

*1<sup>st</sup> Draft Slieve Rushen South GWB Description – August 2004*

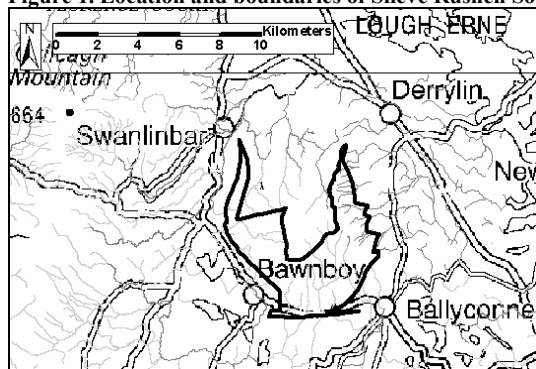
**Slieve Rushen South GWB: Summary of Initial Characterisation.**

<b>Hydrometric Area Local Authority</b>	<b>Associated surface water bodies</b>	<b>Associated terrestrial ecosystems</b>	<b>Area (km<sup>2</sup>)</b>
Hydrometric Area 36  Cavan Co. Co N.I.	<b>Rivers:</b> Bawnboy. <b>Streams:</b> Templeport Lake stream, Drumane, 42 unnamed streams. <b>Lakes:</b> None identified.	None identified (O’Riain, 2004)	27
<b>Topography</b>	This is a horse-shoe shaped GWB, located on the western, southern and eastern slopes of Slieve Rushen. More productive aquifers bound the body – karstic along the southern boundary and fractured along the northern. The terrain is steep and mountainous, with elevations ranging from 80-370 mAOD over 2-3 kilometres. Surface water flows downslope in all directions (west, south and east), with channels radiating out from the summit.		
<b>Geology and Aquifers</b>	<b>Aquifer type(s)</b>	This GWB entirely comprises <b>LI</b> : Locally important aquifer which is moderately productive only in local zones.	
	<b>Main aquifer lithologies</b>	The GWB is underlain by Dinantian mixed Sandstones, Shales and Limestones. Refer to Table 1 for details.	
	<b>Key structures.</b>	The rock succession in this particular area are part of a syncline feature that is dipping to the north by between 5-15°. There also a small number of SW-NE/SE-NW trending faults dividing the GWB into several main blocks.	
	<b>Key properties</b>	Data are limited for this GWB, with only 2 yields (109 and 118 m <sup>3</sup> /d) and one specific capacity (121 m <sup>3</sup> /d/m). Transmissivity values are unavailable but are expected to be <20 m <sup>2</sup> /d, and possibly <10 m <sup>2</sup> /d in the shale-dominated lithologies. The only available specific capacity value implies a higher transmissivity than would be expected however, this well may be influenced by the close proximity of the more productive Rk <sup>c</sup> aquifer (Newtown-Ballymacconnell GWB, 100 m to the south). Storativity is also expected to be low.  The groundwater level data are also minimal in this GWB – 2 levels are 0-3 m below ground level, the third is 12.2 mbgl. The data are inadequate to calculate groundwater gradients however, they are expected to be relatively steep, given the lower permeability of the rock and the steep topography.  <i>(Dinantian Shales and Limestones Aquifer Chapter)</i>	
	<b>Thickness</b>	Most groundwater flux is expected to be in the uppermost part of the aquifer comprising a broken and weathered zone typically less than 3 m thick, a zone of interconnected fissuring 10-15 m thick, and a zone of isolated poorly connected fissuring typically less than 150 m.	
<b>Overlying Strata</b>	<b>Lithologies</b>	The GWB is predominantly covered by till (58%) with smaller proportions of scree/bedrock outcrop on the upper slopes in the body (c.12%). No data are available for just under 20% of the GWB (NI).	
	<b>Thickness</b>	From the available outcrop, borehole and topographic information (Cavan data), it is likely that subsoil is absent or thin (<3 m thick) over a large proportion of this GWB, especially at higher elevations. At the base of the slopes i.e. along the western and southern boundaries, there appear to be zones of deeper subsoil (>10 m thick). This is also likely to reflect the pattern of subsoil thickness in N.I., where data are absent.	
	<b>% area aquifer near surface</b>	<i>[Information will be added at a later date]</i>	
	<b>Vulnerability</b>	Although maps are not available, the vulnerability is likely to be extreme where subsoil is thin or absent (in the south; inter-drumlin areas), with the drumlins representing probable areas of moderate or low vulnerability.	
<b>Recharge</b>	<b>Main recharge mechanisms</b>	Diffuse recharge occurs via rainfall percolating through the thinner/more permeable subsoil and rock outcrops. Due to the low permeability of any thicker subsoil deposits and the aquifers themselves, a high proportion of the effective rainfall will discharge to the streams in the GWB. In addition, the steep slopes of Slieve Rushen will promote surface runoff. The relatively high stream density is likely to be influenced by the lower permeability rocks.	
	<b>Est. recharge rates</b>	<i>[Information will be added at a later date]</i>	
<b>Discharge</b>	<b>Important springs and high yielding wells</b>	Springs: None identified. Sources: None identified. Excellent Wells: None identified. Good Wells: Gowlagh North (118 m <sup>3</sup> /d); Muinaghan (109 m <sup>3</sup> /d – possibly influenced by Rk <sup>c</sup> aquifer, c.100 m to south).	
	<b>Main discharge mechanisms</b>	The main groundwater discharges are to the rivers and streams crossing the GWB, reflecting short groundwater flow paths. Small springs and seeps are likely to issue at the stream heads and along their course. Groundwater may also flow into the adjacent, higher permeability GWB (Rk <sup>c</sup> ), which is located along the down-gradient boundaries.	

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<b>Hydrochemical Signature</b>	No available data within this particular GWB. <i>National classification:</i> Dinantian Rocks (excluding Sandstones) Calcareous. Generally CaHCO <sub>3</sub> signature. Alkalinity (mg/l as CaCO <sub>3</sub> ): range of 10-990; mean of 283 (2454 data points) Total Hardness (mg/l): range of 10-1940; mean of 339 (2146 data points) Conductivity (µS/cm): range of 76-2999; mean of 691 (2663 data points) <i>(Calcareous/Non calcareous classification of bedrock in the Republic of Ireland report)</i>
<b>Groundwater Flow Paths</b>	In the absence of inter-granular permeability, groundwater flow is expected to be concentrated in upper fractured and weathered zones and in the vicinity of fault zones. Available groundwater levels are 0-15 m below ground level. Unconfined flow paths are likely to be short (30-300 m), with groundwater discharging rapidly to nearby streams and small springs. Groundwater flow directions are expected to follow topography i.e. radiating out from the Slieve Rushen summit to the west, south and east.
<b>Groundwater &amp; surface water interactions</b>	Groundwater will discharge locally to streams and rivers crossing the aquifer and also to small springs and seeps. Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater - surface water interactions occur. Baseflow to rivers and streams is likely to be relatively low.
<b>Conceptual model</b>	<ul style="list-style-type: none"> <li>• The Slieve Rushen South GWB is bounded by more productive aquifers. The topography is steep and mountainous, with elevations ranging from 80-370 mAOD.</li> <li>• The GWB is composed of low transmissivity rocks. Most of the groundwater flux is likely to be in the uppermost part of the aquifer comprising: a broken and weathered zone typically less than 3 m thick; a zone of interconnected fissuring typically less than 10-15 m; and a zone of isolated fissuring typically less than 150 m.</li> <li>• Recharge occurs diffusely through the thin/permeable subsoil and rock outcrops, although is limited by any thicker low permeability subsoil and the bedrock itself. Therefore, most of the effective rainfall is not expected to recharge the aquifer.</li> <li>• Flow paths are likely to be short (30-300 m) with groundwater discharging rapidly to the streams crossing the aquifer, and to small springs and seeps. Overall, the flow directions are expected to be to the west, south and east, as determined by the topography.</li> </ul>
<b>Attachments</b>	Figure 1. Table 1.
<b>Instrumentation</b>	<b>Stream gauges:</b> None identified. <b>EPA Water Level Monitoring boreholes:</b> None identified. <b>EPA Representative Monitoring points:</b> None identified.
<b>Information Sources</b>	MacDermot, C.V. Long C.B. and Harney S.J (1996) <i>Geology of Sligo-Leitrim: A geological description of Sligo, Leitrim and adjoining parts of Cavan, Fermanagh, Mayo and Roscommon, to accompany bedrock geology 1:100,000 scale map, Sheet 7, Sligo - Leitrim.</i> With contributions from K. Carlingbold, G. Stanley, D. Daly and R. Meehan. Geological Survey of Ireland, 100pp.  Geraghty, M., Farrelly, I., Claringbold, K., Jordan, C., Meehan, R., and Hudson, M., 1997. <i>Geology of Monaghan-Carlingford. A geological description to accompany the Bedrock Geology 1:100,000 Scale Map Series, Sheet 8/9, Monaghan-Carlingford.</i> Geraghty, M. (ed.). Geological Survey of Ireland. 60 p.  O' Riain, G. 2004. <i>Water Dependent Ecosystems and Subtypes (Draft).</i> Compass Informatics in association with National Parks and Wildlife (DEHLG). WFD support projects.
<b>Disclaimer</b>	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae.

**Figure 1. Location and boundaries of Slieve Rushen South GWB**



**Table 1. List of Rock units in Slieve Rushen South GWB**

Rock Unit Name	Code	Description	Rock Unit Group	Aquifer	% Area
Meenymore Formation	ME	Shale, laminated carbonate, evaporite	Dinantian Mixed Sandstones, Shales and Limestones	L1	100