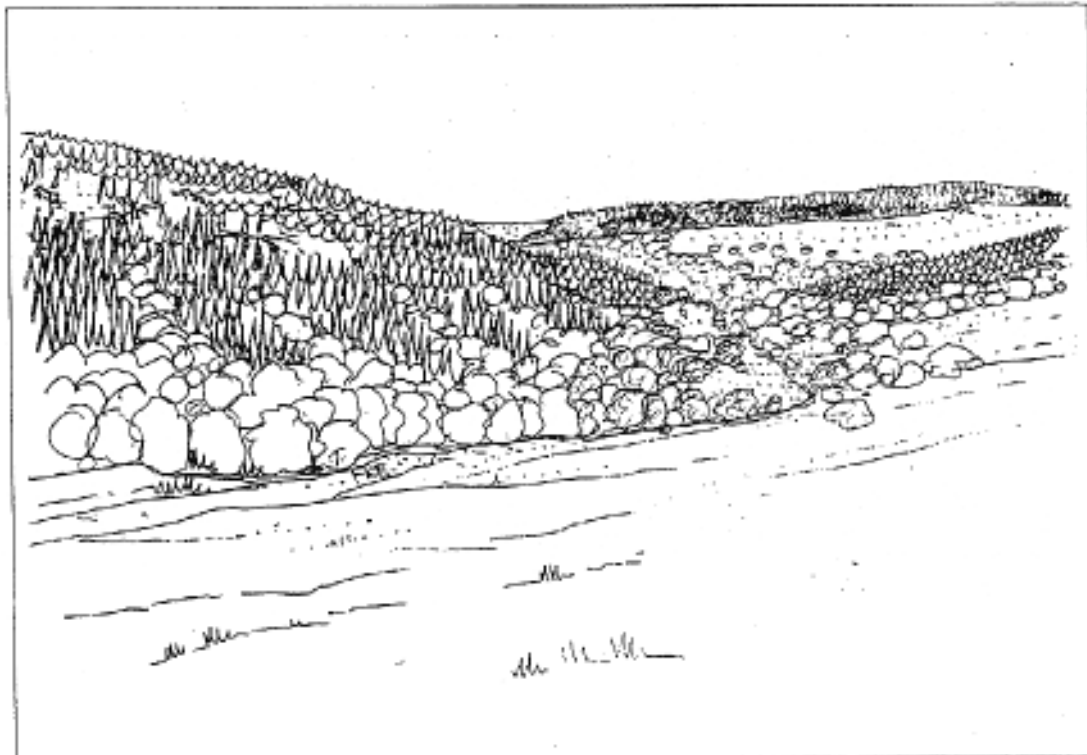
- The protection of these woodlands should be regarded as very important. Semi-natural and ancient woodlands make important contributions to the landscape of Tayside - particularly its glens. Continued support for their protection and management through the Tayside Native Woodlands and other initiatives is essential.

- The sketches on pages 59, 60 and 61 illustrate the possible effects of implementing management options to deal with changes in forestry and woodlands. Examples are given for three different landscape character types ('Igneous Hills', 'Lower Highland Glens' and 'Mid Highland Glens'). These landscape character types are discussed in greater detail in Part II.



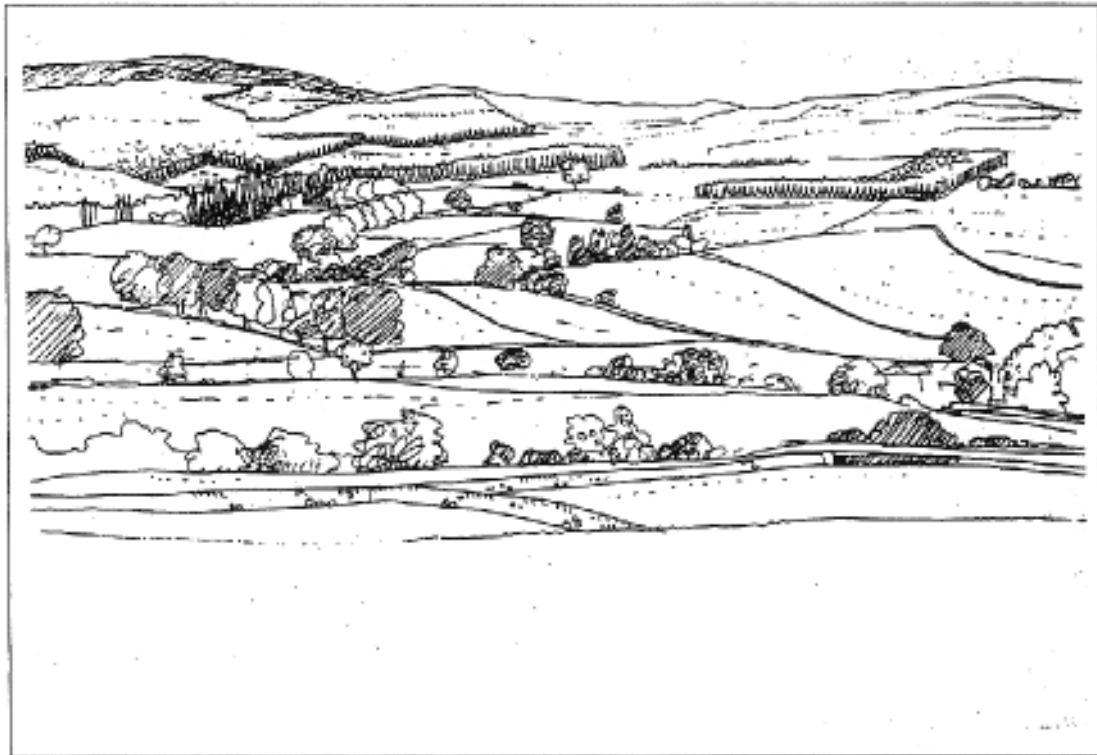
Igneous Hills

Mature 'blanket' forests of Sitka spruce cover parts of these hills, devoid of open space and species variations.



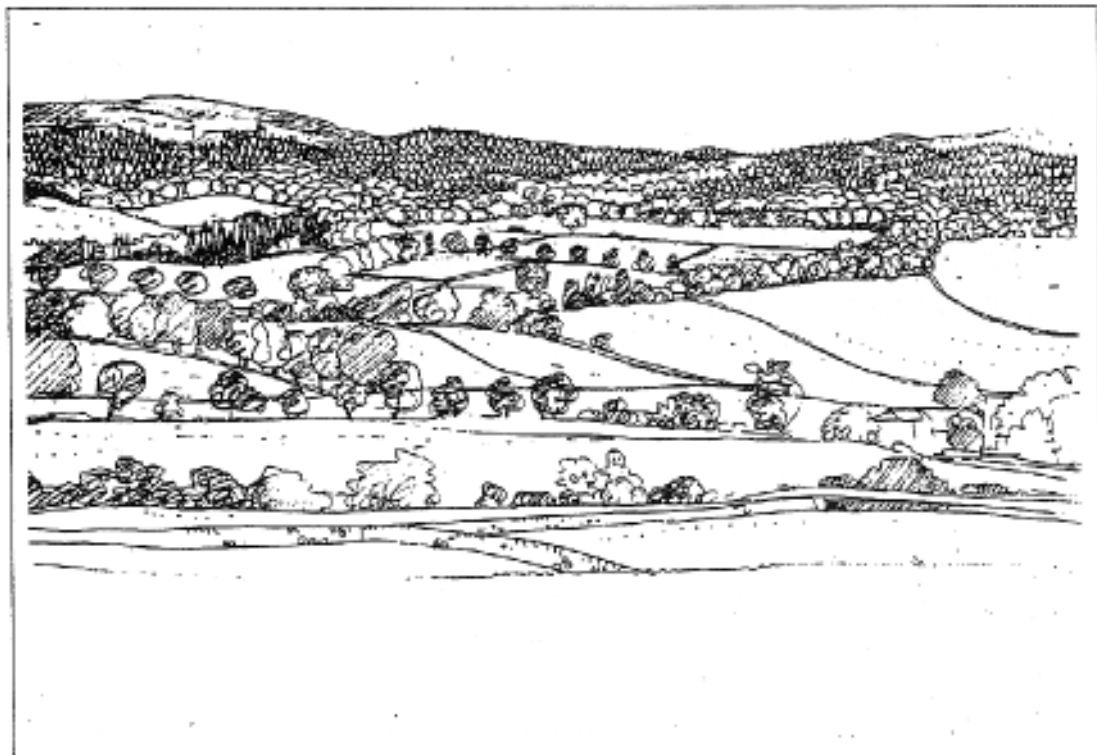
Management Option

Future rotations present opportunities for modifying the existing forests - introducing riparian corridors, large-scale patterns of interlinked open space, broad-leaf planting around low margins and along valleys and large- to medium-scale use of conifer species variations e.g. spruce and larch.



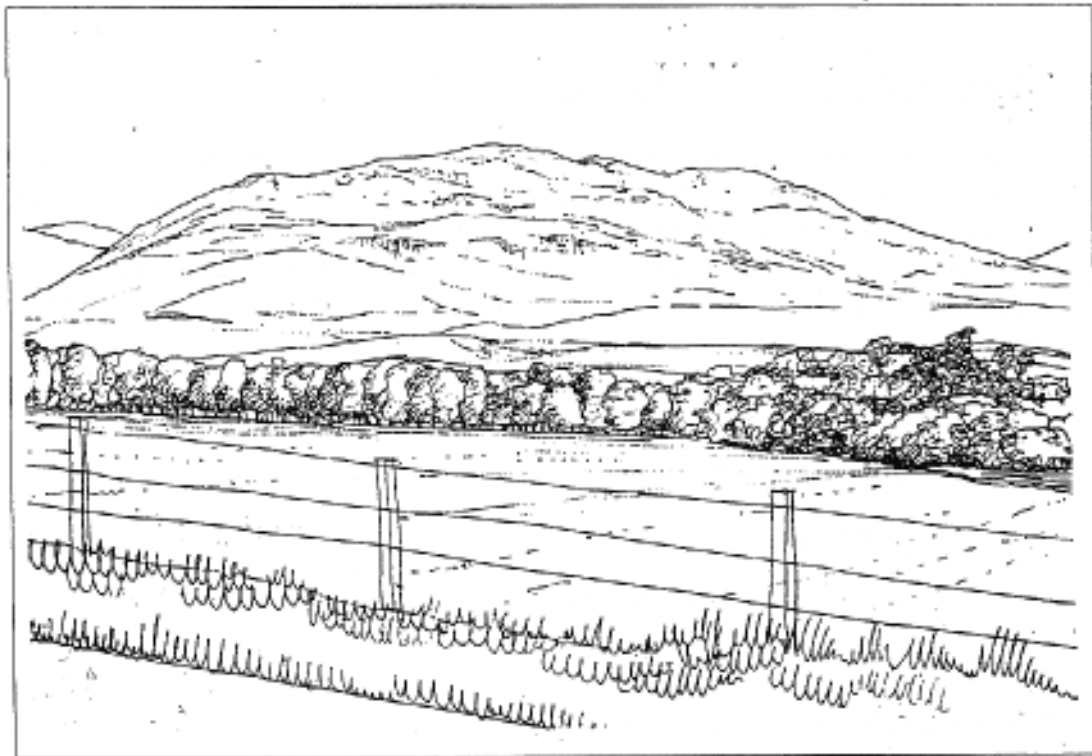
Lower Highland Glens

Lack of integration between conifer plantations and farm woodlands, loss of tree lines and walls.



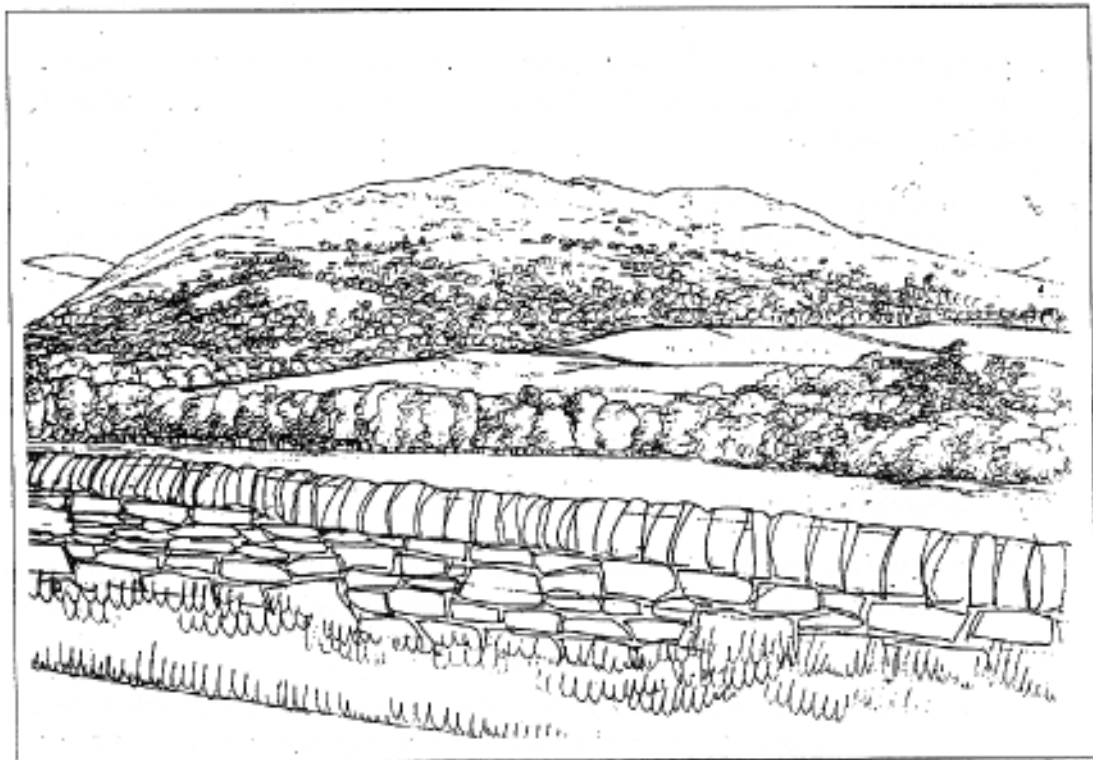
Management Option

Establish new broad-leaf woodland belts connecting with broad-leaf forest margins; restore tree lines, walls and hedges.



Mid Highland Glens

Decline of field boundary walls, loss of pastoral enclosures and prevention of natural woodland regeneration by sheep and deer grazing.



Management Option

Reduction of grazing or increased use of fencing to allow natural regeneration of woodland; restoration of dry-stone dykes and reclamation of old pastures on the glen floor and lower glen sides.

DEVELOPMENT PRESSURES

4.21. Tayside has an enviable reputation for its quality of life. It is consequently an attractive place to live and work and a popular holiday destination. These characteristics are conducive to inward investment and generate demands for a range of development in many parts of the region. This is facilitated by the region's strategic communication routes which allow ease of access along their corridors. The main development issues area as follows:

- (i) urban expansion;
- (ii) building in the countryside;
- (iii) tourism developments;
- (iv) minor and major road developments;
- (v) wind farms.

These issues are described below.

Urban Expansion

Background

4.22. Over the last 30 years, there has been a steady rise in the demand for development sites within, and in close proximity to, main settlements, which has been accommodated through strategic and local planning on a mixture of brown and greenfield sites.

4.23. Development pressures still exist as a result of high demands for new housing and demands for strategic business developments. Demands which directly affect the landscape include:

- (i) demand for greenfield sites on the periphery of existing settlements to allow urban expansion for housing and occasionally business/industrial development;
- (ii) demand for greenfield sites adjacent to strategic transport routes and in close proximity to settlements;
- (iii) potential development of new villages where the existing settlements lack capacity or are unsuitable for expansion;
- (iv) demands for isolated developments in the countryside (discussed below).

4.24. Satisfying the above demands can and does cause significant changes in the character of the landscape within the zone of visual influence of settlements. These changes include:

- (i) sub-urbanisation of the countryside through the extended visual influence of new development and the inclusion of 'suburban' design elements in peripheral developments;

- (ii) alterations to the physical and visual relationship between town and countryside;
- (iii) loss of local distinctiveness through unsympathetic building developments;
- (iv) loss of indigenous buildings through their inability to accommodate new uses, the lack of interest in expansion restoration projects or through 'over-conversion' which emasculates the original character.

4.25. These issues to a greater or lesser degree, affect all but the exposed highlands and the remotest glens. The gradual compounding change could transform the everyday experience of the landscape for the resident population and modify the perception of visitors.

Urban Expansion

Summary of Key Landscape Issues

The key landscape related issues to be addressed by planning and management guidelines are as follows:

- ***how a strong indigenous character and identity could be created for all types of new urban development, i.e. to avoid peripheral zones of ubiquitous or characterless developments;***
- ***how new and appropriate relationships might be developed between urban expansion developments and the countryside, i.e. both visual and physical;***
- ***how the limits of urban development might be determined and landscape frameworks developed for the main settlements;***
- ***how the perception of settlements on arrival or from distant viewpoints could be influenced by planning and management to achieve the best and lasting impressions;***
- ***how new housing and other developments sympathetic to the local character, could be encouraged;***
- ***how significant original buildings might be safeguarded from dereliction, demolition or unsympathetic conversion.***



While many of the large towns in Tayside have a limited impact on the wider landscape, sometimes, as in Dundee, the transition from urban to rural is abrupt.



Many smaller settlements have experienced considerable growth, often by the addition of suburban estates and with little attention paid to the urban/rural interface.



Photo: SNH

Here at Kinnesswood, suburban development has spread up the lower slopes of the Lomond Hills, with a considerable effect on the wider landscape.



In parts of the region, planning policies have allowed development in the countryside, sometimes resulting in isolated groups of suburban houses.



This recently constructed 'kit' house shows that it is possible for new build to reflect traditional designs, materials and features.

FIGURE 11

FORCES FOR CHANGE

Government and Local Authority Planning Guidance

4.26. The Scottish Office has published Planning Advice Notes (PANs) which are relevant to the subjects of urban expansion and building in the countryside. These are PANs 36, 39 and 44, which cover the following subjects:

- (i) PAN 36: Siting and design of new housing in the countryside (Scottish Office, 1991);
- (ii) PAN 39: Farm and forestry buildings (Scottish Office, 1993);
- (iii) PAN 44: Fitting new housing development into the landscape (Scottish Office, 1994a).

These address in general terms most of the issues prevalent in the siting and design of domestic (including farm and forestry) buildings and provide guidance suitable for universal application.

4.27. The planning framework for the region is currently adapting following local government reorganisation in April 1996. As comprehensive local plan coverage evolves, there is considerable scope for supplementary planning guidance to address issues such as settlement and building design. There is also substantial potential for the wider use of design briefs which encourage developers to respond to the landscape context, settlement form and vernacular building styles.

General Planning and Management Guidelines

- Ubiquitous imported housing designs applied throughout the UK should be avoided. Designs for new buildings which reflect local characteristics should be promoted and local industries encouraged to produce component parts suited to Tayside's landscapes.
- There is a need to promote new developments of a high architectural quality where they are highly visible, form the urban edge or define the main approaches to towns and villages.
- The potential expansion of settlement should be given defined limits to ensure the overall identity and character is not compromised. Proactive landscape planning should seek to establish landscape frameworks (e.g. new woodlands, shelterbelts, etc.) at potential development sites in order to facilitate the future integration of buildings. Where a landscape framework cannot be established, then the urban design architectural treatment should seek to produce an appropriate urban edge.
- The potential for establishing new villages should be assessed where existing settlements lack capacity for expansion without compromising their sense of place. This would require an environmental appraisal to determine viable sites that are appropriate in landscape terms.
- Design briefs and even 'urban plans' should ideally be prepared by local authorities for large and sensitive sites. This would help to ensure new developments have clear identities and respond to their landscape and townscape context in an appropriate manner.

- PAN guidance does not address the development forms of contemporary business developments that demand large sites and building footprint areas, in particular that of retail warehouses, single storey industrial buildings and certain office/workshop combinations. These are typified by low cost, rapid build forms of construction and are frequently located within close proximity to strategic road corridors, e.g. to the north of Perth. The demand for these types of development may warrant the production of design guidance and its application to potential sites. Proactive guidance may then be useful to potential developers and be a positive influence on future proposals.

Building in the Countryside

Background

- 4.28. The scenic and accessible nature of much of Tayside encourages interest in development in the countryside. These are predominantly demands for houses, agricultural buildings and tourist accommodation. Whilst the lowlands and more accessible glens and straths are characterised partially by their settled nature, continuing incremental development in the countryside could compromise the rural character and/or scenic quality of the landscape.

Changes in the landscape

- 4.29. Decades of rural depopulation affecting some of the more remote or less prosperous parts of Tayside, have prompted planning policies which encourage a certain amount of house building in the countryside as a means of supporting the rural economy. The Tayside Structure Plan (Tayside Regional Council, 1997b), for example, states a presumption in favour of small-scale housing development in the countryside, provided that certain environmental and infrastructural criteria are met. Rural Angus Local Plan (Angus District Council, 1991) policies adopt a similar approach, supporting the development of housing within certain rural areas. The results of this policy are evident in areas north of Dundee where a dispersed pattern of isolated modern houses or groups of houses can be seen. Perthshire and Kinross policies are more restrictive, stating a presumption against housing development outside settlements except where certain criteria are satisfied. Perth and Kinross Council's 'Houses in the Countryside' policy (1996) opposes housing in the countryside except where:
- (i) the development comprises sympathetic additions to existing building groups;
 - (ii) houses are required to serve a clearly defined operational need;
 - (iii) sympathetic replacement of existing houses can be justified;
 - (iv) the development comprises the restoration of existing building(s);
 - (v) the development comprises the sympathetic conversion of existing buildings.

- 4.30. This policy appears to be effective in limiting isolated and intrusive developments throughout Perth and Kinross. Local Plans in Perth and Kinross have, however, identified 'Development Zones' in which there is a presumption in favour of housing development. Particular examples are found on the northern side of Strath Tay to the east (Cluny to Strathtay) and west (Coshieville to Farleyer) of Aberfeldy. Although comparatively limited in geographic extent, these zones do have the potential to result in a semi-dispersed pattern of residential development within these parts of Perth and Kinross. To minimise adverse effects on the character of the landscape, development within these zones should be encouraged to avoid higher slopes, and to favour clustering along roads, echoing the traditional pattern of development. Design guidance will be important so as to avoid particularly prominent and unsympathetically designed buildings. Even the most restrictive planning policies do not guarantee sympathetic architectural solutions. Style, quality and occasionally placement in the landscape, are sometimes unsympathetic and project a suburban image. In general, however, the quality of Tayside's contemporary rural architecture is noticeably better than many other parts of Scotland, this perhaps reflects the success of the planning authorities and a more sympathetic approach on the part of developers. Perth and Kinross's recently published siting and design guidance (Perth & Kinross District Council, 1995) should further assist in this regard.
- 4.31. Changes in agricultural practice have brought about a range of farm building developments and conversions. Traditional buildings, being unsuited to contemporary needs for machinery or livestock, have become largely redundant. These have been replaced by large barns, potato or overwintering sheds, which dwarf the original buildings and which frequently detract from the farmsteads' composition and relationship with the landscape. This is particularly evident in lowland areas such as Strathmore, where the spread of potato growing has led to the construction of many large sheds for processing and storage. Recent legislation requires a planning application for farm buildings over 365 sq.m. and prior notification for all other buildings. The guidance contained within PAN 39: Farm and Forestry Buildings (Scottish Office 1993), coupled with the above planning controls, should result in farm building being more sympathetically positioned and designed henceforth.
- 4.32. There is a significant demand for traditional buildings as restoration projects within Tayside. Many of these are redundant farm buildings or isolated dwellings in the countryside. Generally, these restoration projects have significant environmental benefits, however, in some cases, there are associated changes in character. These are typically caused by changes to windows, whitewash treatments, the creation of driveways, gates and elaborate gardens, all of which change the building and its immediate setting.

Buildings in the Countryside:
Summary of Key Landscape Issues

The key landscape issues related to building in the countryside that need to be addressed in future policies and management strategies are:

- **the capacity of different landscape types to accommodate new isolated developments;**
- **the importance of sensitive planning policies which are able to balance the needs of the rural economy with the importance of avoiding over-development and 'suburbanisation' of the countryside;**
- **how the siting and design of new residential buildings should best achieve integration with the different landscapes of Tayside;**
- **how design guidance might prevent 'suburban' solutions from being applied in the countryside;**
- **the identification of key design requirements in the restoration of old buildings, to avoid dilution of character;**
- **how proposals for new farm buildings might be influenced by design guidance and planning policies in order to achieve more sympathetic results.**

General Planning and Management Guidelines

4.33. The following guidelines should be considered in conjunction with PAN guidance 36, 39 and 44 and with the guidelines included under paragraph 4.29.

- Proposals for new building in the countryside should be required to demonstrate an understanding and relationship with the local buildings in terms of scale, layout, materials and colour. While it may not be appropriate to reproduce replicas of historic buildings, modern design should respond creatively to local factors which may include:
 - (i) building materials - clear distinction between the use of grey granites and schists in the Highlands and the use of red sandstones in the lowlands. More subtle variations include use of whitewash in some of the Highland glens, the progression from dull reds to brighter reds in sandstones moving from west to east, the use of pantiles in Kinross, and variations in the appearance of stone used in dry-stone dyking;
 - (ii) building layouts, which range from simple linear villages (e.g. Auchnamithie on the Angus coast), 'planted' villages on grid layouts (e.g. Ardler in Strathmore), to nucleated settlements (e.g. Kirriemuir). At a micro scale, farmsteads and hamlets often have characteristic layouts which reflect both their function and the need to shelter from prevailing winds;

- (iii) building styles which may range from historic vernacular (often solid, low buildings of one storey or with typical dormer windows), the particular design style of estate villages such as Kenmore, Fortingall or Blair Atholl to Victorian interpretation of the local vernacular;
 - (iv) local pattern of settlement and location which historically would have had much to do with the importance of shelter, defence, communication, markets, access to lowlands and higher ground, patterns of stock keeping including transhumance, land ownership and the legacy of the clearances, quality of agricultural land and religious factors.
- The relationship with soft landscape components and with landforms to achieve shelter and allow views is an important characteristic of Tayside valleys and glens. New developments should seek to achieve similar sympathetic relationships without contrivance or extravagant site alterations.
 - New developments should seek to match local building materials (at least in appearance) in order to reinforce local character.
 - The peripheral treatment of new building sites should be given careful consideration. Boundary treatments, gateways and edge planting can sometimes be more noticeable than the house. Appropriate detailing is, therefore, essential to avoid the expression of suburban concepts in the countryside, design guidance, and examples of best practice may be the best way of influencing these factors.
 - Building on the sites of former buildings could satisfy a number of objectives for siting, integration and relationship to infrastructure, these should be encouraged providing the original building is beyond redemption.
 - PAN 39 provides concise guidance on farm and forestry buildings which can be applied to Tayside. There are, however, a number of specific factors that should be considered:
 - (i) guidance and planning policies covering the conversion of typical farm buildings could assist in the useful preservation of some of Tayside's fine farm buildings;
 - (ii) encouragement for the use of smaller buildings with more diverse roof configurations could achieve more balanced farm units where original buildings are retained beside the new; more diversity in the range of barn 'kits' available would assist in this regard.
 - As noted above, Perth and Kinross Council have also produced guidance on the siting and design of buildings in the countryside (Perth & Kinross District Council, 1995).

Tourism

Background

- 4.34. Tayside is a major holiday destination and tourism is fundamental to the region's economy. Tourism and recreation are activities which are heavily dependent on the character and quality of the Tayside landscape. In common with many other parts of Scotland, most visitors are drawn by the unspoilt nature of the region's environment, often touring, walking or cycling, and visiting castles and other monuments. It is essential, therefore, that the basic resource - the landscape - is conserved and enhanced.

Changes in the Landscape

- 4.35. Tourist activity is evident throughout Tayside and the region has a broad range of facilities and attractions. These are largely based on existing features or urban centres, but some have been newly developed. The economic benefits of tourism have supported many positive works in the landscape, e.g. building restoration and upkeep of designed landscapes. There is, however, a range of impacts which require control if they are not to have detrimental effects on landscape character.
- 4.36. The region has a number of established caravan/chalet parks, several of which are prominently positioned beside lochs, in the glen floors and beside main roads. Some of these are poorly integrated with the landscape and have unsympathetic ranks of white caravans or chalets which are visually obtrusive. Particularly obtrusive developments are at Loch Tummel near Queen's View, the south side of Loch Earn, Strath Tay near Kenmore and between Pitlochry and Killiecrankie. It is possible that proposals for additional caravan parks may come forward in the future, both in established areas such as the principal lochs (Tay, Earn, Tummel) and in areas such as the Highland Foothills. There is an opportunity to learn from past experience and to favour sites which have a limited impact on the wider landscape. Off-site screening may be provided both by the natural topography and by surrounding woodland and hedgerow trees. On-site planting can also play an important role, providing boundary screening and helping to break the caravan site into smaller areas. In some areas, notably the southern side of Loch Earn, there has been considerable caravan development over many decades - both in terms of single static caravans and larger sites. No matter how well-designed, additional caravan sites in such areas would further affect their landscape character. Opportunities may arise, however, to improve and enhance existing sites.
- 4.37. Tayside has a number of timeshare developments, notably at Kenmore, Dunkeld, Rannoch and Aberfeldy. These are permanent developments aimed at a more prestigious market. They employ, therefore, comparatively high quality architectural solutions as befitting the scenic and heritage values of their sites. These constitute a form of development in the countryside, but usually have been closely integrated with existing villages, built features of designed landscapes or with former hotels/country houses, thereby minimising impacts on the broader countryside. Only at Kinloch Rannoch do timeshares, in conjunction with other tourist facilities, give the impression of over-development. Development of existing timeshare complexes is continuing, but it is thought unlikely that there will be pressure for new timeshare developments in the future.

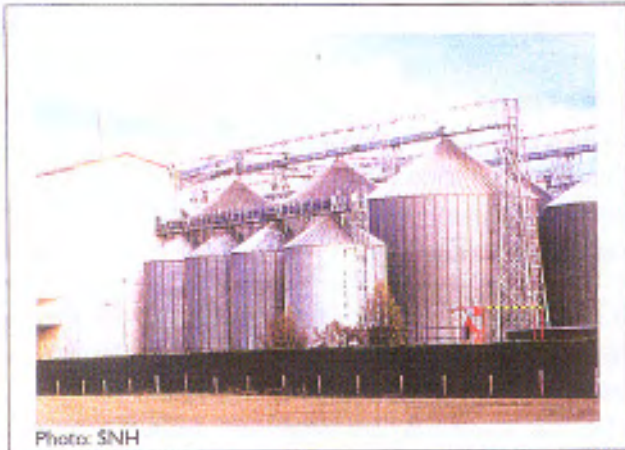


Photo: SNH

Recent decades have seen the rationalisation of agriculture and the construction of many large buildings including grain driers (above) and potato sheds.



While mineral working can have a major impact on the local landscape, existing quarries in Tayside have a more limited effect on the wider countryside.



Major road schemes are difficult to integrate into the wider landscape. There is often scope to use planting to screen the road, and to tie it into the structure of woodland and hedges.



Tourism and recreation, while contributing to the local economy, can have effects on the landscape. This major development was recently opened at Bruar, on the A9.



Photo: SNH

The area is popular for caravans, with a number of large static caravan parks located close to the main lochs. Without suitable screening, these can have a major effect on the landscape.

FIGURE 12

FORCES FOR CHANGE

- 4.38. Certain towns have developed as tourist centres and 'honeypots' of activity. These have enjoyed the economic benefits, allowing the built fabric to be kept in good order by proprietors and encouraging public agencies to carry out environmental improvements. These centres, e.g. Pitlochry, Dunkeld and Crieff, are the likely focus for new strategic tourist attractions and developments which may change the local character of the town or its surrounding landscape through the need to accommodate the development, associated large car parks and additional motor traffic.
- 4.39. The major communication routes which run through Tayside (in particular the A9) have generated interest in tourism developments close to the road corridors, at convenient locations close to junctions (e.g. the Macbeth Experience Centre, the Dowally Craft Centre, the House of Bruar). It is possible that there may be continued demands for such isolated developments which may have significant local impacts due to their high visibility from the main road.
- 4.40. Tourism has supported the restoration of many traditional rural properties for use as holiday homes. This has generally had a very positive effect in the landscape, although the changed function of the property can sometimes be evident in the less well-managed gardens, signage and lack of occupation during the winter months.
- 4.41. Certain forms of recreation can have implications for the landscape. The Uplands of Tayside are popular destinations for hill-walking, skiing and mountain cycling; activities that can cause erosion at a local level and introduce developments, noise and movement into otherwise 'wild' and remote landscapes. At lower levels, the noise and movement introduced by powered watersports (e.g. Loch Tay) and off-road vehicles, can be intrusive.
- 4.42. Signage related to tourism facilities can be an intrusive feature of popular holiday areas. Private signs of variable quality, positioned in an ad hoc manner close to roads, can introduce clutter and detract from views. While planning policies do address signage, enforcement of unauthorised signs is not always carried through. Furthermore, the regulation of 'official' brown signs has been relaxed. Taken together, these factors mean that signage clutter is increasing with implications for landscape character, particularly at the local level.

Tourism:

Summary of Key Landscape Issues

- *the siting and appearance of caravan and chalet parks and the opportunities to enhance established facilities;*
- *the potential landscape effects of major tourism developments at 'honey pot' towns;*
- *the need to reconcile different forms of recreation and steer intrusive and noisy activities to suitable locations;*
- *landscape implications (both beneficial and potentially adverse) of rural diversification and the growth of 'green tourism';*
- *the need for control of private signs to prevent signage clutter in the landscape;*
- *landscape implications of growing volumes of visitor traffic - both direct (noise, movement, etc.) and indirect (demand for car parks, road improvements etc.).*

General Planning and Management Guidelines

- Caravan and chalet park developments illustrate how easy it is for such facilities to undermine the character of the landscape. It is important, therefore, that such developments are carefully controlled, and steered to locations where the topography or land cover limits their impact on the wider landscape. The sensitive choice of materials, colours and screen planting can reduce these impacts still further. There is a need to address the landscape impacts of existing park developments.
- The landscape implications of tourism-related traffic should be considered, both in general and in relation to specific development projects. Parking provision, minor and major road provision and signage, all have a landscape impact. Equally important are the effects of noise and vehicle movement in some of the more remote and tranquil parts of the region. Green tourism projects based on cycling, walking or horseriding, or served by public transport, could provide the opportunity to develop less car oriented tourist attractions.
- Without effective and co-ordinated management, even the most benign forms of recreation, such as walking, can result in erosion, landscape damage and conflict with other interests. With the increasing range of rural recreation activities and the growth of particularly noisy activities, the role of management and co-operation becomes even more essential.
- 'Green tourism' may provide scope to develop tourism and recreation activities that respond to an area's local distinctiveness through community involvement and emphasis on landscape conservation.

- A signage policy and guidance for private signs/tourism promotion would help to prevent signage clutter and preserve landscape character.

Road Developments

Background

- 4.43. Tayside is traversed by several major roads (A9, M90, A85, A90) which generally follow lowland coastal and major glen routes through the region. The trunk roads have been subject to varying scales of road engineering work by the Scottish Office to improve their efficiency and safety. The remainder of the public road network is the responsibility of the local authorities who have a statutory responsibility for its management.

Changes in the landscape

- 4.44. The A9 is an important strategic road which has been the subject of progressive improvements over the last 30 years. These have involved the construction of considerable lengths of dual carriageway, local widening and realignment of the original road, and considerable major engineering works (bridges, embankments, rock cuts, etc.). These works have locally affected the landscape of Strathallan, Strathearn, the valley of the Tay and Glen Garry.
- 4.45. The M90 is the other major road in the region providing motorway access from the Forth Bridge to the strategic intersection of main routes at Perth. The M90 is shorter and traverses less dramatic topography. Its corridor, nevertheless, has a significant local impact and the impressive engineering works around Perth (bridges, under/overpasses and sliproads) are dominant features in the landscape.
- 4.46. Similar works have been undertaken along other strategic routes such as the A90. These have all generated landscape impacts, not only related to the roads, but also in the surrounding areas where borrow pits, local quarry, sand and gravel extraction and temporary works have been required.
- 4.47. While these strategic improvements have increased traffic efficiency, they have changed both the local landscape character through the scale of construction works and the volumes of traffic generated; they have also affected the way in which motorists perceive the landscape due to the increased speed of traffic and the 'corridor' effect of the major roads. Future improvements, including further dualling of the A9 north of Perth, and the creation of grade separated junctions on the A9 and A90, may increase these effects.
- 4.48. Changes to minor roads are less noticeable, but the compounded effect can become significant. Local road improvements such as junction improvements and minor realignments can result in the removal of characteristic features such as hedgerows, walls, trees and old signs.
- 4.49. Improvements to rural roads may be required in the future to facilitate forestry haulage; it is important, therefore, that any such loss of characteristic features is mitigated by reinstatement works.

Road Developments:

Summary of Key Landscape Issues

The key landscape issues related to road developments that require to be addressed by planning policies and strategies are:

- ***how to reduce the impact of existing major roads;***
- ***how the landscape design of new road corridors could reflect and reinforce the character of landscapes traversed;***
- ***how the scenic qualities of certain landscapes might be acknowledged by innovative road engineering which avoids crude cutting and filling;***
- ***how the characteristic features and inherent interest of the minor road network could be preserved and maintained, i.e. hedgerows, verges, tree lines, walls and bridges;***
- ***how roadside services and facilities can best be located and designed.***

General Planning and Management Guidelines

- Design guidance contained within the Design Manual for Roads and Bridges Volumes 10 and 11 (Scottish Office Industry Department, 1993) should be applied, taking due regard for the local landscape characteristics of Tayside.
- The management of existing roads may require a different emphasis if their essential characteristics are to be maintained, e.g. tree avenues, narrow bridges, sinuous alignments. The Scottish Office is currently examining the potential for establishing a rural road hierarchy. This aims to define management types and priorities for rural roads, distinguishing between functional and categories of leisure roads. This would allow the current statutory standards to be waived in favour of a conservation led approach for many rural roads.
- For extensive ongoing road programmes, the landscape treatments for the entire road corridor should be reviewed as a strategic project to ensure that a strong regional character will ultimately be projected and that the subtleties of the local landscape character changes are also acknowledged. On and offsite landscape works should be designed to integrate the road into the broader landscape.
- For areas of designated and perhaps locally appreciated scenic value, there should be an emphasis on high quality sensitive engineering solutions, e.g. bridge design by competition, as at Glencoe.
- The adoption of a rural roads management programme could make positive contributions to the countryside, if all characteristic features of the road corridors were

addressed. Such a programme would require a multi-agency approach if all opportunities for visual amenity, wildlife and recreation were to be realised.

- Approaches and gateways to towns and villages should ideally be announced subtly in the design of roads and their landscape corridors. Roadside treatments such as tree lines, walls and hedgerows, combined with low-key carriageway alterations, may be able to create a gateway effect without the need for a proliferation of warning/speed restriction signs in the landscape. Again, this requires integration and co-operation to ensure that the messages given by the built environment and the road corridor coincide.
- Roadside services and facilities should be located so as to minimise their impact on the wider landscape. Screening, topography and woodland can help in this respect. The design should similarly seek to minimise visual intrusion. There may be opportunities to adopt local building styles and materials. The night-time landscape, in particular the effect of street lighting and vehicle lights, should be considered carefully since the principal route corridors pass through otherwise rural and undeveloped areas.

Wind Farms

Introduction

- 4.50. There is growing pressure for wind farm development in Tayside. While wind farms are a novel and exciting means of generating 'clean' electricity, many point to potential landscape and other environmental impacts, particularly when they are built in otherwise undeveloped areas. Local planning authorities have a key role to play in balancing the environmental benefits and impacts of wind farm development, and steering such schemes to locations which meet environmental as well as technical criteria.
- 4.51. Concerns about the effects of acid rain and rising concentrations of atmospheric carbon dioxide (the so-called greenhouse effect) have prompted a move away from fossil fuel power generation and towards alternatives including energy sources such as wind, wave and solar power or biofuel and waste incineration. As is described below, targets for renewable energy power generation have now been set and local authorities are required to facilitate its development. To date, most interest has focused on wind energy, with a number of wind farms (comprising groups of wind turbines) already having been built and many others proposed. However, this interest is tempered by concerns that those areas with the highest wind speeds (thus potentially most suited to wind power generation) also tend to be those areas with the most sensitive landscape (generally upland and coastal areas).
- 4.52. The National Planning Policy Guideline (NPPG 6) on renewable energy (Scottish Office, 1994b) includes an assessment of the 'realistic longer-term potential for renewable energy developments in Scotland'. This suggests that Tayside has the potential for 149 megawatts (MW) of installed generating capacity from renewable energy sources. Wind power contributes the bulk of this, accounting for a potential 92.5 MW of installed capacity. However, the policy guidelines note that realisation of this potential is likely to

be constrained by the restricted capacity of the electricity transmission system, particularly in areas north of a line drawn between Pitlochry and Dundee. This suggests that in the short- to medium-term, opportunities and pressures may be greatest in the west Highlands, the foothills, western Sidlaws and Ochils. It also suggests that there may be pressure to upgrade the power system elsewhere in the Highlands in the longer term.

Wind farms - the renewable energy context

- 4.53. NPPG 6 requires local authorities to plan *'positively for renewable energy where this can be achieved in an environmentally acceptable manner'*, and to *'safeguard sites with potential for renewable energy projects'*. It recognises that there is a need to reconcile the siting of renewable energy developments with the protection of important environmental assets within nationally important areas (such as NSAs, ESAs, NHAs and Regional Parks) such schemes should only be permitted where the integrity and underlying objectives are not affected and where adverse effects are outweighed significantly by the national benefits that would result from the development. Turning specifically to wind power, NPPG 6 states that wind turbines should only be permitted where they would *'not be significantly detrimental to areas valued for their landscape character'*.
- 4.54. NPPG 6 requires planning authorities to define areas of search for renewable energy developments, to safeguard areas considered suitable for renewable energy development and to define areas where, because of environmental and other considerations, such developments are likely to prove difficult to reconcile with other policy considerations. The development of an integrated strategy for renewable energy in Tayside should therefore be regarded as a priority. This should examine the practical potential for each type of renewable energy in greater detail, taking into account the basic resource itself and the technical constraints, along with key environmental, commercial and other planning constraints affecting realisation of the overall potential. The development of a renewable energy strategy, which is reflected in the planning policy framework, will assist in the consideration of proposals for wind turbines or wind farms. By examining and planning for the potential for other forms of renewable energy, the strategy would demonstrate a positive commitment to the overall benefits offered by alternative sources of power. Key sources of renewable energy within the region, in addition to wind, may include:
- small-scale hydro schemes at former mill sites (e.g. along the Tay and Almond, or in lochside locations); by utilising existing infrastructure, wider landscape and ecological effects can be kept to a minimum;
 - domestic and agricultural waste (incineration or anaerobic digestion to create biogas); while processing plant would be required, this approach would help reduce the need for landfilling or other forms of disposal;
 - biomass (e.g. short rotation coppice) in the lowlands and glens; although a temporary effect, this could have a local influence on landscape character;

- residues from forestry management and timber processing; again, although processing plant would be required, this would be generally small in scale and would make good use of an otherwise wasted resource;
- energy savings achieved by passive solar design, active solar technology and the use of solar cells (photo voltaics).

Most of these alternative forms of renewable energy are relatively small-scale, or require processing and generating plant which differ little from conventional industrial or agricultural developments. This section, therefore, concentrates on issues relating to wind energy. Some of the issues covered are also of relevance to other forms of development, most notably masts, aeriels and other tall structures.

- 4.55. It is notable that the nominal production of over half of Tayside's energy needs from existing large-scale hydro schemes within the region compares with just 2% of energy supplies from renewable sources for the UK as a whole.
- 4.56. Appendix A to Planning Advisory Note 45: Renewable Energy Technologies provides further information and guidance on wind power developments. The Appendix sets out criteria thresholds to determine whether an environmental assessment is required under the Environmental Assessment (Scotland) Regulations 1988 (as amended in 1994):
- the proposed development is located within or is likely to have significant environmental effects on a sensitive location such as a NSA, SSSI or Natural Heritage Area (NHA);
 - the proposed development is located within or is likely to have significant environmental effects on any other area valued for its landscape character;
 - the development consists of more than 10 wind generators;
 - the total installed capacity of the development exceeds 5MW.
- 4.57. From this discussion, it is clear that planning authorities have a critical role to play in the development of wind power. The following sections outline the effects of wind farm development providing a framework for assessing the implications for individual landscape types.

Changes in the Landscape

- 4.58. The development of wind farms is guided by three principal groups of factors. Firstly, there are the technical issues that influence location. These relate primarily to the incidence of the high wind speeds that are required for power generation. As noted above, this requirement tends to favour coastal and upland areas since average wind speeds tend to be significantly higher here than in more sheltered locations. Additional technical factors include the need to link into the National Grid at a suitable location (the grid tends to be least dense in remote areas and the installation of new cables tends to be both expensive and environmentally damaging), the need to avoid electro-magnetic interference and the need to provide road access (suitable for articulated vehicles) to the site in question. Economic factors are closely related to technical factors, further limiting the areas where the costs of development and operation will be outweighed by the revenue accruing from power generation. The third group of factors that should govern

the choice of wind farm sites comprises the likely environmental effects. These may include:

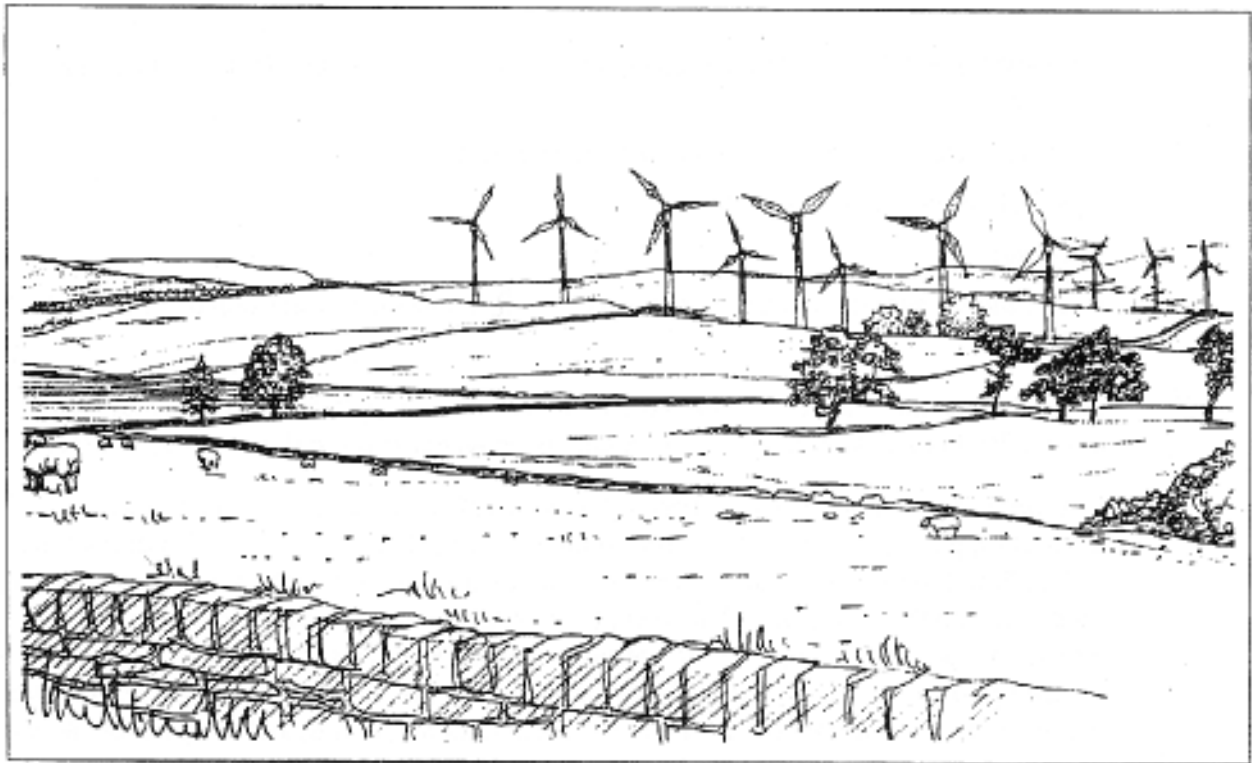
- visual intrusion and effect on landscape character;
- effect on nature conservation;
- noise;
- secondary effects resulting from links to the National Grid or the provision of road access.

4.59. While the last three of these issues are important concerns, this discussion focuses on the implications of wind farm development on visual intrusion and landscape character.

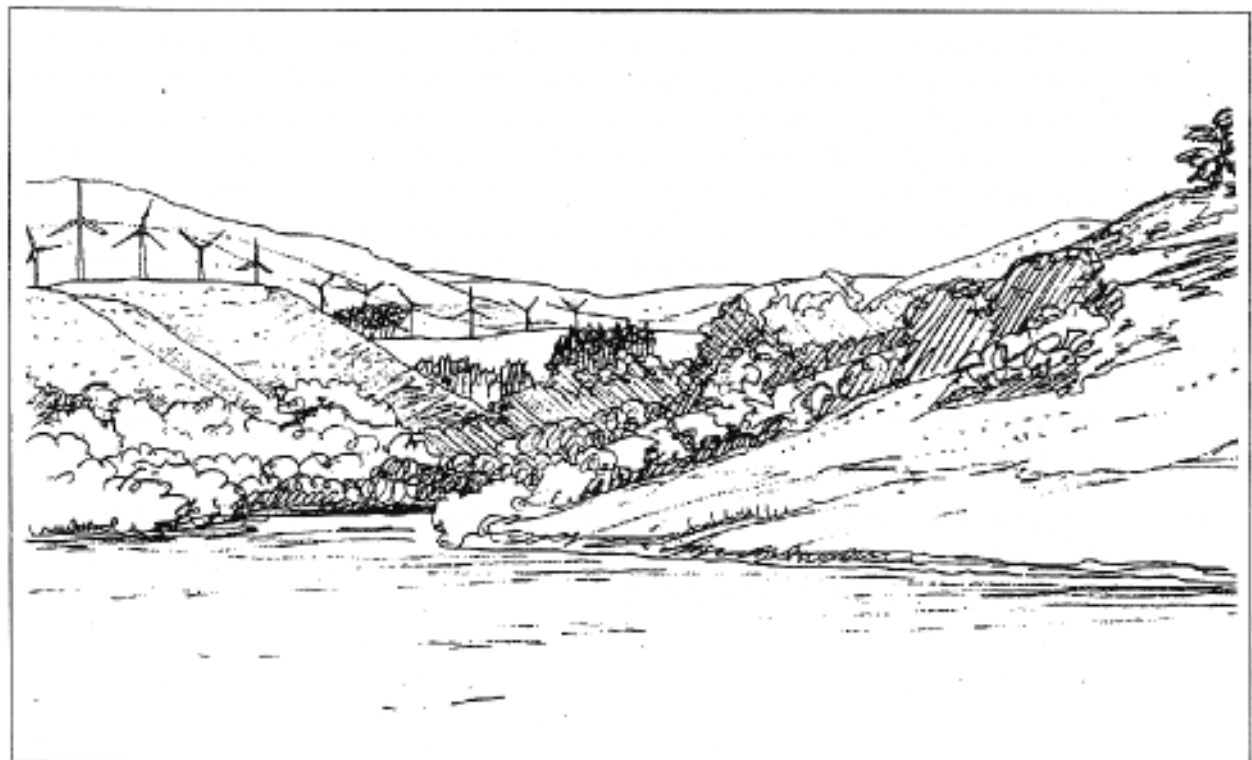
4.60. The landscape impact of wind farms will, in turn, reflect a variety of factors. Most significant, perhaps, is the size of individual turbines (30-35m high with a rotor diameter of 30-35m), their vertical, modern and industrial appearance and the movement that they introduce into the landscape. While in some situations the structures can be almost sculptural, turbines can appear incongruous, particularly in a sparsely developed upland or coastal location. Clearly, the effects increase with the number and density of turbines in any single wind farm development. Associated infrastructure, including buildings and service roads can also be visible features.

4.61. A critical influence on the scale and nature of wind farms' visual impact is the nature of the landscape in which they are developed. Thus, in a large-scale landscape (e.g. an exposed upland area) the visual impact of turbines may be comparatively small, though they will be visible over a considerable area. Conversely, in a small-scale landscape, wind turbines are likely to be particularly obvious, though they are less likely to be visible over a wide area. A further factor is the degree of existing development. Impacts are likely to be greater in unsettled landscapes, and least where the landscape has already been affected by masts, pylons and other structures. A further influence on wind farms' landscape impact is their prominence. Thus, turbines sited on the skyline are likely to be far more noticeable than those located a little further down the hillslope. Topography and landcover may further influence these impacts, providing screening or backclothing for all or part of the wind turbines. It is useful to consider the landscape impacts in terms of the development's viewshed. Where can the wind farm be seen from? Who can see it? How does it appear, against a backdrop or on the skyline? Local residents, farmers, tourists, visitors, and walkers (for example) are all likely to have different perceptions of a given wind farm.

4.62. Since wind farms may be visible over a considerable area, it is important that the impacts on surrounding landscape types and designated areas is taken into account during the consideration of planning applications.



Example A Siting of wind turbines within the Sidlaw Hills using the low ground between ridges to accommodate low level structures and roads without visual intrusion. This example also illustrates how the turbines might be located inside the main watershed/visual horizon, thereby limiting visual impacts to one geographic zone i.e. south of the hill range.



Example B Siting of wind turbines within the more dramatic topography of the Ochil Hills using the high ground to the north for 'backclothing' the turbines. This example also illustrates how the irregular topography could be used to absorb low structures and roads without significant visual effects.

Wind Farms

Summary of Key Landscape Issues

- *interest in wind power is likely to increase over the next few years; can the environmental benefits of this renewable energy generation be balanced with the need to protect other aspects of the environment?*
- *wind turbines are often visible features in the landscape, in part reflecting their size, modern and industrial design, vertical orientation and the movement of their blades; how can they best be incorporated into the landscape ?*
- *given the common coincidence between areas of high scenic value and areas with the highest average winds, how can the planning system balance the need to select prominent sites with the need to protect the most sensitive landscapes?*
- *how can natural topography and land cover be exploited to screen and backcloth wind farms?*
- *are some landscape types better suited to wind farm development than others?*

General for Planning and Management Considerations

- 4.63. In accordance with the approach recommended by NPPG 6 it is considered that the local authorities should take a proactive role in defining areas with potential for wind farm development and those areas where such development cannot be reconciled with other policy objectives. Although factors such as noise, safety, proximity to National Grid connections and communications may influence this analysis, it is the effect on landscape, and upon nationally protected landscapes, which are likely to be most significant in defining these areas. The analysis of landscape types provides broad guidance on the acceptability of wind farm development in different areas. However, it would be simplistic, and probably misleading, to calculate the actual scope for wind farm development on this basis since many more local factors are likely to be significant in defining suitable sites within areas of search. Some of these factors are considered below and the importance of environmental assessment in the design process is outlined.
- 4.64. The following locations are likely to be particularly sensitive to wind farm development:
- extensive upland areas where development is sparse and views extensive;
 - areas designated for their landscape or nature conservation value;
 - small-scale landscapes;
 - skyline sites;
 - sparsely developed areas;

- prominent locations where the development can be seen by large numbers of people (e.g. residents, travellers or visitors).
- 4.65. Taken together, these factors apply to much of the region. The challenge, therefore, is to determine the extent to which these issues can be addressed during the design and implementation of schemes. If this is not possible, an alternative approach may be necessary.

Environmental Assessment

- 4.66. The process of environmental assessment should be used to influence the design of wind farm development. In particular, the assessment process should:
- examine alternative sites;
 - examine the scope for alternative site layouts; there may be scope to reduce the visual impact of a scheme, for instance by removing turbines from the skyline, without making it unviable;
 - the impact on the character of the surrounding landscape, taking account of those landscape types from which the development would be seen;
 - the impact on sites designated for their landscape or nature conservation value;
 - the scope for on-site or off-site mitigation, including the use of additional planting;
 - impacts during construction and decommissioning.

Design

- 4.67. It is important that wind farm developments respond to the character of the surrounding landscape. As a general rule, flat or open landscapes should be avoided since here views will be long and the turbines will often be visible against the sky. More undulating landforms are likely to provide better screening. Wherever possible, skyline locations should be avoided in favour of sites where the natural land form provides a backdrop against which the wind farm would be seen. Existing land cover (particularly woodland or forestry) may accentuate the screening provided by the landform.
- 4.68. Locations within coniferous plantations may have the potential to reduce a number of the environmental impacts noted above for the following reasons:
- woodland would provide screening for turbines, particularly when viewed from nearby; associated buildings would be concealed from view;
 - to some extent, coniferous forests already present a modified upland landscape; this offers scope for the siting of wind turbines and may help to ease the pressure on open landscapes;
 - infrastructure such as forest and access roads usually already exists in these areas.
- 4.69. However, the option of steering wind farm development to forest locations requires technical assessment. It is recognised that commercial forestry activities usually avoid the most exposed areas. Account should also be taken of the forestry harvesting and management plans in order to ensure that the benefits of woodland screening are sustained.

Regional Overview

- 4.70. Detailed information on average wind speeds is not available for Tayside. However, taking into account the basic need for high and reliable average wind speeds, it is likely that suitable areas are likely to include:
- highland summits and plateaux;
 - transitional hills along the Highland Boundary Fault;
 - the Sidlaws and Ochils;
 - lowland hills such as the Gask Ridge and Montreathmont Moor.
- 4.71. As noted above, technical constraints, principally the need for proximity to a suitable part of the electricity distribution network, means that large parts of the Highland, particularly to the east of Glen Garry/Strath Tay, are unlikely to be viable.
- 4.72. Other parts of the Highlands are likely to be very sensitive to wind turbine development as a consequent of their extremely open 'wilderness' character and extensive views. Any structures would be very visible in this otherwise undeveloped landscape. Even where large parts of the upland have been modified by commercial forestry, any turbines would still be visible over a considerable distance and from many of the principal peaks and viewpoints. This would undermine its wild, upland character. Set against this is the fact that many parts of the Highlands are remote, and comparatively few people would be exposed to the turbines. Overall, however, given the sensitive nature of this landscape, there is a very high level of constraint affecting the development of wind farms in the Highlands. However, should the technical constraints associated with this area be reduced, the Highlands could come under considerable pressure for wind farm development. If this should happen, the areas of highest environmental constraint should be identified as a means of steering wind farms to the most suitable locations. Factors to consider might include:
- the importance of avoiding areas of high nature conservation importance;
 - the need to avoid areas of high plateau where turbines would be visible for many tens of miles;
 - the need to avoid areas of high recreation value, particularly those used by walkers and climbers;
 - the scope for backclothing provided by locations on shoulders and shelves of upland.
- 4.73. As the term suggests, the transitional foothills along the Highland Boundary Fault form a transition zone from the uplands to the lowlands. This is reflected in landform, land use, vegetation and settlement. West of Strath Tay the landform is often open and rounded. To the east it is more fragmented and smaller scale. Although wind speeds would be lower than in the Highlands, it is probable that these areas would still be viable, particularly since they are relatively close to parts of the electricity distribution network. Wind farm development in these areas would have the advantage that turbines could be set against a backdrop of the Highland mountains. However, the erection of modern

prominent structures could undermine these areas' role in marking the transition from unsettled uplands to settled lowlands. There is generally a high level of constraint in these areas, but that there may be limited opportunities where view-sheds associated with developments are relatively contained. There may also be opportunities to the north of Glen Almond, particularly where the A9 corridor has brought a measure of development. Schemes here would need to be carefully designed and assessed.

- 4.74. The Sidlaws and Ochils are close to the principal centres of population and, over the years, have accommodated a considerable amount of development including masts, pylons, roads, plantations and reservoirs. While the overall aim should be to reduce the impact of these past developments, the different character and quality of these areas suggests that they may be better for wind farm development. The suitability of areas will vary considerably within the hills, and it is inevitable that some degree of landscape impact will result. However, it is possible that the balance between benefits and impacts is easier to find in the Sidlaws and, to a lesser extent the Ochils, than in more sensitive landscapes. The principles of development should include:
- avoid skyline locations, particularly where this results in extensive areas of visual influence on either side of the hill range;
 - favour shallows bowls on the dipslopes;
 - examine the potential of areas already affected by major roads, masts or forestry;
 - take into account any constraints associated with telecommunications infrastructure;
 - employ environmental assessment during the design stage
- 4.75. An indicative map, illustrating the sensitivities of the landscape for wind farm development in the Sidlaws, is contained in **Appendix C**. It should be noted that this has been prepared on the basis of a regional scale landscape assessment and that much more detailed assessment would be required in the event of a proposal coming forward in this area.
- 4.76. Lowland hills such as the Montreathmont Moor near Forfar may hold potential for wind farm development. Given the concentration of commercial woodland in some of these areas, it may be worth exploring whether wind farms and forestry are compatible.

CLIMATE CHANGE

- 4.77. There has been considerable debate about the phenomenon of climate change which may result from higher concentration of carbon dioxide and other 'greenhouse' gases in the atmosphere. Potential effects include rising temperatures, rising sea levels as ice caps melt, and a decrease in climatic stability resulting in more frequent episodes of storminess or drought. It is too early to draw firm conclusions about the scale and nature of these changes in relation to the landscape of Tayside. Possible scenarios include:
- rising sea levels creating pressures along the cliff and sand coastline, and along the Tay estuary;
 - changing temperatures and rainfall patterns with implications for upland vegetation, woodland, etc.;
 - changing patterns of snow-lie, with implications for skiing and other forms of recreation;
 - increased incidence of drought with implications for agriculture and soil stability.
- 4.78. Many of these scenarios are of a major scale and, should they become reality, little could be done but modify patterns of activity, management and planning. In situations such as the Firth of Tay, however, we face a choice. We could either respond to rising sea levels by raising sea defences (thereby protecting farmland and other property, but squeezing the ecologically important intertidal zone), or we could accept the changes and institute a programme of managed retreat of the coastline.
- 4.79. Although the effects of climate change could affect most landscape types in some way, consideration of the issue in subsequent chapters has been limited to situations where management responses to such change would have serious implications for the landscape.