

## **DEPARTMENT OF THE ENVIRONMENT**

### **DECLARATION OF AREA OF SPECIAL SCIENTIFIC INTEREST AT GIANT'S CAUSEWAY AND DUNSEVERICK, COUNTY ANTRIM. ARTICLE 24 OF THE NATURE CONSERVATION AND AMENITY LANDS (NORTHERN IRELAND) ORDER 1985.**

The Department of the Environment (the Department), having consulted the Council for Nature Conservation and the Countryside and being satisfied that the area described and delineated on the attached map (the area) is of special scientific interest by reason of the flora, fauna, geological and physiographical features and accordingly needs to be specially protected, hereby declares the area to be an area of special scientific interest to be known as the 'Giant's Causeway and Dunseverick Area of Special Scientific Interest'.

The Giant's Causeway is Northern Ireland's most renowned geological locality and is one of the few geological sites in Ireland with a truly international reputation. Its importance relates to its historical role in early debates on the origin of, what are now recognised as, igneous rocks. The site includes many of the main features of the Antrim Lava Group, particularly the spectacular columnar basalts of the Causeway Member itself.

Around 60 million years ago, the northward extension of the Atlantic Ocean was accompanied by crustal fractures tapping basaltic magma from the upper mantle in the area of Northern Ireland, Western Scotland and Greenland. All three of the main eruption series are represented within the Causeway area, being the Lower, Interbasaltic and Upper Basalt Formations.

The Causeway itself became internationally renowned and held an important position in the advancement of the concepts of volcanology in the late 18th and early 19th centuries. The role of a series of etchings produced from the water colours of Susanna Drury cannot be overstated, making it one of the best known geological localities in the world at that time. Indeed the site is as much a cultural phenomena as it is a scientific one.

The Lower Basalts are best observed at sea-level in the area of the Great Stookan and eastwards, where they underlie the Causeway Formation. These flows exhibit good examples of spheroidal weathering and typical flow junctions.

An apparent lava tube can be seen in the Lower Basalt near Portmoon, resting on the rock platform. It appears to be the relict of a roll or rod like structure about 9m. in diameter which probably represents a lava feeder conduit that has remained full of lava. This lava would subsequently have solidified. Partial erosion of the surrounding basalt has left this finer grained feature isolated. Unusually, while structures of this type are often widespread in basalt systems, this remarkable feature is the only convincing example of a lava tube among the Antrim Basalts.

The period of volcanic quiescence at the end of the first cycle of volcanism in Antrim is marked by the development of thick red laterite beds, represented here by the Port na Spaniagh Member of the Interbasaltic Formation. This period was long enough to allow the development of extensive river valleys by erosion, and a vegetation cover as evidenced by pockets of lignite found on the interbasaltic surface. At Port Noffer the relict structures of the weathered Lower Basalt can be seen, including large rounded residual masses of partially weathered basalt known as the Giant's Eyes. Evidence of past working of the iron and bauxite rich laterites can be seen near Portmoon.

This dormant phase was interrupted by the eruption of the Causeway Tholeiite lavas. The first flow buried the lateritized Lower Basalt surface, and where river valleys or other depressions had existed on this landscape, the lava was ponded to greater depths than normal. One such valley was at the Giant's Causeway, where the first flow is almost 100m. thick. The cooling of this thick body of very homogeneous lava flow led to the formation of a complex set of cooling points, forming spectacular and often very regular columns.

These columnar structures were first described in classical architectural terms at the Causeway, a system, although modified, now applied worldwide. Individual flows were partitioned into a colonnade for the lower, wide and very regular columns, and entablature for the upper zone of narrower, more irregular and often curved columns. That the first flow encountered standing water in places on the Lower Basalt surface, is indicated by the presence of hyaloclastite flow foot breccias in a number of localities, notably at Port na Callan. The Causeway area is one of a number of sites worldwide, being reassessed to determine the role of water in the development of columnar basalts.

Dykes cutting through Lower and Causeway Basalts can be seen in a number of localities along the foreshore. The most notable are the Camel Dyke in Portnaboe and a dyke in Port Reaston which traverse the Lower Basalts, laterite and Causeway Tholeiite flow. These dykes may represent feeders carrying later phase erupting lavas toward the surface.

A discrete flow unit of unusual composition and texture occurs among the Causeway Tholeiitic Basalts at Dunseverick. This is the only example of an intermediate or late differentiate basalt from the Causeway series. An andesitic flow unit some 2 m. thick is enclosed within a normal tholeiitic basalt. The lower contact is planar and shows no special features, suggesting a chilled contact. The upper contact however provides good evidence of a liquid-liquid interface, that is, the andesite was still liquid within the host tholeiite. Slow crystallisation by the andesite would be expected due to the absence of crystal nuclei. Subsequent crystallisation of the andesitic lava would be delayed as the host lava would have to cool down first.

While the second, upper, interbasaltic horizon is not present within the site, the succeeding Upper Basalt Formation is present in the Portbradden area, brought down to the level of the Causeway Basalt by faulting. It is of interest in that some aspects of its geochemical composition are more similar to the Causeway Formation than it is to the Lower Basalt. This is in contrast to the bulk chemistry, which might indicate commonality with the latter. This suggests that the Causeway and Upper Basalt are part of the same eruptive cycle and discrete from that of the Lower series.

The cliffs and screes of the Causeway area are one of the best sites in Northern Ireland for zeolite minerals. As early as 1858 the mineralogical importance of this site was recognised. The only recorded occurrence in Northern Ireland of the zeolite mineral paulingite comes from Portnaboe, below Weir's Snout. A zonal arrangement of zeolites through a single lava flow can be demonstrated at Benanouran Head near Port na Spaniagh.

The eastern end of the site contains a range of features attributable to raised sea levels. These include isolated sea stacks, the arch at Portbradden and stranded cliff-lines, particularly in the Dunseverick area. The Dunseverick River also exhibits some interesting elements towards its mouth where a series of cascades appear to relate to former beach levels, the river not yet having re-graded to the lower, modern, sea-level.

The Causeway area is notable for its maritime cliff plant communities. The diversity of these habitats and associated floristic communities are influenced by exposure to marine conditions and sea spray, soil depth, aspect, slope and degree of water-logging, together with past and present management practices, particularly grazing regimes.

Saltmarsh is restricted to the more sheltered bays, occurring both in perched and inundation situations, the former maintained by sea spray. Invariably dominated by Saltmarsh Rush *Juncus gerardii*, other typical species include Common Scurvygrass *Cochlearia officinalis* and Sea Sandwort *Honckenya peploides* with patches of Sea Club-rush *Bolboschoenus maritimus*. Inland there is generally a fen or swamp community, the former typically with Common Sedge *Carex nigra* and Silverweed *Potentilla anserina*, the latter dominated by Common Reed *Phragmites australis*. Unusually, Black Bog-rush *Schoenus nigricans* can be present through both the saltmarsh and mire communities, where strong flushing exerts an influence down slope to the shore. Notable shoreline species include Oysterplant *Mertensia maritima* and Saltmarsh Flat-sedge *Blysmus rufus* while Scots Lovage *Ligusticum scoticum*, although sparsely present throughout the site, is more frequent along the shore.

Scree is widespread varying from species impoverished block fields, to more diverse types comprised of smaller grade rock. The damper, more sheltered areas support Great Wood-rush *Luzula sylvatica* and Wood Avens *Geum urbanum*, while Cat's-ear *Hypochaeris radicata*, English Stonecrop *Sedum anglicum* and Herb Robert *Geranium robertianum* are present where the scree is drier together with occasional pockets of heath. The locally distributed Crested Hair-grass *Koeleria macrantha* is also recorded for some of these areas.

The main slopes vary considerably. The sheltered areas support False Oat-grass *Arrhenatherum elatius* grassland with high cover of Red Fescue *Festuca rubra*. Damper areas often have Meadowsweet *Filipendula ulmaria* present, with Wild Angelica *Angelica sylvatica*. A high proportion of these slopes are dominated by Bracken *Pteridium aquilinum* and Bramble *Rubus fruticosus* agg. Deeper soils in sheltered, warmer locations, are generally accompanied by a more varied grass sward, comprising Cock's-foot *Dactylis glomerata*, False Brome *Brachypodium sylvaticum*, Sweet Vernal-grass *Anthoxanthum odoratum*, Yorkshire-fog *Holcus lanatus* and Red Fescue *Festuca rubra*. Where this occurs at the cliff top, Creeping Willow *Salix repens* can become locally abundant in damp hollows, associated with a sedge-rich sward. Conversely, thinner soils and associated drier conditions support Red Fescue *Festuca rubra*, Lady's Bedstraw *Galium verum* and Kidney Vetch *Anthyllis vulneraria*.

More exposed and steeper slopes are again dominated by Red Fescue *Festuca rubra*, with Primrose *Primula vulgaris*, Common Dog-violet *Viola riviniana*, Harebell *Campanula rotundifolia* and Ribwort Plantain *Plantago lanceolata* all common. Local flushing allows the bog moss *Sphagnum capillifolium* to flourish together with Devil's-bit Scabious *Succisa pratensis* and elements of wet heath. Wilson's Filmy-fern *Hymenophyllum wilsonii* has been recorded from this habitat. With thinner soils, the communities become more diverse, grading into cliff and ledge types. Grassland dominated by Red Fescue *Festuca rubra*, Sea Plantain *Plantago maritima* and Thrift *Armeria maritima* is widespread, while ledges, often guano enriched, frequently support additional species such as Hogweed *Heracleum sphondylium*, Sea Aster *Aster tripolium*, Sea Mayweed *Tripleurospermum maritimum*, Sea Beet *Beta vulgaris* ssp. *maritima* and Sea Champion *Silene uniflora*. Areas of near-vertical cliff, usually more sheltered, tend to be very species-rich and include Glaucous Sedge *Carex flacca*, Lady's Bedstraw *Galium verum*, Wild Thyme *Thymus polytrichus* and Purging Flax *Linum catharticum* together with the ubiquitous Red Fescue *Festuca rubra*. Notable species recorded from cliff communities include Thyme Broomrape *Orobanche alba*, Hare's-foot Clover *Trifolium arvense*, Zigzag Clover *Trifolium medium*, Common Cornsalad *Valerianella locusta* and Juniper *Juniperus communis*.

Dry heath is found along some of the cliff tops, associated with poorly developed soils and the shrub component is frequently wind-pruned. Common species include Heather *Calluna vulgaris*, Bell Heather *Erica cinerea*, Tormentil *Potentilla erecta* and the moss *Hypnum jutlandicum* with Mountain Everlasting *Antennaria dioica* frequent in places. Spring Squill *Scilla verna* is a common associate on thin soils.

Wet heath is quite widespread in the area generally and is often heavily grazed. Typically, it is comprised of Cross-leaved Heath *Erica tetralix*, Common Cottongrass *Eriophorum angustifolium*, Deergrass *Trichophorum caespitosum* and the moss *Racomitrium lanuginosum*. Areas of standing water support Bogbean *Menyanthes trifoliata* in the pools. At Aird, heavy grazing has allowed flush expansion by poaching and erosion of the shallow peat soil. Complex communities include residual wet heath where the peat is intact while the broad flushes support Carnation Sedge *Carex panicea*, Tawny Sedge *C. hostiana*, Star Sedge *C. echinata*, Meadow Thistle *Cirsium dissectum*, Bog Pimpernel *Anagallis tenella*, Devil's-bit Scabious *Succisa pratensis* and Purple Moor-grass *Molinia caerulea*. Strongly flushed

zones have Dioecious Sedge *Carex dioica*, Few-flowered Spike Rush *Eleocharis quinqueflora* and Many-flowered Spike Rush *Eleocharis multicaulis* present. Some wet flushes are dominated by Black Bog-rush *Schoenus nigricans*.

A series of raised beach stacks and knolls to the east of the site support very different grasslands, probably as a result of their more open aspect and grazing regime, compared to the main Causeway Coast. Species-rich grassland with Crested Dog's-tail *Cynosurus cristatus*, Black Knapweed *Centaurea nigra* and Bird's-foot Trefoil *Lotus corniculatus* dominate the slopes. Knoll tops are more freely draining and have a more acid grassland type with Heath Bedstraw *Galium saxatile* and Sheep's-fescue *Festuca ovina* widespread. Areas with skeletal soils can be exceptionally species-rich with Sheep's-fescue *Festuca ovina*, Wild Thyme *Thymus polytrichus* and Purging Flax *Linum catharticum* present.

Other noteworthy species within the site are Awl-leaved Pearlwort *Sagina subulata*, Spring Sandwort *Minuartia verna*, Frog Orchid *Coeloglossum viride* and Sea Spleenwort *Asplenium marinum*.

The intertidal area is dominated by bedrock with wave-cut platforms often reaching substantial widths. The most notable localities are at Portmoon, Port-na-Tober and the Great Stookan. A seaweed community dominated by Oarweed *Laminaria digitata* and Dabberlocks *Alaria esculenta* typifies lower shores, while shallower mid-shore areas are frequently encrusted by Coralline seaweed. Less steeply sloping areas commonly have abundant Sea-thong *Himantalia elongata*, a seaweed exposed at low tide. Upper and mid-shore rock pools are frequent, often deep, with a range of green, furoid and kelp seaweed present. Many of the rocks which are most exposed along the mid-shore sections, are often dominated by the Common Limpet *Patella vulgata* and barnacles, especially *Chthamalus* spp.

As might be expected with such a diverse site, the invertebrate assemblages reflect the range of habitats present. Together with the common or typical species, a number of significant records have occurred. These include the English Chrysalis Snail *Leiostryla anglic*, which favours wet grassland, and the Moss Snail *Pupilla muscorum*, which favours drier localities. Brackish marsh hosts the rare ground beetle *Trechus discus* and two rare craneflies, *Limonia goritiensis* and *Dactylolabis sexmaculata*, utilise cliff-top and base-rich seepage areas respectively. Other notable invertebrates recorded for the area include the weevils *Otiorhynchus arcticus* and *Mesites tardii*, the hoverfly *Tropidia scita*, the Bilberry Bumblebee *Bombus monticola* and the woodlouse *Metatrichoniscoides celticus*.

The site supports a range of breeding and wintering birds. Most notable are Chough *Pyrrhocorax pyrrhocorax* which have nested in the past and use lands in the area of Benbane Head for feeding. Peregrine Falcon *Falco peregrinus* and Twite *Carduelis flavirostris* also breed and are present throughout the year. Of the breeding seabirds, significant populations of Fulmar *Fulmarus glacialis* and Black Guillemot *Cephus grylle* are present, with some 200 and 60 – 70 pairs respectively.

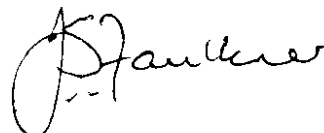
## **SCHEDULE**

**The following operations and activities appear to the Department to be likely to damage the flora, fauna, geological, and physiographical features of the area:**

1. Any activity or operation which involves the damage or disturbance by any means of the surface and subsurface of the land, including ploughing, rotovating, harrowing, reclamation and extraction of minerals, including rock, sand, gravel and peat.
2. Any change in the present annual pattern and intensity of grazing, including any change in the type of livestock used or in supplementary feeding practice.
3. Any change in the established method or frequency of rolling, mowing or cutting.
4. Any change in the annual pattern of application of manure, slurry or artificial fertiliser.
5. The application of herbicides, fungicides or other chemicals deployed to kill any form of wild plant, other than plants listed as being noxious in the Noxious Weeds (Northern Ireland) Order 1977.
6. The storage or dumping, spreading or discharge of any material not specified under paragraphs 4 or 5 above.
7. The destruction, displacement, removal or cutting of any plant, seed or plant remains, other than for
  - (i) plants listed as being noxious in the Noxious Weeds (Northern Ireland) Order 1977;
  - (ii) normal cutting or mowing regimes for which a consent is not required under paragraph 3 above.
8. The release into the area of any animal (other than in connection with normal grazing practice) or plant. 'Animal' includes birds, mammals, fish, reptiles, amphibians and invertebrates; 'Plant' includes seed, fruit or spore.
9. Burning.
10. Introduction of tree or woodland management, including afforestation, planting, clearing, selective felling and coppicing.
11. Construction, removal or disturbance of any permanent or temporary structure including building, engineering or other operations.

12. Alteration of natural or man-made features, the clearance of boulders or stones and grading of rock faces.
13. Operations or activities which would affect wetlands (including rivers, streams and open water), e.g.
  - (i) change in the methods or frequency of routine drainage maintenance;
  - (ii) modification to the structure of any watercourse;
  - (iii) lowering of the water-table, permanently or temporarily;
  - (iv) change in the management of bank-side vegetation;
  - (v) changes in field drainage or boundary field drainage.
14. The disturbance, killing or taking of any wild animal except where such killing or taking is treated as an exception in Articles 5,6,11,17,20,21 and 22 of the Wildlife (Northern Ireland) Order 1985.
15. The following activities undertaken in a manner likely to damage the interest of the area:
  - (i) educational activities;
  - (ii) research activities;
  - (iii) recreational activities;
  - (iv) exercising of animals.
16. Changes in game, waterfowl, or fisheries management or fishing or hunting practices.
17. Sampling of rocks, minerals, fossils or any other material forming a part of the site, undertaken in a manner likely to damage the scientific interest.
18. Use of vehicles or craft likely to damage the wildlife, habitat or geological features of the area.

Sealed with the Official Seal of the  
Department of the Environment 25 FEBRUARY 2000



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Senior Officer of the Department of  
the Environment

#### **FOOTNOTES**

- (a) Please note that consent by the Department to any of the operations or activities listed in the Schedule does not constitute planning permission. Where required, planning permission must be applied for in the usual manner to the Department under Part IV of the Planning (Northern Ireland) Order 1991. Operations or activities covered by planning permission are not normally covered in the list of Notifiable Operations.
- (b) Also note that many of the operations and activities listed in the Schedule are capable of being carried out either on a large scale or in a very small way. While it is impossible to define exactly what is "large" and what is "small", the Department would intend to approach each case in a common sense and practical way. It is very unlikely that small scale operations would give rise for concern and if this was the case the Department would normally give consent, particularly if there is a long history of the operation being undertaken in that precise location.