

*1<sup>st</sup> Draft Ballaghnatrillick GWB Description – November 2004*

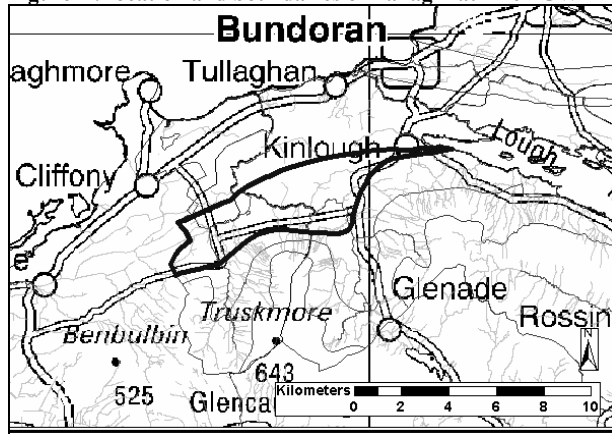
**Ballaghnatrillick GWB: Summary of Initial Characterisation.**

Hydrometric Area Local Authority	Associated surface water bodies	Associated terrestrial ecosystems	Area (km <sup>2</sup> )
Hydrometric Area 36  Leitrim Co. Co. Sligo Co. Co.	<b>Rivers:</b> Duff, Ballaghnatrillick. <b>Streams:</b> 78 unnamed streams <b>Lakes:</b> Derrynavoggy, Uragh.	Ben Bulben, Gleniff and Glenade Complex	21
<b>Topography</b>	This E-W elongated GWB becomes much narrower towards its eastern end, where it borders Lough Melvin. The western boundary comprises a topographic divide (Hydrometric Area 35) and more productive aquifers are located to the north and south. Elevations gently increase inland from c.30 AOD at Lough Melvin to 70 mAOD, just north of Tievbaun Mountain and Benwisikin. Surface water flows northwards towards the coastline, as part of the Duff and Ballaghnatrillick river network.		
<b>Geology and Aquifers</b>	<b>Aquifer type(s)</b>	This GWB is predominantly underlain by <b>LI</b> : Locally important aquifer, moderately productive only in local zones. A slither (<2%) of <b>Rk<sup>c</sup></b> : Regionally important karst aquifer dominated by conduit flow, occurs along the NW boundary.	
	<b>Main aquifer lithologies</b>	Dinantian Shales and Limestones is the main bedrock group within the GWB (98.21%). The small area of karst aquifer (1.79%) is classified as a Dinantian Pure Bedded Limestone. Refer to Table 1 for details.	
	<b>Key structures.</b>	The rock succession dips to the south by 5-10°.	
	<b>Key properties</b>	Only one yield is available for this GWB (130 m <sup>3</sup> /d) with a specific capacity of 16 m <sup>3</sup> /d/m. These data do suggest that good yields are achievable although the borehole may not necessarily be representative of the GWB as it is located in close proximity to a more productive aquifer. Generally, yields are expected to be limited and transmissivity values are thought to be <20 m <sup>2</sup> /d, and possibly <10 m <sup>2</sup> /d in the shale-dominated lithologies. Storativity is also expected to be low.  Groundwater gradients are expected to be relatively steep, given the lower permeability of the rock. Flow is expected to be down-gradient, which is generally northwards. <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>	No data are available for just over 60% of the GWB (Leitrim). Over the remaining area, the subsoil is dominated by peat (24%) and then by till (15%).	
	<b>Thickness</b>	Although available data are limited, minimal outcrops are mapped, possibly indicating that the subsoil in this GWB are relatively thick (>3 m).	
	<b>% area aquifer near surface</b>	<i>[Information will be added at a later date]</i>	
	<b>Vulnerability</b>	<i>Data not available.</i>	
<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 any low permeability subsoil deposits and the aquifers, a high proportion of the effective rainfall will discharge to the streams in the GWB. 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: Park (130 m <sup>3</sup> /d).	
	<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 Lm GWB.	
	<b>Hydrochemical Signature</b>	There are no data available for this GWB. <b>National classification:</b> 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>	

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<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. Unconfined flow paths are likely to be short (30-300 m), with groundwater discharging rapidly to nearby streams and small springs. Overall, the flow direction will be northwards towards the coastline, as determined by topography.
<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 GWB is bounded by more productive aquifers to the north and south, Lough Melvin to the east, and a topographic divide to the west. Elevations range from 30-70 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 north, 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.  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 Ballaghtrillick GWB**



**Table 1. List of Rock units in Ballaghtrillick GWB**

Rock Unit Name	Code	Description	Rock Unit Group	Aquifer Class.	% Area
Bundoran Shale Formation	BN	Dark shale, minor fine-grained limestone	Dinantian Shales and Limestones	L1	84.13%
Benbulbin Shale Formation	BB	Calcareous shale with minor calcarenite	Dinantian Shales and Limestones	L1	14.08%
Ballyshannon Limestone Formation	BS	Pale grey calcarenite limestone	Dinantian Pure Bedded Limestones	Rkc	1.79%