DEPARTMENT OF THE ENVIRONMENT FOR NORTHERN IRELAND

DECLARATION OF AREA OF SPECIAL SCIENTIFIC INTEREST AT BOVEVAGH, COUNTY LONDONDERRY. ARTICLE 24 OF THE NATURE CONSERVATION AND AMENITY LANDS (NORTHERN IRELAND) ORDER 1985.

The Department of the Environment for Northern Ireland (the Department), having consulted the Council for Nature Conservation and the Countryside and being satisfied that the area delineated and described on the attached map (the area) is of special scientific interest by reason of its geological 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 'Bovevagh area of special scientific interest'.

Bovevagh is an example of a shallow deltaic setting, where gravelly sediments prograded northwards into fossiliferous glaciomarine clays. If the sequence is *in situ*, it records the development of major lowland ice masses during the Early Midlandian resulting in marked isostatic depression. While the Bovevagh sequence is open to two possible interpretations, it is clearly of major significance. This association of large lowland ice sheets and isostatic depression during the early part of the last cold stage, has important palaeoenvironmental and palaeoclimatic implications for Quaternary research in north-west Europe. No other site known in Ireland demonstrates this setting during the Early Midlandian and its preservation is probably a result of weak glacial activity in the Dungiven basin during the Late Midlandian.

The site near Bovevagh Old Church occurs 12km inland at a height of about 95m O.D; it is therefore of critical scientific importance with respect to its location and altitude. The site was described as early as 1843, since when these fossiliferous muds have been viewed as reworked seafloor deposits as elements within glacial tills. More recent sedimentological and palaeoecological work suggests that they are more complex than hitherto realised, and are a remnant of a low angle, prograded glaciomarine delta.

The exposure consists of poorly-stratified gravels, sands and sandy diamicts which interfinger laterally with massive, fossiliferous mud. Poorly-sorted gravel at the base of the exposed sequence consists of amalgamated beds of cobble to pebble gravel, which are generally ungraded and massive. At several horizons in the gravels, strong imbricated fabrics indicate a palaeoflow to the north.

Thin beds (10cm) of silty-clay within the gravels thicken northwards and pass below the base of the exposure.

The basal gravels are overlain abruptly by a flat-lying bed of silty clay, which is highly variable internally and ranges from massive to faintly-laminated. This unit is interbedded with the fossiliferous marine muds towards the end of the section. It contains comminuted marine shell fragments. The contact with the overlying pebble and cobble gravel is sharp and marked by a discontinuous stone lag. The upper unit of gravels is similar in clast composition and sedimentological characteristics to the lower gravel unit. The upper 10m to 15m of the sequence is not exposed, though small slumps immediately behind the graveyard suggest that a brown, massive to stratified diamict is present.

The interbedded relationships between massive grey mud at the northern end of the sequence and the coarse clastic units at the southern end of the sequence, show that both were deposited contemporaneously. The most common fossil is the Tower Shell Turritella communis, which occurs in profusion, with about 50% of the specimens being perfectly preserved. Some mud samples contain low concentrations of poorly-preserved foraminifera. Others, however, contain very distinct, well-preserved, foraminiferal assemblages. One assemblage is boreal in aspect and is similar to modern environmental settings of western Norway. The other reflects shallow water glaciomarine conditions with a distinct Arctic aspect. These samples require further processing before more definite statements can be made. Two AMS dates on a whole shell of Aporrhais pespelicani (>34ka B.P.) and several whole shells of Turritella communis (>44ka B.P.) are infinite. Amino acid ratios indicate an Early Midlandian age.

Flat-lying beds together with the absence of obvious glacitectonic structures at this site suggest that the sequence is *in situ* and has not been transported by ice. Rapid interbedding of facies and the preservation of many primary sedimentary structures and bedding planes are also indicative of an undisturbed succession. However the exposure is small and could be part of a much larger deformed unit which is not exposed.

The marked lateral and vertical facies changes at the site reflect a range of processes. Coarse-grained gravels are the result of mass flow and traction activity with a northwards palaeoflow. Grain size variability shows that flows ranged from fluidal to more dense flows, with debris flow events also evident. The delicate, interbedded relationship between these flow units and the mud shows that both are contemporaneous. The most likely depositional setting is where a stream formed a low-angle delta, which prograded into a shallow water glaciomarine setting dominated by plume deposition from suspension.

If the muds are *in situ* then the succession records deep and prolonged isostatic depression and glaciomarine conditions in the Dungiven basin. The implications are that extensive ice masses developed, probably during the Early Midlandian in north-west Britain. An alternative explanation involves ice transport of sea floor muds, followed by reworking in a shallow proglacial water body, which would explain the sediment geometry of the section. In this case, large onshore ice masses are required during the Early Midlandian (leading to ice-damming), but this does not require deep isostatic depression to explain the present height of the muds and their inland position. The second model would explain the presence of mixed faunas in a simpler way than the first, which would require sustained isostatic compensation during the deglacial phase and boreal-type environmental settings. Further work is in progress to resolve this problem.

SCHEDULE

The following operations and activities appear to the Department to be likely to damage the geological 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 extraction of minerals, sand, gravel and peat.

2. The storage or dumping, spreading or discharge of any material.

3. Construction, removal or disturbance of any permanent or temporary structure including building, engineering or other operations.

4. Alteration of natural of man-made features, the clearance of boulders or stones and grading of outcrop.

5. The following activities undertaken in a manner likely to damage the interest of the area:

   (i) Educational activities;

   (ii) Research activities;

   (iii) Recreational activities;

6. 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.

7. Changes in tree or woodland management, including afforestation, planting, clearing, selective felling and coppicing.

8. Operations or activities which would affect wetlands (including rivers, streams and open water), eg.

   (i) change in the methods or frequency of routine drainage maintenance;

   (ii) modification in 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.

9. Use of vehicles or craft likely to damage the interest of the area.

Sealed with the Official Seal of the
Department of the Environment for
Northern Ireland on 27 June, 1995

John Crowther

J CROWTHER
Assistant Secretary

H. Sprott
CIVIL SERVANT
CLARENCE COURT
BELFAST

FOOTNOTES

(a) Please note that consent by the Department to any of the above operations or activities 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 (NI) 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 above 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 give consent, particularly if there is a long history of the operation being undertaken in that precise location.

BOVEVAGH

Views About Management
The Environment (Northern Ireland) Order 2002 Article 28(2)

A statement of Environment and Heritage Service's views about the management of the Bovevagh Area of Special Scientific Interest ("the ASSI")

This statement represents the views of Environment and Heritage Service about the management of the ASSI for nature conservation. This statement sets out, in principle, our views on how the area's special conservation interest can be conserved and enhanced. Environment and Heritage Service has a duty to notify the owners and occupiers of the ASSI of its views about the management of the land.

Not all of the management principles will be equally appropriate to all parts of the ASSI and there may be other management activities, additional to our current views, which can be beneficial to the conservation and enhancement of the features of interest. It is also very important to recognise that management may need to change with time.

The management views set out below do not constitute consent for any operation or activity. The written consent of Environment and Heritage Service is still required before carrying out any operation or activity likely to damage the features of special interest (see the Schedule on pages 2 and 3 of the attached Document B for a list of these operations and activities). Environment and Heritage Service welcomes consultation with owners, occupiers and users of the ASSI to ensure that the management of this area maintains and enhances the features of interest, and to ensure that all necessary prior consents are obtained.

MANAGEMENT PRINCIPLES

The earth science interest at Bovevagh is partly buried, occurring beneath the farmland, but with some outcrop on slopes and in the stream. Environment and Heritage Service would like to encourage the maintenance of the ASSI and its earth science interest.

1. The geological series

Environment and Heritage Service would encourage the continued use of the site for agricultural activities. Provided no damaging activities are undertaken without consent, as set out in the Schedule (pages 2 and 3), the needs of

owners, occupiers and the Department can be met. Specific objectives include:

Retain the geological series in an undamaged state.

Retain access to the geological series.

C. McParland

C McParland
Authorised Officer

Dated the 26TH of FEBRUARY 2004

DEPARTMENT OF THE ENVIRONMENT FOR NORTHERN IRELAND
BOVEVAGH AREA OF SPECIAL SCIENTIFIC INTEREST

MAP REFERRED TO IN THE DECLARATION DATED: 27 June, 1995

SITE BOUNDARY: The ASSI includes all the lands within the solid black line.

AREA OF SITE: 5.7 ha

SCALE: 1 : 10000

SHEET NO: 39

IRISH GRID REFERENCE: C668140

COUNCIL AREA: Limavady Borough

COUNTY: Londonderry

J CROWTHER
Assistant Secretary