



## LANDSCAPE CHARACTER ASSESSMENT

### SHETLAND LANDSCAPE EVOLUTION AND INFLUENCES



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**Title Page Photographs**, clockwise from top left:

Serpentine rocks near Haroldswick, Isle of Unst, Shetland Isles, Northern Isles Area.©Lorne Gill/NatureScot

St Ninian's Isle tombolo, Shetland.©Lorne Gill/NatureScot.

Broch of Mousa, Shetland.©Lorne Gill/NatureScot

Sea cliffs, Hermaness NNR, Unst, Shetland.©Lorne Gill/NatureScot

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

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

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

The information has been updated with input from the relevant Local Authorities. The historic and cultural aspects have been reviewed and updated by Historic Environment Scotland. Gaps in information have been filled where possible.

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

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

The content of this document was drawn from the background chapter information in the "NatureScot Review 93 – A landscape assessment of the Shetland Isles", 1998, Gillespies.

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*Hermaness National Nature Reserve © Daniel Brazier/NatureScot*

Although the Shetland Islands lie as far north as St Petersburg, Russia and Anchorage, Alaska, they are much milder. This mild climate with higher than average temperatures for latitude 60 results from the warming effect of North Atlantic Drift (or Gulf Stream).

The most significant features of Shetland's climate are the constant change and force of the wind. The remote location and maritime context of Shetland results in pollution free air and visual clarity. This, in combination with its northerly latitude, makes for a special quality of light.

### **Physical and cultural influences: key points for the landscape**

The landscape character of the Shetland Islands is a confirmation of the intrinsic qualities of the physical landscape and human use of the land and sea. This has evolved over many centuries to create the subtle mosaic which today supports a thriving community of just over 23,000, 32% of which lives in the capital, Lerwick.

The majority of the interior and upland parts of Shetland are covered by expansive areas of peatland, which is suitable for rough grazing and contains important natural habitats. The more productive land, based on areas of boulder clay and other drift deposits, is restricted to bands of low lying land along the coast and around voes and sounds.

The landform of Shetland affords some shelter from the high winds, especially at lower level, at the coast and to leeward. The sheltered voes, sounds and inland valleys are, as a result,

extremely important for human use, as well as providing sheltered habitats for wildlife. The productive low-lying land between the moorland hills and the sea provide for grazing and fishing respectively. Consequently, these areas have been the focus for continued settlement and activity since the Iron Age. The relative lack of agricultural intensification and improvement and the shallow soils has meant that the landscape has retained a wealth of well-preserved archaeological sites across a wide time-depth.

Shetland's landscape can be considered as two broad types. The first is the unenclosed peatland interiors where recent human intervention has been limited since the period of woodland and scrub clearance in Neolithic times. Their character is defined by geology, landform, the simple, relatively uniform vegetation cover, hydrology and climate. The second broad type is the settled, enclosed lowlands, where long term settlement and land use patterns have modified the landscape. These areas have been formed in large part by human activity and are characterised by the modified grassland vegetation and farmland features such as field boundaries and dwellings.

This long-lived division of inhabited farmed lowland and uninhabited peatland upland is changing in places. Modern development is not bound to this division and the relationship between physical characteristics, the agricultural capability of the landscape and settlement patterns has become increasingly diffused.

During the 1980's and 1990's there was move to higher density of sheep grazing, due in part to per head subsidies by the EU. This hit a peak in the early 1990's at over 390,000 but has since declined to around 280,000 and has remained fairly stable over the last decade. Traditional crofting practices have been in decline for much of the 20<sup>th</sup> Century, the small scale crofts with a mix of arable and grazing land giving way to more extensive sheep grazing. Arable land has been lost and grassland and heather moorland improved for grazing, leading to an increasingly uniform pattern of land use and vegetation cover. Traditional grazing animals such as the Shetland sheep, cattle and pony breeds have either evolved from livestock brought with Neolithic settlers or from grazing animals crossing from Europe during the ice ages. These were hardy and small as a reflection of the poor nutrition and fairly indiscriminate meaning that they did not only graze the softer vegetation. These breeds although well suited to the environment are less well suited to the modern market so larger and more productive breeds have been introduced over the last 200 years. Introduced larger breeds have reduced the plant diversity due to their preferential grazing.

Cattle numbers have declined by a third since 1971 from 6945 in 1971 to 4500 in 2017. The dairy industry is almost entirely local supply, reducing the need for importing dairy products from the mainland. The native Shetland sheep is small but reared for both meat and wool and cross breeds are now also reared for the mainland meat market.



*Beehive shaped corn drying kiln and sheep enclosed in the sheep fanks at the Isle of Noss National Nature Reserve, Shetland. ©Lorne Gill/NatureScot*

## 2. PHYSICAL INFLUENCES

### ***Landform***

The most dominant land form feature is the strong north-south linear pattern to the central mainland with a landform of ridges and valleys, which in the north turn north-east to south-west. The landform is generally undulating in coastal and other low-lying areas with moorland and occasional hillocks and hummocks reaching to the edges of the cliffs in many places. In many parts of western Mainland there is a fine grained hummocky landform.

Low-lying land is generally concentrated along the coastal strip, in the western portion of Mainland and in north-south bands running through central Mainland. Areas of upland include Ronas Hill on north Mainland; north-south running ridges in central Mainland; a hill mass forming the spine of southern Mainland; and a band of upland along the western edge of Unst. The topography of the islands has long been important for seafarers. In clear weather, the sailor has a continuous series of landmarks from Saxa Vord to the Caithness Coast.

There is a strong and clear relationship between the geology, the topography and the landform of Shetland. The central Mainland valleys correspond to bands of metamorphosed limestone, whilst the ridges are composed of steeply inclined metamorphosed-sedimentary rock. The South Mainland upland spine corresponds to the Clift Hills division of metamorphic rock and the coastal plain with Old Red Sandstone. The uplands of Ronas Hill correspond to an area of igneous intrusive rock.

Elsewhere, notably in the west Mainland, this relationship is less clear, probably as a result of modification to the landform by glaciation. Shetland has experienced successive glaciations, although most of the superficial deposits and ice-formed features are attributable to the last glaciation.

### ***Solid Geology***

Shetland's geology has a complex pattern of faulting and altered sedimentary, igneous and metamorphic rocks. There are many faults, mainly with a north-south trend across the whole island group, suggesting they were responses to crustal stress. In general terms, the Shetland Islands can be divided into two distinct geological parts to the west and east of one of the major north-south fault systems - the Walls Boundary Fault which is associated with the Great Glen Fault.

The western portion of Mainland is dominated by Old Red Sandstone, with areas of igneous and metamorphic rocks. The north-west portion of Mainland is dominated by igneous intrusive rock, with a band of igneous extrusive rock (lava), which encompasses Eshaness and Papa Stour. There are areas of metamorphic gneiss, for example the Ve Skerries linked to this.

Central Mainland is formed predominantly of steeply inclined metamorphosed sedimentary rock, including bands of metamorphosed limestone, orientated north-south. To the north, this central band is bounded by an area of igneous rock. The Eshaness coastline shows the strata of volcanic ash and lava flows clearly where the sea has revealed the cliffs with a deep purple colour from the andesite. The island of Papa Stour, just off the west coast of Mainland, is predominantly a pink rhyolite lava, with two flows broken up by basalt, tuff and sandstone.

Similar rocks occur on the Walls Peninsula, west of the Walls Boundary Fault, especially at Fethaland where the folding and jointing of granites and metasedimentary rocks shows the movement of the area. Thick vertical bands of limestone running through the central Mainland were etched away by water millions of years ago to form the parallel valleys of Pettadale and Weisdale, their fertile soils an obvious indicator of their geology.



*Sea cliffs at Eshaness, Shetland. ©Lorne Gill/NatureScot*

The southern Mainland is made up of two distinct bands: the metamorphic rock of the Clift Hills Division and Old Red Sandstone which forms the eastern portion and the adjacent islands. Fossils can be found in the sandstone, as can outcrops of conglomerate rocks, such as breccia found between Brindister and Quarff, which is made up from river pebbles or scree.

The island of Yell is composed of relatively uniform metasedimentary rock, known as Moine rocks, although the substantial blanket of peat on the island means that detailed geological survey has often not been possible. Originally laid down 1000 million years ago as thick layers of sand and mud in the sea on the edge of the American continent, the rocks were metamorphosed when major plates collided. Heat and pressure welded the grains of sand together to form quartzite and changed the mud to schist containing new minerals such as shiny flakes of mica and deep red grains of garnet.

Geologically, the islands of Unst and Fetlar are divided from north to south into two parts, the western parts being metamorphic rock and the eastern parts serpentine and greenstone. This unusual geology has led to a distinctive landscape of peat free rusty brown crags, flower rich heathland and gravel plants. Minerals such as chromite are contained within the serpentine rocks and chromium was mined in Unst for over a century. The Catpund area has deposits of soapstone and talc, metamorphosed to serpentine from the mineral olivine found in magma. The soapstone has been carved and used since the Norse settlers.

Metamorphic Dalradian rocks under Hermaness show the power of storm driven erosion. The strata slope steeply down eastwards meaning that the force of the Atlantic Ocean can exploit weaknesses creating stacks, geos, caves and skerries as well as the awe-inspiring cliffs found at the most northerly point of Britain.

Hydrothermal veins criss-cross Shetland's rocks where hot water trapped in the crust escaped through fractures and dissolved minerals crystallised in these fractures. Garths Ness contains copper iron sulphide and iron sulphide and was briefly mined in the 19<sup>th</sup> Century. More commercially viable deposits of iron and copper were mined at Sandwick between 1790 and 1929.

2.5-billion-year-old Lewisian gneiss, found in Northmavine, is Shetland's oldest rock - half the age of the Earth itself. Since it first formed it has been metamorphosed - heated, folded and recrystallised - many times by massive earth movements. Lewisian gneiss also occurs on the north-west coast of Scotland and in the Outer Hebrides. Ronas Hill, Shetland's highest summit, is a granite pluton formed from a slow cooling body of magma.

The most important geological feature influencing Shetland in the later 20<sup>th</sup> and 21<sup>st</sup> Century is not on the land at all. The movement of plates which produced the complex geology of Shetland also opened a rift along the North Sea, approximately 300 million years ago. This rift filled with carboniferous marine sediments and produced the North Sea oil fields. Shetland's proximity to this has meant that the largest oil terminal in Europe, Sullom Voe, was built on Mainland. The infrastructure and cargo ships operating from this make it very visible, especially in the dark. The terminal and the oil industry have become a major employer in Shetland bringing demands for modern accommodation, and a significant road-building programme since the mid-1980s.

### ***Glaciation***

Ice has covered Shetland several times over the past two million years. Evidence suggests that Shetland and its surrounding ocean were covered by an independent ice cap between 30,000 to 19,000 years ago. The remnants, centred on Mainland, are thought to have remained until 17,000 years ago. It was never as deeply buried as Scandinavia or mainland Scotland, so it does not display a similar deep carved landscape – rather, the glaciers gently scoured the landscape. As a result there has been a smoothing of relief, giving rise to rounded hills with many of the underlying irregularities now covered by boulder clay. There are many moraine features, and glacial scouring has occurred, producing many hollows, which now form small inland lochs. On at least one occasion, ice from Scandinavia pushed across what is now the North Sea to Shetland, bringing with it glacial erratic boulders that can be traced back to Norway. The Dalsetter Erratic is a well-known example, made from a rock type unique to an area south of Oslo.

During the ice ages, a large amount of water was locked away as ice, making sea levels considerably lower. Only when the ice began to melt some 12,000 years ago did the seas begin to rise. Much of Shetland became a flooded landscape as the lower ends of its valleys drowned beneath the rising waters. Many sea inlets - the "voes" now characteristic of Shetland - were formed. It is possible that 5,500 years ago, sea level was up to nine metres lower than

at present. The rise in sea level may be partly accounted for by the worldwide eustatic rise in sea level, although this is counteracted by the isostatic rebound of the land. It is assumed that rebound would be more limited than in other parts of Scotland where the weight of ice would have been heavier. Thus sea level rise would have taken the then large island of Shetland and transformed it into the current cluster of islands.

The granite block-fields and gravelly terrain (fellfield) on Ronas Hill - Shetland's highest hill at 450 metres - are the result of repeated freezing and thawing which cause the rock slowly to crumble, indicating that the area was likely not covered by ice for the entire glacial periods but likely tundra. Periglacial mass movement and slumping is found on many of the hill slopes of Shetland. This activity may be still occurring to a limited extent.

There is evidence of several tsunamis in the North Sea area, caused by submarine landslips off the coast of Norway. There is suggested to have been at least three episodes where unstable glacial sediments collapsed, and estimates of the size of the generated waves range from 10 metres, as they approached Shetland, up to 25 metres as the waves travelled up the coastal inlets.

### ***Coastal Erosion***

The interaction between geology, glaciation and sea level changes has produced a great diversity of coastal landscapes. The drowned nature of the coast, the supply of glacial sediments and the nature of the geology all interact to produce this variety. There is a remarkable range of depositional features such as spits, bars, sandy beaches and tombolos (spits that connect a mainland with an island), which is exceptional in Britain, juxtaposed with some impressive cliffs.

Due to the proximity of the entire land mass to the ocean, and the exposed location in the stormy Atlantic Ocean, the most recent landscape-changing activity comes from the sea. This shows a marked contrast between the outer and inner coasts of the islands. The outer coasts, especially those facing into the prevailing storms from the west and south-west show distinctive lines of spectacular cliffs that drop into deep sea, some with boulders on top of them, indicating the strength of the wave attack. Caves, stacks, arches and geos are commonplace, with the waves exploiting the jointed nature of the geology. Vegetation is often limited and in some cases stripped. There are few beaches, gravel or boulders at the base of these cliffs, as the forces eroding them are also transporting the debris away. The western coasts of Foula and Hermaness show some of the best examples of this. The Kames on Foula are the second highest sea cliffs in Britain at 376m high, with only the equally exposed St Kilda being higher.

In contrast, inner coasts are shaped by flooding of the low level land by sea level rise. The inlets show sediment accumulation with low cliffs being formed more by erosion of submerged peat deposits than the bedrock. On Whalsay, freshwater peat areas are below sea level and it is estimated that the sea has risen around 9 metres since their formation 6000 to 7000 years ago. Beaches, sandbars and spits are found in these sheltered inner coasts. St. Ninian's Isle is connected to Mainland by 500 metres of sand. This breath-taking coastal feature is the largest active sand tombolo in the British Isles. The sand is subjected to waves from two

opposing directions. It is constantly being eroded by destructive waves and built up by constructive waves loaded with sediment in an ongoing geomorphological process.



*Sea stacks at Hillswick, Shetland. ©Lorne Gill*



*The St.Ninian's Isle tombolo, Shetland.©Lorne Gill/NatureScot*

## **Climate**

### **Present Climate**

Three major factors govern the Shetland climate: the intimate relationship between the land and sea, the open topography and the high latitude.

Shetland has a temperate maritime climate and lies in the track of Atlantic depressions. Although the Islands lie as far north as St Petersburg, Russia and Anchorage, Alaska they are much milder. This mild climate, with higher than average temperatures for latitude 60 is due to the warming effect of North Atlantic Drift (or Gulf Stream).

Rainfall is relatively low, averaging only 1,200 millimetres per annum, which is less than half of the rainfall for the West Highlands of Scotland. However, the number of days with recorded rain is high due to the frequency of light rain or mist – the eastern seaboard is affected by the haar (sea fog), which reduces the effectiveness of the sun.

The most significant feature of Shetland's climate is the constant change and force of the wind – there is a high incidence of strong to gale-force winds. In Lerwick gales occur on an average of 53 days a year, (a gale is defined as a wind speed of over 17.2 metres per second which is maintained for at least ten minutes), and mean wind speeds are 14.5 knots, significantly higher than on the mainland (e.g. Aberdeen 8.8 knots, Aviemore 7.0 and Leuchars 9.4) or other islands such as the Outer Hebrides (Stornoway 11.5 knots).

August has a daily average maximum of about 15°C, cooler than the Scottish mainland, whilst February is the coldest month with a daily average maximum of 5.4°C, Air frost occurs about 15 days per year, which is comparable to coastal areas of Cornwall or Devon.

Due to the northern location of the islands, from mid-May to mid-July Shetland experiences the 'summer dim' where there is almost 19 hours of daylight and the sun barely dips below the horizon. In contrast in midwinter there are fewer than six hours of daylight.

### **Future Climate**

Temperatures in the sea around Shetland have risen due to anthropological climate change and, given its maritime climate, Shetland is particularly affected by this. The rise in temperature has impacts on the food source for seabirds, which are already experiencing population decline. The sight and sound of puffins, kittiwakes, guillemots and other birds is an intrinsic part of the cliff landscape and their absence is notable. There is likely to be an increase in precipitation, winter storms, and an increase in summer temperatures. Sea level rise will also be a significant consideration, especially in the more sheltered and lower parts of the coastline. These climatic and physical changes will be factors in increasing coastal erosion.

## **Soils**

The dominant soil cover is peat on most of the Islands, covering over half the land area and often overlying other deposits. Blanket bog forms in cool wet climates. Constant precipitation with low evaporation tends to leach porous terrain such as glacial till, leading to the production of an iron pan. This podsolisation further helps to waterlog the base-deficient leached soil and create conditions in which sphagnum can begin to carpet the ground. Sphagnum, and the relatively few other plant species that thrive in this habitat, do not rot away after they die;

rather, they build up and eventually form deep layers of peat. Shetland has had peat accumulating at about 1mm a year since the last glaciers, and the peat is 10 metres thick in some areas, though a more common average is 3 – 4 metres. The peat has been utilized for fuel, especially important due to the low amounts of trees on the islands, and drained for agriculture. Its value for carbon storage and sequestration is now becoming more widely understood, as is the need for appropriate management to avoid landslips and flooding.

The main exception to this peat coverage are on Unst and Fetlar, where their serpentine and greenstone geology have meant that mineral gleys cover large parts of the islands.

The central portions of the land masses are covered by peat, with coastal strips covered by boulder clay, or bedrock which is at or near the surface. Boulder clay is also concentrated along inlets and valleys, and there is a notable concentration in north Mainland and in the eastern portions of Unst and Fetlar. Fresh water alluvium is limited in its extent, as there are no major rivers. Strips of calcareous soils follow the central limestone valleys of central Mainland.

Ronas Hill is notable for its immature soils with drifts derived from granites and granitic rocks meaning it has limited vegetation, which includes Arctic–Alpine plants found nowhere else on Shetland, and generally at much higher altitude in other places, such as Alpine Lady’s Mantle and Moss Campion. This is due to the hill’s high exposure.

### ***Hydrology***

Western Mainland demonstrates a disordered, non-directional pattern of watersheds and watercourses with no dominant orientation. In this area there are many waterbodies and small watercourses. This pattern of hydrology results from the modification of the landform by glaciation which has formed a deeply undulating topography. Central Mainland has a strong north-south series of linear watersheds, with the largest watercourses following the same orientation, aligned with the main geological faults. South Mainland has a single dominant watershed running broadly north-south. Watercourses flow perpendicular to this ridge, running east-west. There are no mature river systems as the lower reaches of the rivers have been flooded by sea level rise since the last glacial period. There is submerged peat in many of the long narrow voes as further evidence of this.

Yell shows a north-south trend in its hydrology, though less distinct than elsewhere. Unst has a distinctive structure, with two dominant parallel watersheds running north-south, enclosing a central valley which includes two major waterbodies.

### ***Areas with Common Physical Characteristics***

There are twelve distinct areas with common physical characteristics in Shetland;

#### ***South Mainland upland spine***

Defined by a single coherent upland landform running north-south, this distinct hill mass forms the backbone of the southern portion of Mainland. The west coast of this upland mass is defined by a line of steep slopes and cliffs. To the east and south this range abuts a flatter coastal strip. The solid geology is of metamorphic rock of the Clift Hills Division, distinct from

adjacent metamorphic rocks. The drift cover is of peat with a vegetative cover composed largely of peatland and heather moorland.

The upland spine forms the major watershed for the southern Mainland. Water courses flow perpendicularly to the north-south line of the hills down to the coast. The upland has a massing of hills in its central portion, with smaller groupings to the north and south. The main break in the band of upland occurs as a well-defined valley between the east and west voes of Quarff. To the north the hill mass splits, with Dales Voe slicing into the upland.

There is an isolated area at Fitful Head which falls away dramatically to the west, with a series of steep cliffs meeting the sea. Fitful Head is of the same geological origin and vegetative cover as the main upland spine.

#### *Bressay and South Mainland coast*

This area includes the southern and eastern coastal strips of the southern Mainland and the transitional slopes between the backbone of the hills and the coast. This is characterised by a gently undulating landform, mainly less than 50 metres above sea level. The geology is predominantly of Old Red Sandstone, overlain by large areas of boulder clay and other glacial drifts. There is a concentration of better quality agricultural land with large areas of improved grassland. This area also includes the island of Bressay, which in terms of geology, drift, land capability and landform (apart from a small area of upland) is comparable to the coastal strip.

#### *Central Mainland ridge and valley system*



*Weisdale Voe, Shetland. ©Lorne Gill/NatureScot*

This area demonstrates a strong pattern of north-south ridges and valleys which turn eastward at their northern extreme. This strongly linear landform is formed from metamorphic rocks with bands of metamorphosed limestone which correspond with the north-south valleys. The valleys contain boulder clay drifts and alluvium with better quality agricultural land. The higher land is overlain with peat and the vegetative cover is therefore predominantly heather moorland and blanket bog. The agricultural productivity of the land mirrors the alternate banding of valleys and ridges, and the major watercourses follow the line of the valleys. The strongest valley and ridge pattern occurs centrally, where narrow ridges (the Kames) define the valleys of Weisdale and Petta Dale. This central area is defined to the east and west by broader bands of upland, with a strong linear quality, but with a more broadly undulating topography. The valley of Weisdale supports the only significant plantation of trees in the Shetland Islands. This area includes East and West Burra, which are comparable in terms of geology and also display the same strong north-south linear pattern in the series of voes, headlands and islands.

#### *West Mainland undulating moorland*

Western Mainland has fairly fine-grained undulation (most marked in the north) and limited areas of higher ground. There is no overriding direction to the landform pattern in this area, in contrast to the areas to the east. The area is predominantly made up of Old Red Sandstone with some metamorphic and igneous rock to the north and south. These geological differences have a minor impact on topography or landform. This geology is overlain by peat, with areas of boulder clay and the vegetation therefore consists largely of peat and heather moorland, with some areas of grassland. There are few dominant water-courses, a disorderly pattern of smaller watercourses and a large number of small lochs sitting in this evenly undulating topography. There is a concentration of better quality agricultural land around the inlets of the southern and western coastal strip. The generally undulating landform is more elevated towards the west, with the highest point at Sandness.

#### *Walls Fault System*

This transitional area between the major land masses consists of a narrow band of voes and inlets running north-south separated by narrow strips of coastal land. The coastal strips are undulating with better quality agricultural land, a consequence of the numerous sheltered inlets and soils. The area lies along two parallel fault lines, with a geology of igneous and metamorphic rock distinct from that of adjacent areas. This area includes the inlets of Sullom Voe, Busta Voe, Aith Voe and Sandsound Voe.

#### *Whalsay and East Mainland coast*

This area consists of the eastern portion of central Mainland and a series of islands to the east. It is divided from the ridge and valley pattern of central Mainland by a major fault line. The landform creates a transition from ridges to the west to an undulating form to the east. The geology of metamorphic and igneous rocks is faulted in many places. The landform and landmass are fragmented, and ridges give way to undulation with an irregular coastline of promontories and islands. The islands have a geology similar to that of the adjacent Mainland and represent isolated portions of that land mass. There is a general north-east to south-west orientation to the landform. The area is generally low lying, predominantly below 50 metres above sea level. There is better quality agricultural land on the drift deposits of boulder clay, particularly on the island of Whalsay.

*North Mainland undulating moorland*

This represents two areas separated by the Walls Boundary Fault. Both are areas of igneous rock with an undulating landform, supporting peatland and heather moorland vegetation. The undulating hillocks, small watercourses, many small lochs and vegetative cover of the area to the west of the fault are similar to the west Mainland undulating moorland (Area 4). The geology is of igneous rock as opposed to the Old Red Sandstone which is dominant in west Mainland.

*Northmavine uplands*

This area is dominated by Ronas Hill, which reaches a height of 450 metres above sea level. Most of the area is over 100 metres above sea level. The hills are formed of igneous intrusive rock, with superficial deposits of peat, boulder clay and glacial drifts. The vegetative cover is mainly peatland and heather moorland. The principal characteristic of the area is the extent of upland and the imposing feature of Ronas Hill, the highest point on Shetland. The area has many features in common with west and north Mainland Undulating Moorland (Areas 4 and 7).

*Eshaness and Papa Stour heathland*

Eshaness, on the western extreme of northern Mainland, and the island of Papa Stour, south of St. Magnus Bay, are linked by common geology, topography, landform and vegetation. Both are areas of extrusive rather than intrusive igneous rock and are relatively low-lying and gently undulating with vegetation that includes maritime heathland. Papa Stour's vegetation is dominated by maritime heathland, whereas Eshaness has a mixed cover of maritime grassland with smaller areas of maritime heathland.

*Yell peatlands*

The extent to which this area has been surveyed reveals a structure of metamorphosed sedimentary rock of uniform type, with a band of metamorphosed quartzite forming a ridge of higher ground rising above the otherwise undulating landform. Vegetation is predominantly peatland and heather moorland with sporadic areas of grassland along the coast, related to areas of boulder clay and other glacial drifts.

*Unst and Fetlar ridges*

The western edge of the islands of Unst and Fetlar form a line of sections of higher ground, or ridges, composed of metamorphic rock with a vegetative cover of peatland and heather moorland. The island ridges form distinct watersheds and the associated pattern of watercourses contrasts strongly with those of the adjacent lower lying ground. This change in hydrology is a result of the underlying geology. Unst has a well-defined division with two parallel north-south watersheds.



*Serpentine rocks near Haroldswick, Isle of Unst. ©Lorne Gill/NatureScot*

#### *Unst and Fetlar lowlands*

This represents the eastern portion of the islands of Unst and Fetlar which have an undulating landform of serpentine and greenstone bedrock, with a surface layer of shattered rock and glacial drift. There are areas of improved grassland, good rough grazing land and heathland without peat, resulting from the nature of the underlying rock.

### 3. HUMAN INFLUENCES

#### ***History***

The geographical location of the Shetland Islands has had a major influence on their cultural development. Shetland's location has led to its development as a meeting point between Scotland and Norway. Shetland has strong cultural links with Scandinavia and is closest to the most populous area of Scandinavia, but lies off the least populous part of the British Isles. All the centres from which Shetland has been governed are distant from it, (Bergen, London and Edinburgh). The Islands have always been at the periphery and culture has developed in a distinct manner incorporating aspects from Britain and Scandinavia. Humans have made their mark on the Shetland Islands from prehistoric times to the present day. The purpose of this section is to understand the changing nature of this relationship, and the impact and influence of human activities on the character of the landscape.

#### ***Neolithic: The First Settlers (4,000-2,500 BC)***

There is some evidence that the semi-nomadic groups inhabiting Scotland during the Mesolithic (7,000-4,000 BC) period may have reached Shetland. Middens at West Voe, Sumburgh can be dated to this time. It is possible that evidence has been lost as sea levels have risen as Mesolithic populations were often found close to the coast. By 3,000 BC Neolithic farming communities had established themselves. The first dwellings were probably constructed a little before 3,500 BC. Areas known to have been occupied at this time include sites around Walls and west Burrafirth on west Mainland; Whalsay, South Nesting Bay, Cat Firth on east Mainland; and Mavis Grind, Burra and Sumburgh.

The first settlers are thought to have arrived from Scotland in small groups, bringing with them farming technology. The extensive visible evidence of agriculture and the division of land, still in existence today, suggests a relatively large number of early settlers. These settlers introduced the grazing of animals, rudimentary arable farming, spinning and weaving. Low stone walls divided farmed land and incorporated clearance cairns, whilst large turf and stone dykes partitioned the landscape into irregular areas of about 100 - 200 hectares. This land division suggests a large population which used the land in an organised fashion. The large dykes are still in evidence today and have since been adopted as boundaries between township out-bye grazing lands.

Known settlements were sited near to fresh water, and there may also have been settlements nearer the sea which have since been built upon or submerged by the rise in sea level. It is not clear whether the small groups of 2, 3 or 4 houses typical of prehistoric Shetland represent villages or are remains of a succession of houses, each built following the other. Some of the dwellings were in higher and more exposed locations than more recent settlements, which supports the theory that the climate in this period was milder than today. There is evidence of a greater dependence on crops in this period, which became less reliable as the climate deteriorated in the Bronze Age.

At the time of the first settlers, sea level was considerably lower and the land was covered by low scrubby forest of alder, willow, hazel and birch. Small areas of taller trees would have occupied more sheltered locations. There were no known land mammals. The grazing of animals and clearance of woodland to create arable land for growing barley gradually led to

the creation of a more open treeless landscape. The extent of woodland was progressively reduced through climate change and human activity, particularly the introduction of grazing livestock.

### ***Bronze Age (2,500-800 BC)***

This period saw major changes in the location of settlements and of farming practices as a direct response to the change in the climate. The key feature of this period was climate change which started from about 1,500 BC. The climate deteriorated, becoming wetter and cooler, perhaps as a result of a series of volcanic eruptions in Iceland. With the change in the climate, peat began to accumulate on higher ground, especially where the soil had been exhausted by primitive farming practice. Ultimately this buried the Neolithic farmland and habitations. The upland inhabitants of Shetland were gradually forced down from the hill slopes, to areas around voes and along the coast. In the same period, the sea level rose, inundating large areas of low lying land along the shore, creating the characteristic drowned valleys or 'voes' of Shetland. The area of arable land was reduced and with the colder, wetter climate, crops also became less viable.

The population gradually adapted to the situation, moving downslope, becoming more dependent upon domestic animals, relying less on crops, and beginning to exploit the resources of the sea more fully. As a consequence, population density on coastal lands increased during the Bronze Age. Because of the less hospitable environment, there was less of an inducement for new settlers and the existing inhabitants may well have been openly hostile to newcomers.

### ***Iron Age (800BC – c.400AD)***

Major changes in Shetland continued during the middle of the first Millennium BC. The unenclosed single farms of the Neolithic and early Bronze Age gradually evolved into more nucleated settlements, houses were clustered together, often close to the shore. This change in the pattern of settlements continued the trend from the Bronze Age with the added factor of self-defence. The number of people on the islands gradually increased, while the capacity of the land to support them decreased. It was around this time that brochs and other types of defensible structure developed on easily defended promontories, seemingly for refuge from attack. The largest and best preserved broch is on the island of Mousa.

The Iron Age saw the introduction of a pattern of land use familiar today, with a small settlement nucleus surrounded by well fertilized arable land, with good grazing land on higher ground merging into the moorland. The climate stabilised to support more cereal growing and the sea continued to provide food, especially when harvests were poor. Many of the traces of Iron Age farming have disappeared, erased by the continuous use of land. Settlements were located in a narrow strip between the hills and the sea, carefully chosen to exploit every available facet of the environment for survival. Old Scatness on South Mainland was discovered during the construction of Sumburgh airport's access road and excavation found a 4m high Broch and a village built around it. There were also Pictish (late Iron Age up to 800AD) structures built in this area and a Pictish carving of a bear was found within the village, likely an orthostat (an upright stone or slab) originally. The Pictish buildings contained later Viking soapstone artefacts and the remains of Viking improvements suggesting that the village remained occupied through Viking rule.

Towards the end of the Iron Age, there was increasing contact with other parts of Scotland and perhaps Scandinavia. Little is known about the end of the Iron Age in Shetland and in many respects the way of life is thought to have changed little until medieval times. The native population, composed of the results of various influxes from Neolithic times to the late Iron Age seemingly lived a peaceful agricultural life during the 5th and 6th Centuries AD.

Many religious sites were founded around this period, some in inhospitable locations, which survived the Norse immigration and became the locations of medieval chapels, giving a structure to the pattern of early Christian settlement on the Islands.

### ***Scandinavian Shetland (800 AD – 1,200 AD)***

There were large scale migrations to Shetland from Scandinavian countries over the period 800 AD to 1,200 AD. Most of the settlers in Shetland came from the Norwegian west coast. There is no single or simple explanation for why the migration began, but a critical economic situation in Norway caused by a collapse of the farming system due to poor harvests and a worsening climate have been suggested as possible reasons.

It is likely that Shetland, visited by early raiders, appeared an attractive and familiar landscape. Subsequent colonisation took place on a considerable scale with an estimated 22,000 people inhabiting Shetland toward the end of the period. The preferred settlement sites had easy access to the sea, a patch of fairly fertile land to cultivate for grain as well as pasture for animals. Settlements were established above farmland overlooking the sea, with easy access to hill grazing lands, and superseded the former Iron Age sites. It seems likely that settlements excavated on Unst form part of the initial settlements and now over 50 settlements have been identified there. However the poorer soil meant that they were not long term.

Tingwall became the centre for local government, with documents dating from 1307 relating to meetings there. Law Ting Holm was an islet surrounded by water and accessed by a stone causeway where these meetings would take place. The water in the loch was lowered in the 1850s; the stone seats had already been removed by then, however the causeway is still visible.

As the population increased, the township system of farming evolved. A township consisted of an area of land that was let by the laird to a superior tenant who then sublet to a group of people who were in effect joint tenants of the whole. A hill dyke enclosed the township and separated the lower arable land and improved pasture from the higher unimproved grassland and moorland. Hill dykes were never straight but curved upwards from and back down to the seashore. The foreshore formed the boundary of the township and provided valuable shellfish, seaweed and drift-wood.

Within the better land (known as in-bye) ground was divided by ditches into long strips, or 'rigs'. This was held under a system of run-rig which ensured that each tenant had a share of good and poor quality land. As a consequence, each tenant's land tended to be scattered throughout the township, and the distribution of these parcels within the farm was changed from time to time. Each house was surrounded by a small area of land (the 'toon mal'), used for various purposes, including keeping milking cows for part of the year. There were also meadows within the hill dyke which were divided and sometimes used in rotation. Beyond the

hill dyke were common grazings, or 'scattalds', upon which the farms depended for summer grazing. The hill dyke was usually breached in autumn to allow grazing on the cropped land.

This system of tenure declined when the farms were subdivided to create individual crofts, however, the term 'township' was retained. Agricultural changes were also less complete than on the Scottish mainland, for while most townships ceased to be held and cultivated jointly, many of the hill grazings continued to be used in common or reverted to common use upon being restored to the crofters in the 19<sup>th</sup> century. Some run-rig lasted into the 20<sup>th</sup> Century, as at Brough in Bressay and over 93 scattalds were in existence in 1969.

Many of the Scandinavian settlements have been erased by later settlements on the same sites which have retained the Norse names. Jarlshof in south Mainland was discovered when storms exposed part of a settlement (the name is not historic but refers to Sir Walter Scott's book *The Pirate*). The village shows evidence of late Neolithic houses, Bronze Age houses with souterrains attached, a Broch built in the Iron Age, now partly eroded by the sea, wheelhouses and a 9<sup>th</sup> Century Norse Settlement, including longhouses, barns and byres. Much of this was replaced by a Medieval Farmstead by the 13<sup>th</sup> Century.



*The archaeological site at Jarlshof near Sumburgh. ©Lorne Gill/NatureScot*

St Ninian's Isle has the remains of a 12<sup>th</sup> Century chapel that can be found on the eastern side of the island. An archaeological dig at this ancient chapel site uncovered 8<sup>th</sup> Century Pictish silver objects hidden beneath the chapel floor, which coupled with the Pictish burial practices found in the vicinity suggests that Christianity was introduced from Scotland and not Scandinavia.

### ***Scottish and British Rule***

From the late 15th Century, Shetland was under Scottish administration, after James III married Margaret, the daughter of Christian I of Denmark in 1472. The Danish king had insufficient cash for the dowry so included Orkney and Shetland to make up the shortfall.

The settlement patterns and township farming remained unchanged through this period. However, in the early 15<sup>th</sup> Century sea trade increased as Shetland developed strong links with Germany and Holland, and the economy became tied to the German Hanseatic League. Merchants traded in various commodities, but were mainly interested in buying fish, with demand occasionally outstripping supply. In the 17<sup>th</sup> Century, Lerwick developed as the major administrative centre, due to Bressay Sound providing a sheltered anchorage adjacent to the herring grounds.

By 1700, most Shetlanders who were making a living from the land had become tenants of Scottish landowners. The Hanseatic merchants withdrew due to political and fiscal changes, and the trade with Germany was continued by Scottish merchants. Merchant lairds developed the fishing industries and their tenants were encouraged to crew boats.

A distinctive historic feature of this period survives in the form of lowland-type 'haa' houses built by these merchants and landowners. A key characteristic is their tall form, often two storeys with a hidden attic, which means they can be very prominent forms in the open landscape. The houses of merchant lairds were often sited close to a pier which may have been served by a booth (or bod) for goods and equipment. The houses may also have had associated byres and enclosed fields in the manner of a smallholding. The landowning lairds built larger or extended versions of these houses as seen at Belmont, Unst, and North Haa, Yell. Records show that these houses had thriving gardens with flowers, fruit and vegetables, although only the walled enclosures remain.

The grander houses followed British practice of setting out a designed landscape that was also for pleasure and was laid out to take in views of features of interest. These may have been a distant hill or island, or a structure. Four designed landscapes of this type have been included in the Inventory of Designed Landscapes in Scotland.

These are Lunna House, Gardie House, Bressay, Belmont House, Unst, and Brough Lodge, Fetlar. Whilst these have been included in the Inventory as the best examples of designed landscapes in Shetland the islands contain many other gardens and designed landscapes of interest that may not have been included due to their degraded state. Example of this are Symbister House on Whalsay and Halligarth on Unst. Whilst little horticultural evidence survives at most of them, some of the enclosures contain the few plantations of older trees on the islands.

The change to a crofting system of farming involved the subdivision of townships and consolidation of run-rig into compact blocks. In Shetland, the resulting crofts were usually separate parcels of land, but with the scattald still held in common. Most changes in run-rig came about due to the development of 'haaf' or deep-sea fishing for cod, tusk and ling from the second half of the 18th Century. Haaf-stations were established, such as at Fethaland on north mainland, where crews lived as close as possible to the fishing grounds for the duration of the fishing season in seasonally-roofed structures. Lairds encouraged early marriage to

increase the number of men to crew the 'sixerns' (six-oared open offshore fishing boat), and the population increased from 15,000 in 1755 to 32,000 in 1861. It became necessary to fish to earn an entitlement to a croft. Crofts were subdivided and 'outsets' created on the scattald to provide additional homes. The amount of land under cultivation increased but several families lived on land that had supported one in the 1770s. The arable acreage of some 50,000 acres was insufficient to support a population of over 30,000 and, between 1861-81, one quarter of the population emigrated.

Fishing is the principal reason why crofting remains so evident in Shetland to this day. On the Scottish mainland, the inland areas were cleared of crofts from early on. In coastal areas, labour was needed for intensive kelp harvesting and the coastal population increased as a result. With the collapse of the kelp markets in the early 19th Century, clearance of the coasts began, except in places like Shetland where there remained a need for men to fish. Here there was an incentive for most lairds to maintain crofting through the early 19th Century and clearance was the exception rather than the rule. Some of the lairds did change their emphasis from fish to sheep farming and the common grazings were enclosed by stone dykes and wire fences. The tenants were evicted for sheep grazing as the lairds attempted to establish private property and many Shetlanders emigrated to either mainland Scotland or to Canada, USA, New Zealand and Australia.

The Napier Commission of 1883 established the first official enquiry into crofting conditions. Shetland was designated a Crofting County because of the prevalence of crofting. Crofts were defined as tenanted smallholdings, where the returns met only part of the tenant's needs, and were rented from a landlord, not a superior tenant. Because of the small size of crofts, Shetland came fully within terms of the Crofters' Holdings (Scotland) Act of 1886 which established tenants' civil rights, security of tenure, compensation for improvements, a guaranteed fair rent, and the restoration of the scattald to the crofters. The 1886 Act effectively froze the distribution of land and the sizes of crofts, which have remained to this day. The rate of emigration dropped as a result of the improved outlook for crofters.

In the 1790s summer herring fishing was established outwith the haaf season, and by 1880 herring was of equal importance to the haaf fishing. Shetland underwent an economic and social revolution, with over 300 registered herring boats at the height of the fishing activity in 1884. By 1894 herring fishing accounted for nearly 150 fishing stations. Harbour facilities and a concentration of houses around them developed, particularly at Scalloway, Hamnavoe and Lerwick. Shetland was once again predominantly a marine community.

As part of the maritime industry of Shetland, lighthouses were an essential part of the islands architecture. Sumburgh Head is home to Shetland's first Stevenson lighthouse, built in 1819. Bressay, Out Skerries and Eshaness lighthouses were also built by the Stevenson dynasty. Muckle Flugga, originally North Unst Lighthouse, was built in 1854 and is Britain's most northerly lighthouse. None of the lighthouses are now manned and some operate as tourist accommodation.



*Muckle Flugga from Hermaness National Nature Reserve, Unst, Shetland. ©Lorne Gill/NatureScot*

### ***The 20th Century***

The end of the 19th Century saw an improvement of living conditions, with security of tenure and the implementation of various Public Health Acts by the former Zetland County Council. This period also saw the slow but steady construction of roads to all the main population centres which had always mainly been accessed by boat. Although narrow and unsurfaced, these roads represented a considerable improvement in accessibility within the Islands.

After 1911 herring fishing declined, but the Shetland Islands' strategic position became important to Britain during the First and Second World Wars. In the two decades between the wars, communications with the rest of Britain were improved. However in the 1920s, mains electricity services available throughout mainland Britain were still lacking in Shetland.

During the Second World war Shetland became the destination for Norwegians escaping the Nazi occupation of Norway and a resistance movement, supported by British Special Operations and known as 'the Shetland Bus', operated during this time, mainly from Scalloway.

There were, through this period, minor improvements all over Shetland, but with few new jobs, the population continued to decline and by 1961 there were fewer than 18,000 people in Shetland. The 1960s saw a remarkable economic upswing with a revitalisation of the Islands' traditional industries, aided by government subsidies. The fishing fleet was rebuilt and new processing plants ensured that catches were processed on the Islands, providing much needed employment. There were also changes in agricultural practices. Subsidies for sheep became available and the economy diversified with the expansion of knitwear manufacture.

At the start of the 1970s the downward trend in population was reversed and there was a generally positive view of the Islands' economic future. In 1972 Esso and Shell announced the finding of oil and gas in the east Shetland Basin, and plans were developed for a crude oil loading terminal.

Due to the increase in development pressure and land speculation, the former Zetland County Council and Shetland Islands Council had to react swiftly with the development of planning policies. With regard to oil development it was decided to concentrate activity in one place. Sullom Voe was found to be a suitable strategic location with deep water, an uninhabited hinterland and a disused airfield nearby.

During construction of the terminal there was a peak of about 7,000 construction workers. The sudden influx of people created a demand for new houses, schools and amenities as well as for the widening and improvement of roads. This phase of development was clearly of a different nature, no longer relating to the needs of small rural communities.

The arrival of oil changed the nature of employment and the structure of the local economy. Traditional industries lost staff to the more profitable oil industry. Houses became expensive and the general price level of consumer goods and services rose. There were also some effects on the environment through the spillage of oil causing pollution of the sea and shore and killing wildlife, although the most serious pollution incident, the grounding of the Braer in 1993, was unrelated to the oil terminal at Sullom Voe. The landscape around the Sullom Voe terminal was affected by the infill of Orka Voe and blasting near Mavis Grind for aggregate. Large numbers of incomers (people not born on Shetland) around this time brought about significant social changes. The scattering of new houses among villages reasonably close to the terminal was intended to aid integration.

There has been a general trend toward concentrated settlement since the middle of the 19th century. In 1861, 31,670 people lived on 32 islands. By 2018, 22,990 people lived on 16 them. In the same period the population of Lerwick has increased from 3,000 to 7,500.

### ***Landcover***

Landcover of the Shetland Islands is dominated by peatland, montane and heather moorland, with improved and rough grassland being concentrated along the coastal strip, around voes, inlets and along valleys. Improved grassland and good rough grassland are generally concentrated in the valleys of central Mainland, along the east and south coasts of southern Mainland, along the line of the Walls Boundary Fault and in the eastern portions of the islands of Unst and Fetlar.

The only significant plantations of trees in Shetland occurs in Weisdale valley associated with the Kergord Estate, although small pockets of trees do occur throughout the islands in sheltered locations. Older plantations of this type are generally associated with the policies of historic houses such as Busta.

## **Landuse Agriculture**

Much of the landscape of Shetland is a reflection of past crofting and farming practices and the differentiation between enclosed and unenclosed land. The principal form of agriculture on Shetland is crofting. A typical croft consisting of an area of in-bye with grazing rights on upland areas (out-bye or 'hill land'). The distinction of in-bye land provides a rich mosaic of colour and texture contrasting with the rough grassland and moorland of the out-bye.

Over the last century, sheep rearing has expanded, leading to the apportionment and improvement of moorland and common grazings, the decline in hay production and winter keep crops and the increase in silage production. The increase in the amount of grassland available for sheep pasture has come about through reseeding and fertilisation of moorland. These areas are highly visible and contrast in colour and texture with the heather moorland areas.

At the same time traditional crofting practices have been in decline, the small scale crofts with a mix of arable and grazing land giving way to more extensive sheep grazing. The loss of arable land and improvement of grassland and heather moorland has led to an increasingly uniform pattern of land use and vegetation cover.

During the 1980's and 1990's there was move to higher density of sheep grazing, due in part to per head subsidies by the EU. This hit a peak in the early 1990's at over 390,000 but has since declined to around 280,000 and has remained fairly stable over the past decade.

Traditional grazing animals such as the Shetland sheep, cattle and pony breeds have either evolved from livestock brought with Neolithic settlers or from grazing animals crossing from Europe during the ice ages. These were hardy and small as a reflection of the poor nutrition and fairly indiscriminate meaning that they did not only graze the softer vegetation. These breeds, although well suited to the environment, are less well suited to the modern market so larger and more productive breeds have been introduced over the past 200 years. Introduced larger breeds have reduced the plant diversity due to their preferential grazing.

Cattle numbers have declined by a third since 1971 from 6945 in 1971 to 4500 in 2017. The dairy industry is almost entirely local supply, reducing the need for importing dairy products from the mainland. The native Shetland sheep is small but reared for both meat and wool and cross breeds are now also reared for the mainland meat market

The Shetland Islands were designated an Environmentally Sensitive Area by the Scottish Office Agriculture and Fisheries Department (SOAFD) under the Agricultural Act, 1986. This was recognition of the fact that the maintenance and enhancement of the wildlife and landscape interest of Shetland is dependent on the continuation of appropriate farming and crofting practices. The mechanisms for supporting Shetland's agriculture and the level of recognition for the importance of the relationship between the environment and agriculture have changed over the decades. The ESA was not revoked but the mechanisms for farming support has changed radically. Since the early days of farm subsidies the attention has shifted from high stock levels to more sustainable management, a focus on diversification in many instances, especially through the Rural Development Fund, and subsidies focussed on climate change as well as local habitats, landscapes and biodiversity.

### ***Gas and Oil***

The main influence of the oil industry on Shetland's landscapes is evident at Sullom Voe and around Sumburgh and Lerwick, all on Mainland. Sullom Voe is the largest oil terminal in Europe, on a site of approximately 400 hectares, and the flare stacks and lighting are highly visible at night. The alignment of underground pipelines leading to the terminal can be identified in many places by the brighter green grass species and the location of marker poles. It is adjacent to the Shetland Gas Plant, covering another 78 hectares. The oil and gas industry has also had an indirect impact on the landscape of Shetland through infrastructure development of community buildings and transport routes such as road improvements.

### ***Renewable energy***

Shetland's high winds have proven attractive to large scale wind farm development, and there are projects approved for development, such as the large Viking development across much of the northern part of Mainland, as well as a five turbine scheme at Ward Grimsetter on Yell. However, this is hampered by the requirement for interconnector cables from Shetland to the mainland. Large scale projects need to consider the landscape carefully to ensure that the turbines do not dwarf the scale of the hills and features across the island. Due to the low lying nature of the island visibility can be long reaching, having an impact on the experience of the place.

There are still opportunities for local renewable energy projects, mainly on- or off-shore wind, and wave or tidal schemes, to produce energy for domestic consumption which would reduce the need for the diesel power plant that currently provides the energy for Shetland, but which is due to cease operations by 2025. Single domestic turbines are common, especially on the smaller islands and in areas where the mains electricity does not reach.

There are a number of small run-of-river hydroelectric schemes on across the islands. These are mostly used to provide energy for single or clusters of remote rural dwellings. The hydrology of the islands is not suitable for larger schemes.

### ***Aggregate extraction***

Extraction of rock and aggregates can have significant effects on the landscape, including the coastline. The principal quarries on the islands are at Scalloway and at Brindister a few miles south of Lerwick. The Brindister workings, which provide high quality material for export, are well screened from the A970 although the cleaning and outwash plant is rather more visible. In contrast, the Scalloway site is highly visible and will require considerable reinstatement at some stage.

In addition to the major sites, a number of smaller quarries and borrow pits are to be found throughout the islands. Some of these quarries have been designated as geological Sites of Special Scientific Interest (SSSIs) either prior to work starting or due to features being exposed as work has progressed.

### ***Peat extraction***

Deep peat deposits cover one third of Shetland, where there is an estimated 56,000 hectares of blanket and peat bog. Exploiting these for domestic heating is a long tradition. Although

peat-cutting is not a sustainable activity, small scale removal for domestic purposes has minimal landscape effects when traditional methods of hand cutting are used and restoration (by replacing the top turves) is done with care. Peat cutting for domestic use has seen a recent revival due to the high price of other domestic fuels and occurs across the islands. Large amounts of land are under crofting tenure which allows crofters to win peat on their own lands or to exercise a 'peat right' on the common grazings. Some peat banks are rented. Extensive sheep grazing is the cause of much erosion with overgrazing, trampling and sheep-sheltering in the lee of peat hags opening up areas to further wind-erosion and loss of/changes in vegetation.

In the past there was commercial peat extraction (Lerwick, Parkhall, Mid Yell and Gutcher). This still continues at Cunningsburgh and there is interest in extending this. Depending on the method used, mechanized peat cutting can have a significant impact as heavy vehicles damage the vegetative cover, and extraction methods can leave bare and unstable surface layers so that natural vegetation cannot re-establish itself. Nowadays, commercial extraction is limited by environmental constraints and high transportation costs. Yell has the largest peat deposits in Shetland and peat is still extracted there, but for the home market.

62,000ha of blanket bog is under designation equalling 11% of the total resource. Recognition of the importance for good condition peat land, not only for biodiversity, but also for the carbon storage, is growing. It is estimated that peatbog is three times more effective than rainforest in storing carbon and there are a number of peat bog restoration projects being undertaken across the islands.

## ***Fishing and aquaculture***

### ***Fishing***

Traditionally, a Shetlander is said to be a 'fisherman with a croft', while an Orcadian is a 'crofter with a boat'. Fishing is Shetland's biggest industry sector by some way, and it is the second most important landing port in Scotland, and in the UK, in terms of both the weight and value of landings. More fish and shellfish were landed in Shetland in 2014 than any other port in the UK, apart from Peterhead. In 2017 Shetland boats landed 123,000 tons of fish and shellfish, worth £82 million. This is a quarter of the total fish landed in Scotland. When landings by non-Shetland boats in the isles are included, the total turnover was £155 million.

There are more than 170 commercial fishing vessels, the majority locally owned and operated by members of the Shetland Fish Producers Organisation. Whitefish processing is largely based at Scalloway, Lerwick, Burra, Northmavine and Whalsay. Support facilities and buildings accommodate related activities on land.

The North Atlantic Fisheries College (NAFC) Marine Centre is an educational and scientific institute, located in Scalloway in Shetland. The Centre delivers training and education, carries out research and development, and provides consultancy, advisory and other services for the maritime industries. The Centre is operated by a charitable trust (the Shetland Fisheries Training Centre Trust).

### **Aquaculture**

Aquaculture has become an important activity in the Islands, diversifying and sustaining Shetland's economy. Most fish farms are located in the voes along the west coast of the Shetland Mainland and around Burra. Isolated farms exist in other locations, notably the north-east Shetland Mainland and as far north as Yell, Unst and Out Skerries.

Mussel farming in Shetland produced almost  $\frac{3}{4}$  of the UK's mussels in 2016. It is a valuable local industry, using thick long ropes in deeper voes to grow mussels clinging down them.

Fish farms introduce man-made structures (cages and sometimes feed barges) into the sea and inland waters of Shetland where traditionally no structures have occurred. This can affect landscape character and experience of the landscape. Fish farms are also associated with land-based facilities such as new piers, ancillary buildings and access roads.



*Fish farm and mussel farm in Busta Voe, Brae. ©Glen Tyler*

### **Tourism and recreation**

Tourism has become an important industry in Shetland, although numbers are lower than for the other Scottish island groups, and substantially lower than on the Scottish mainland. The key reasons for visiting the islands were the scenery and landscape and the history and culture. Cruise ships have become a regular sight and in 2019 115 cruise liners arrived with more than 90,000 passengers disembarking at Lerwick. These passengers have much shorter stays than other visitors and visit a much more limited array of sights. It can lead to the main ports seeming empty after the ships departure with the sudden decrease in numbers of people in the towns, villages and at tourist destinations.

### **Roads**

During the 20th Century, the balance of travel changed from sea to overland on metalled roads, with the most significant development occurring in support of the oil industry and later through EU funding. A two-lane road runs from Sumburgh to Yell and Unst. This road runs through the centre of the islands, missing out settlements so travelling along it can overstate the moorland and uninhabited nature of the islands.



*A cruise ship and the Northlink Ferry, Lerwick Harbour, Shetland. © Lorne Gill.*

The engineering works associated with road building and improvement can have a considerable impact on the character of the landscape. In recent years, many characteristic single track roads have been up-graded, resulting in new alignments (often less related to landform), with embankments and cuttings. There is evidence of erosion of many roadside cuttings. More recent projects have benefited from ground stabilisation and planting at the edge of the road.

### **Airports**

There are 3 airports on Mainland (although Scatsta has recently been marked for closure and Tingwall is occasionally also proposed for closure). Foula, Fair Isle and Papa Stour also have small airports. The main airport at Sumburgh is distinctive from the air due to the airstrip spanning the width of the tombolo behind sand dunes. It is considered to be in a vulnerable position for flooding due to its coastal location and low altitude, especially with sea level rise and increased storm surges as the climate changes.

### **Communications and infrastructure**

The Shetland landscape, particularly the upland spine running north south along Mainland, contains a number of communication and early warning stations dating from the Second World War and through the latter half of the 20<sup>th</sup> Century. A number of these, including the early radar stations, are recognised as being of national importance and are designated as scheduled monuments.

### **Settlement**

Since the climatic changes of the Bronze Age, patterns of settlement and land use have remained remarkably constant. This continuity is due at least in part to the effectiveness of these cultures in using the opportunities of land and sea. Settlements exploit the most productive land on the lower slopes of sheltered coasts and voes, and benefit from access to both hills for grazing and the sea for fishing and transport. Sea based trade and transport has, since the 15<sup>th</sup> Century, led to the concentration of settlement and activity around harbour facilities in a few key areas such as Lerwick and Scalloway.

Traditional croft style has remained constant with low stone buildings with stone walls. Harl (a roughcast wall finish) is common in many areas to protect the stone. Traditionally, crofts also contained clusters of smaller barns and byres and planticrubs. Planticrubs, or plantiecrö, are drystone walled gardens or enclosures built to grow cabbages and kale, sheltered from the wind and protected from grazing. These structures were generally built in sheltered hollows or valleys to protect from the wind; however in areas with more limited fertile ground the houses may be built on the more exposed and rock ground to maximise agricultural use. Remnants of larger enclosures which were built to house sheep or cattle can be seen across Shetland. Along with planticrubs, these enclosures are a distinctive feature of the historic landscape across the islands. Many crofts now lie unused indicating the shift of population to settlements.

Modern rural housing tends to be made in a modular system and utilises a range of colours, such as those found in Scandinavian settlements. These are now common and buildings aligned with the key views are more common now that modern insulation and glazing mean better protection from the wind. Many houses and crofts have a modern version of the planticrub called the polycrub: these are rigid polytunnels designed to withstand the wind and provide fresh food. They are manufactured on the island using discarded piping from the aquaculture industry and are a common sight in a number of sizes from single dwelling size to large community versions.

Traditional settlements exhibit a layout and pattern of land use closely related to the landscape, and were located in the most advantageous locations. This led to the character of the landscape reflecting successive layers of activity, the artefacts of earlier practices being integrated into the current land uses. The main settlements are all positioned around the coast and generally have a harbour as their focus.

Lerwick is the largest settlement in Shetland, clustered around a harbour and a massive 17<sup>th</sup> Century artillery fortification known as Fort Charlotte that was built in a period of tension to help control key shipping lanes between the Baltic and North sea and the European colonies in America and the Far East. The historic centre is closely built and the houses modest in size. Expansion occurred from the 19<sup>th</sup> Century onwards and villas and municipal buildings, funded by sea trade and fishing grew from the original harbour settlement referred to as the Lanes

area. Lerwick continues to grow with industrial areas, the power station and a modern harbour now distinctive parts of the north side of the town. Modern housing stretches up onto the slopes around the town. This housing tends to be modular and contemporary in form. All the component parts are imported and stone is rarely used in these developments. Fishing and merchant ships from many nations call at Lerwick and give the town a cosmopolitan air. There has been a consistently strong international influence on this relatively small and remote population.

New settlement does not necessarily have a functional relationship with the landscape and is intended to meet the demands of a different lifestyle. Such settlements can consequently appear to sit less well in the context of areas whose character is a result of a close and long-lived relationship between human activity and the landscape.

Over recent years, there has been an increase in the construction of new houses with the greatest development pressure on the Mainland. In some instances, notably south of Lerwick, the density of development in traditional crofting areas has reached a level where the character of the landscape has been reduced or lost. Whilst good planning practice in Scotland generally presumes in favour of grouping new development (particularly next to existing settlements) to follow traditional practice, the scattered nature of historic crofts has resulted in a similar approach to new-build sites in Shetland in the post-war period.

In smaller settlements a number of large recreation, community and industrial buildings has been provided in recent years. Again these tend to follow a modern modular pattern and are often brightly coloured. Their importance in providing jobs and facilities in remoter areas is essential to stem population loss but their scale and shape often contrasts with the local vernacular.

## 4. CULTURAL INFLUENCES

There is a long-established relationship between the Shetland landscape, the sea and climate and the pattern of settlement and lifestyle of its inhabitants. To properly understand the landscapes of Shetland, it is essential to consider both the land and sea. Until the 20<sup>th</sup> Century the sea represented the principal highway for travel. For the Shetlander the boat had the cultural and practical significance of the landsman's horse and cart. Every croft required a secure 'noost' (usually a hollow at the edge of a beach where a boat is drawn up). Sea based trade and transport has, since the 15<sup>th</sup> Century, led to the concentration of settlement and activity around harbour facilities in a few key areas such as Lerwick and Scalloway.

### **Place names**

The modern Shetland dialect shares much with other branches of Scots, though the legacy of Norwegian is obvious still in place-names, vocabulary, expressions and pronunciation.

The Norn language, developed from Shetland's centuries of Norwegian settlement and culture, was the administrative language until the 16<sup>th</sup> Century and was spoken until the 18<sup>th</sup> century by which point it had been replaced by Scots. Shetland Scots is a distinctive dialect of Scots which is still used within the islands although not widely spoken in recent years.

There is a vast, complex, body of words deriving from Old Norse that are highly descriptive of natural and human landscape features. The Shetland Place Names project is recording all names from oral as well as written sources; these are informative about how humans have interacted with the landscape and environment. They contribute to Shetland's distinctiveness and some understanding of them can assist in our understanding of land-use and the importance of features – for example, names relating to fishing grounds, coastal names and features. One of the main impacts of Shetland Scots is on the pronunciation with a "th" often replaced by a "d".

From about 800 AD Norse settlers applied descriptive names to the landscape and about 95% of the place names in Shetland have their roots in Old Norse. An understanding of some of the basic place name elements can give an insight into the history and geography of place. Lerwick means "the bay of clay", *vik* meaning bay or inlet referring to the gleys found in that area. -A or -ay refers to an island, for example Whalsay is "the whale isle", likely referring to its shape. *Ham* or *hamna* is a haven or harbour, e.g. Hamister refers to "the dwellings (bister) by the harbour", and Hamnavoe is "the harbour in the sheltered bay". The coastal references are widespread - a *geo* is a coastal ravine, -*ness* means promontory, and *wick* (bay), *firth* and *voe* (sheltered bay) are all especially common. Inland, *dale* refers to valleys, and *vord*, *ward* and *wart* are corruptions of Old Norse indicating a cairn. Other names refer to the farms - *setter*, -*sta* or -*step* (as in Swinster) so Fladdabister means "flat farm", and Houser means "high farm". *Ting* stems from the Old Norse for parliament, thus Tingaholm refers to the small island where the lawthing (parliament) met until the 16<sup>th</sup> Century. A similar name is Dingwall in Ross and Cromarty. Landscape colours include *svatr*, black, and *hvita*, white, give names such as Hwita Skerry.

### **Art and literature**

The Shetland landscape is a source of inspiration for visual art, literature and storytelling. Most visitors to the islands will have only encountered the landscape and culture through literature

and television before visiting. TV programmes such as the “Shetland” detective series, “Coast” and “An Island Parish” have provided an insight into the landscapes of Shetland and attracted tourists to the area. A visitors’ survey in 2017 found that 20% of overseas visitors overall mentioned being inspired by watching a TV programme and 23% were inspired by a book about Shetland.

There is little literature recorded about the islands before the start of the 19<sup>th</sup> Century. Margaret Chalmers, Dorothea Primrose Campbell and Thomas Irvine were poets and writers who wrote about the places and people of Shetland. Chalmers wrote the “Rose of the Roack” about a trip to Noss in 1813. Sir Walter Scott wrote his novel “The Pirate” (1822) about Shetland and Orkney, and introduced the idea of the northern isles being culturally Norse more widely. However, his novel based on fleeting visits and referred little to the landscapes.

Later in the 19<sup>th</sup> Century writers proliferated, especially those writing in the Shetland dialect but this petered out by the First World War and the resulting movement of people. In the 1930’s Hugh MacDiarmid was writing poetry and prose on Whalsay, much of it about the places and people of his adopted home. Christopher Mylne was a mid-century film maker, who lived on Foula, writing “Foula The Times of My Life” about the experience of becoming the schoolmaster in the 1950’s.

More recently Anne Cleeves’ “Shetland” series, a series of crime drama books, also now televised, has brought Shetland into popular literature.

### **Music**

Folk music thrived in Shetland through the centuries, inspired by sea faring shanties, oral folk tales and the dark winters. Shetland music has always been at the crossroads of two cultures, influenced by Scandinavian music and the Celtic music of the British Isles.

One of the biggest influences on Shetland music was the hardanger fiddle, a type of violin introduced to Norway in the 16<sup>th</sup> Century. The hardanger has five strings more than the standard violin, which resonate when the melody is played on the upper strings. The practice of letting adjacent strings ring open in Shetland music comes from the hardanger’s influence.

The violin is the most important instrument in traditional music of Shetland. The music is a mixture of Scandinavian folk music, songs and dance music of Scotland, and tunes brought by sailors from Ireland, North America, Germany and Greenland. Many of the tunes are modal, with a syncopated rhythm, often with “extra” notes or beats; an influence of Scandinavian music, rare in Irish or Scottish music.

The tradition continues to thrive, with the events like the Shetland Folk Festival and Shetland Fiddle Frenzy, as well informal music sessions in pubs and community halls, although some of this has been formalised for the tourist trade. Well known contemporary musicians such as fiddle player Aly Bain, and the group Fiddler’s Bid also continue to perform and write tunes inspired by Shetland’s landscapes, seascapes and starry clear skies.

### **Natural Heritage Values**

The importance of Shetland's environment has been recognised through a wealth of designations. These policies are designed to identify, conserve and protect the aspects of Shetland's environment which are of local, national and international importance.

National Scenic Areas (NSAs) are areas of exceptional landscape value. Shetland has one NSA which covers seven of the finest sections of coastline. These separate areas lie in the south-west and northern extremities of the archipelago and include Fair Isle, Foula, the western edge of Dunrossness and the Deeps, part of Muckle Roe, Eshaness, Uyea Isle and Fethaland and Hermaness.

Shetland has two National Nature Reserves which are outstanding sites for nature conservation and attract a large number of visitors. Hermaness on Unst and Noss to the east of Lerwick host two of Britain's largest seabird colonies with thousands of gannets, puffins, guillemots, kittiwakes and skuas. NatureScot operates a third nature reserve, the Keen of Hamar on Unst, colonised by rare plants and with an unusual serpentine debris geology

Over 70 Sites of Special Scientific Interest (SSSIs) in Shetland have been designated as part of a national network to represent the most important examples of habitats and geological features. Shetland's environment also benefits from protection under European legislation, including Special Areas of Conservation and Special Protection Areas (SPAs). There are also Marine Protected Areas. There are a number of Ramsar sites, designated for their wetlands of international significance, especially to birds.



*The Isle of Noss National Nature Reserve, Shetland. ©Lorne Gill/NatureScot*

The archipelago is also designated as a Geopark, a UNESCO designation for areas with internationally important rocks and landscapes. It has a strong focus on using its protection as an economic boost for the area.

Complementing the national and international designations there are Local Nature Conservation sites. These cover notable habitats, geology and species. They include five Tree Preservation Orders, two each in Lerwick and Scalloway, and one at Veensgarth, Tingwall.

#### *Built Environment and Heritage Designations*

The built environment and heritage features are protected through a number of designations by Historic Environment Scotland and SIC. There are three designated Conservation Areas in Shetland: two in Lerwick and one in Scalloway.

There are approximately 8,000 archaeological sites and monuments, architectural objects and marine sites, of which just under 400 of the most important are designated. Some are in state care: Stanydale, Clickimin, Ness of Burgi, Mousa Broch, Muness Castle, Scalloway Castle and Fort Charlotte. There are also two protected wreck sites, Kennermerland and Wrangles Palais off Out Skerries. These are designated a Historic Marine Protected Area.

There are four sites in Shetland included in the Inventory of Gardens and Designed Landscapes, compiled by Historic Environment Scotland: Belmont House, Unst; Brough Lodge, Fetlar; Gardie House, Bressay; and Lunna House, Lunnasting.