

**IAH (IRISH GROUP) ANNUAL FIELDTRIP:  
“LOWLAND KARST OF NORTH ROSCOMMON AND WESTMEATH”  
5<sup>TH</sup> - 6<sup>TH</sup> OCTOBER 2002**

**REPORT BY MORGAN BURKE**

**Introduction and Background**

The 2002 annual IAH (Irish Group) fieldtrip weekend was held in October and was based in North Roscommon on Saturday with a visit to Westmeath on Sunday morning. Intensive karst mapping has been undertaken in parts of North Roscommon (around Boyle, Castlerea and Ballaghaderreen) as part of the Roscommon Groundwater Protection Scheme, and a high density of karst features have been identified. The excursion route on Saturday gave a representative picture of these karst features and illustrated their relevance to groundwater vulnerability and source protection. Karstic sites in Westmeath were visited on Sunday further highlighting the presence of karst in lowland areas.

A total of 28 people attended the trip which was led by Caoimhe Hickey of the Geography Department, TCD/ Groundwater Section, GSI, and by Dr. David Drew of the Geography Department, TCD. Monica Lee of the Groundwater Section, GSI and Robbie Meehan of Teagasc also assisted in leading the fieldtrip. A fieldtrip guide was compiled by the fieldtrip leaders and distributed to the participants. A brief summary of some of the highlights of the trip is outlined below.

**Fieldtrip report**

Saturday morning was spent in the Boyle area. The first stop was Rockingham Spring which is a large karst spring located 5km east of Boyle Town. The spring has an estimated discharge of 16,000m<sup>3</sup>/day but the flow at Rockingham is greatly influenced by season so the daily discharge varies greatly. It has been demonstrated that Rockingham Spring responds rapidly to rainfall, inferring rapid flow rates and low storage capacity. Consequently during prolonged dry periods discharge from the spring can decrease as occurred during the late eighties when the spring failed to meet its demand. As a result of this, Roscommon County Council installed three production wells in 1990 to augment the supply. An additional borehole was drilled in 1999. The group was allowed access to the pump house where Mr. Gerry Higgins of Roscommon County Council explained the operations.

The next stop was a high point on the northern edge of the Plains of Boyle overlooking the low lying part of the Rockingham Spring Catchment. A lack of surface drainage is obvious in the landscape from this viewpoint and it is conceptualised that groundwater flows from the Plains of Boyle to the lower part of the catchment where it emerges as the Rockingham Spring, other associated springs and the Ballykeevican stream.

A discussion took place on the results and conclusions of a water tracing test carried out in November 2000 to increase knowledge on the catchment area to the spring and improve understanding of water movement in the region. Five different fluorescent dyes were used in the test and dyes from two of the five swallow holes used as injection points (which were thought to be near the proposed catchment boundary) were detected at Rockingham Spring 27 hours after injection time giving flow rates of 218m/hr and 279 m/hr, respectively. The results of the tracer tests suggest a well-developed conduit flow regime with low storage.

Following a demonstration of subsoil identification using BS5930, the group visited two examples of the most common type of landform in the Boyle area – swallow holes. One of these swallows, located approximately 6.2km southwest of Rockingham Spring, is an example of one of the few larger permanent swallows in the area. It is located between a number of drumlins and receives surface drainage from the surrounding higher ground with impervious material. The most common type of swallow in the region are small features with intermittent flow. Due to the effectiveness of the underlying aquifers at funnelling surface water into the underground, these swallows only have a stream sinking when it is raining and for a few hours after rainfall has ceased. The second swallow hole visited, located approximately 6.0km southwest of Rockingham Spring, is an example of one of these types of swallow. Both of the swallow holes visited were used as injection points in the water tracer test. A connection was established between the larger permanent swallow hole and Rockingham Spring.

The excursion then moved to an upland area to the southeast of Ballaghaderreen which is dominated by peat bogs. A doline field situated alongside the 'bog-road' was visited. Examples of both solution and collapse type doline features were examined in this field. The 'bog-road' runs through an area of bog where the thickness of peat varies from 6m to 9m. Further examples of dolines of different shapes and sizes were observed along this road. These dolines act as funnels allowing direct point recharge to the underlying aquifer, bypassing the attenuation capacity of the low permeability peat deposits. Approximately 180 karst features have been mapped in this upland area and most of these features are deep dolines formed through thick peat deposits.

In the Castlerea area, the group visited Longford Spring which is one of the five large springs located near Castlerea. These springs are situated on a fault line between two different limestone formations. Longford Spring has an estimated total discharge of 5200-5700m<sup>3</sup>/day and Roscommon County Council use it as a source to supply the Castlerea Rural Water Supply Scheme. The excursion then stopped at a field in Mewlaghmore approximately 5km east of Castlerea. A total of 22 karst features have been mapped in this field. Most of these are dolines but swallow holes and an area of superficial solution features have also been identified. A variety of doline forms occur in this field including deep collapse features and shallow solution dolines with gentle slopes. The collapse features appear to be aligned along a northwest to southeast trend.

For the final stop of the day, the group had an opportunity to explore around the entrance to Roscommon's longest reported cave system – Pollawaddy Cave which is located approximately 7.5km southwest of Ballaghaderreen. The cave has a total surveyed length of 45.5m and is one of only two known caves in County Roscommon.

The 'Lakeland' area of County Westmeath was visited on Sunday morning. A series of steep sided isolated hills occur in this region which covers approximately 100km<sup>2</sup>. Vertical rock faces are widespread on these hills. The group (wearily!!) ascended one of these hills to a vertical cliff face where the likely origin of these hills was discussed. The occurrence and morphology of these hills cannot be easily attributed to structural control or glacial erosion. It is likely that they represent residual karst hillocks (known as hums or towers) from a former karst landscape possibly dating back to the Tertiary.

Many lakes occur in this part of Westmeath as well as numerous springs and swallow holes. These lakes straddle the watershed between the Shannon and Boyne catchments. The final stop of the fieldtrip involved a hike through a woodland to two swallows on the shore of Lough Lene. Water tracer tests have been conducted and a subterranean link between Lough Lene and a spring at Fore has been established with a groundwater flow velocity of 80m/hr calculated. However, this connection does not operate in late summer suggesting a high level connection only. Therefore, the presence of a shallow subterranean drainage system with numerous intermittent springs may be evidence of active, post-glacial karst development. Apart from the many intermittent springs, larger springs with more stable flow regimes also exist in the area. These may be evidence of more mature, ancient subterranean karst drainage systems that are being reactivated to some degree. It was concluded that more comprehensive investigations should be carried out in this area to test the current hypothesis regarding karstification and its influence on the present day landscape and hydrological regime.

The IAH would like to thank Caoimhe, David, Monica and Robbie for leading the trip and all who attended the weekend. It was a superb weekend and a good opportunity to gain an insight into the lowland karst in Westmeath and north County Roscommon.

**Morgan Burke**  
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