

Largydonnell GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water bodies	Associated terrestrial ecosystems	Area (km ²)
Hydrometric Area 36 Leitrim Co. Co. Sligo Co. Co.	Rivers: Ballaghnatrillick, Black, Duff. Streams: 199 unnamed streams. Lakes: Lough Melvin.	Ben Bulben, Gleniff and Glenade Complex (O’Riain, 2004)	24
Topography	This is a narrow, ‘M’-shaped GWB, extending southwest from Lough Melvin. The GWB is bounded by a topographic divide (Hydrometric Area 35) to the west, Lough Melvin to the east and less productive aquifers to the north and south. Elevations gently increase from c.30 AOD at Lough Melvin to 200 mAOD along the lower slopes of Benwisikin. The topography is steep in these higher zones and occasional drumlins are found in the valley areas. Surface water flows northwards towards Lough Melvin or as tributaries of the Rivers Duff and Ballaghnatrillick.		
Geology and Aquifers	Aquifer type(s)	This GWB is underlain by Lm : Locally important aquifer which is generally moderately productive.	
	Main aquifer lithologies	Dinantian Sandstones are the sole rock group in the GWB. Refer to Table 1 for details.	
	Key structures.	The rock succession dips to the south by 5-10°.	
	Key properties	The dominant sandstone lithology of this GWB will generally results in a higher fissure permeability and therefore, the potential to have relatively high transmissivity values – in the order of 10-50 m ² /d, although they may be higher in the vicinity of faults (c.100-150 m ² /d). No discharge data are available for this GWB, although 5 yields are available for the nearby Tullaghan-Lough Melvin GWB– 109-196 m ³ /d (averaging 153 m ³ /d), which comprises the same rock type. The lithology and data suggest that these rocks are capable of sustaining good yields. Storativity is also likely to be reasonably good. Groundwater levels are not available for this GWB, although flow is expected to be down-gradient, which is generally northwards. <i>(Dinantian Sandstones Aquifer Chapter)</i>	
	Thickness	Most groundwater flux is likely to be in the upper part of the aquifer, comprising three broad zones: broken and weathered rock, typically less than 3 m thick; interconnected fissuring up to 30-40 m thick; and a zone of isolated poorly connected fissuring typically less than 150 m. Fissure permeability is generally expected to be more developed in the top 20-30 m of fractured weathered rock and close to fault zones.	
Overlying Strata	Lithologies	There are no data available for the majority of the GWB (77% – Leitrim), although the remaining is dominated by till (16%).	
	Thickness	Although available data are limited, much the of the outcrop is recorded along the stream channels.	
	% area aquifer near surface	<i>[Information will be added at a later date]</i>	
	Vulnerability	<i>No vulnerability maps are available for Leitrim or Sligo.</i>	
Recharge	Main recharge mechanisms	Diffuse recharge occurs via rainfall percolating through the subsoil and rock outcrops. A proportion of the effective rainfall will discharge to the streams in the GWB, especially where low permeability subsoil is present (some tills or peat). In addition, the steep slopes on higher ground will promote surface runoff. The stream density is lower than the adjacent LI aquifer (Rossinver), although is also likely to reflect the influence of the upgradient topography i.e. accumulated runoff from upslope, as well as that of the bedrock.	
	Est. recharge rates	<i>[Information will be added at a later date]</i>	
Discharge	Important springs and high yielding wells	Sources: None identified. Springs: None identified. Excellent Wells: None identified. Good Wells: None identified.	
	Main discharge mechanisms	The main groundwater discharges are to the streams, rivers, lakes and any springs within the GWB. Seepages will also develop along the shore of Lough Melvin. Given the higher transmissivities associated with Lm aquifers, the baseflow proportion of the total streamflow is expected to be higher in this GWB than for the adjacent LI GWBs.	
	Hydrochemical Signature	There are no data available for this GWB. National classification: Dinantian Sandstones Calcareous. Generally Ca-HCO ₃ signature. Alkalinity (mg/l as CaCO ₃): range of 5-524; mean of 153 (65 ‘non limestone subsoils’ data points) Total Hardness (mg/l): range of 5-502; mean of 162 (67 ‘non limestone subsoils’ data points) Conductivity (µS/cm): range of 39-1184; mean of 408 (69 ‘non limestone subsoils’ data points) <i>(Calcareous/Non calcareous classification of bedrock in the Republic of Ireland report)</i>	

1st Draft Largydonnell GWB Description – November 2004

Groundwater Flow Paths	In the absence of inter-granular permeability, groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. Groundwater flow is thought to be unconfined and of a regional scale i.e. long flow path lengths (up to 2000 m) would be expected although are likely to be shorter in discharge areas (c.100-300 m). Overall, the flow direction will be northwards towards the coastline, as determined by topography.
Groundwater & surface water interactions	The main groundwater discharges are to the streams, rivers, Lough Melvin and any springs within the GWB. The baseflow proportion of the total streamflow is expected to be relatively high in this GWB as higher transmissivities are generally associated with Lm aquifers.
Conceptual model	<ul style="list-style-type: none"> • The western GWB boundary comprises a topographic divide and the eastern boundary is Lough Melvin. The northern and southern boundaries are less productive aquifer. The topography is steep in the higher, southern zones, with drumlins in the lower-lying valleys. Elevations ranging from 30-200 mAOD. • The sole rock group in this body is Dinantian Sandstone, which is considered to have the potential for relatively high fissure permeability. Most of the unconfined 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 typically less than 30-40 m, and a zone of isolated fissuring typically less than 150 m. • Transmissivity values are expected to be 10-50 m²/d although may be as high as 100-150 m²/d, especially in the vicinity of faults. Storativity is likely to be good. • High fissure permeability aquifers can generally support regional scale flow systems. Long flow paths (e.g. 2000 m) can be expected although are likely to be shorter in discharge areas (100-300 m). • Recharge will occur diffusely through the subsoil and rock outcrops although is limited by any thicker low permeability subsoil and bedrock. • The main discharges are to the streams, rivers and lakes within the GWB. Overall, the flow direction is northwards, towards Lough Melvin or the Leitrim/Sligo coastline.
Attachments	Figure 1. Table 1.
Instrumentation	Stream gauges: None identified. EPA Water Level Monitoring boreholes: None identified. EPA Representative Monitoring points: None identified.
Information Sources	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, 2004. <i>Water Dependent Ecosystems and Subtypes (Draft)</i> . Compass Informatics in association with National Parks and Wildlife (DEHLG). WFD support projects.
Disclaimer	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 Largydonnell GWB

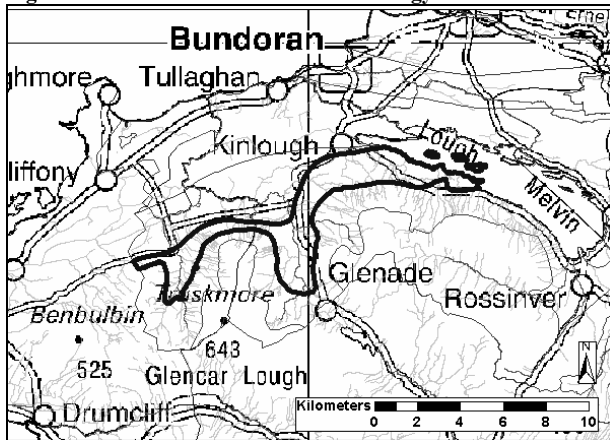


Table 1. List of Rock units in Largydonnell GWB

Rock unit name and code	Description	Rock unit group	Aquifer Classification
Mullaghmore Sandstone Formation	Sandstone, siltstone and shale	Dinantian Sandstones	Lm