

1st Draft Grange West GWB Description August 2004

Grange West GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km ²)
35 Sligo Co. Co.	Rivers: Doonowney, Grange.	Benduff Lough and Machair (000625), Streedagh Point Dunes (001680), Cummeen Strand / Drumcliff Bay (000627) (O’Riain, 2004).	13
Topography	The GWB occupies an area on Lissadell Peninsula, along the northern headland of Sligo Bay. Elevations range from sea level to 50 mAOD. It is bounded to the north and south by the coastline. It is bounded to the east and west by the Grange East and the Yellow strand GWB’s. Figure 1 shows the location and boundaries.		
	Geology and Aquifers	Aquifer categories	Ll: Locally important aquifer, moderately productive only in local zones. Lm: Locally important aquifer, generally moderately productive (0.5 km ²).
Main aquifer lithologies		Dinantian Shales and Limestones, Dinantian Upper Impure Limestones, Dinantian Sandstones. Table 1 shows the rock units in the GWB.	
Key structures		The GWB is located in the Rosses Point-Cuilcagh-Manorhamilton Fault Zone. A NNE-SSW fault bounds the GWB to the west. The beds are dipping at 5°, mainly to the east.	
Key properties		There are no karst features recorded in the limestones, however, there is limited karstification expected within these impure limestones and shales. There are no hydrogeological data specific to the GWB. Transmissivities are expected to be low, in the range of 2-15 m ² /d., however, in the vicinity of faults, transmissivity may be higher. Storativity is expected to be low (<0.5%). The gradients are expected to be greater than 0.005.	
Thickness		Most 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 10-15 m thick; and a zone of isolated poorly connected fissuring typically less than 150 m.	
Overlying Strata	Lithologies	Till is the dominant subsoil.	
	Thickness	There are no depth to bedrock data. Thicknesses of greater than 10 m are recorded in boreholes on either side of this GWB.	
	% area aquifer near surface	<i>[Information to be added at a later date]</i>	
	Vulnerability	<i>[Information to be added at a later date]</i>	
Recharge	Main recharge mechanisms	Diffuse recharge occurs via rainfall percolating through permeable subsoil and rock outcrops. Due to the low permeability of the aquifers, a high proportion of the available recharge will discharge to the streams.	
	Est. recharge rates	<i>[Information to be added at a later date]</i>	
Discharge	Large springs and high yielding wells (m³/d)	None identified	
	Main discharge mechanisms	The main discharges are to small springs, streams and to the coast. Shallow groundwater is likely to discharge to streams and lakes, but the limited bedrock transmissivity means that the baseflow component of the total streamflow will be low.	
	Hydrochemical Signature	There are no data within this particular GWB, thus data for the limestones, from the Drumcliff-Strandhill GWB is presented. It has a CaHCO ₃ signature. Dinantian Upper Impure Bedded Limestones (n=11) Alkalinity (mg/l as CaCO ₃): range 116-136, median 122. Total Hardness (mg/l): range 118-168, median 138 (slightly hard). Conductivity (µS/cm): range 289-320, median 308.	
Groundwater Flow Paths	Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. Flow paths are likely to be up to 300 m within the Dinantian Upper Impure Limestones, with groundwater discharging rapidly to nearby streams and small springs. Groundwater flow directions are expected to follow topography, generally toward the coast.		

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Groundwater & Surface water interactions	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.
Conceptual model	<ul style="list-style-type: none"> • The GWB occupies an area on Lissadell Peninsula, along the northern headland of Sligo Bay. Elevations range from sea level to 50 mAOD. It is bounded to the north and south by the coastline. It is bounded to the east and west by the Grange East and the Yellow strand GWB's. • The GWB is composed primarily of low transmissivity rocks. Most of the groundwater flux is likely to be in the uppermost part of the aquifer. • Storativity is expected to be low (<0.5%) in the limestones. The data are inadequate to calculate groundwater gradients, however, these are generally expected to be greater than 0.005. • Recharge occurs diffusely through the subsoils and rock outcrops. Recharge is limited by peat and the low permeability bedrock, thus discharges rapidly to nearby streams and small springs. • Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. Flow paths are likely to be up to 300 m in the limestones, with groundwater discharging rapidly to nearby streams and small springs. The overall flow direction is to the west and south. • The rock units in GWB are generally of low permeability and baseflow to rivers and streams is likely to be relatively low.
Attachments	Table 1 and Figure 1.
Instrumentation	Stream gauges: None EPA Water Level Monitoring boreholes: None EPA Representative Monitoring points: None
Information Sources	Daly, E. (1975) <i>Report on the groundwater potential of the area around Sligo town</i> . Geological Survey of Ireland. 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> . Geological Survey of Ireland, Dinantian Sandstones and Dinantian Pure Bedded Limestone Aquifer Chapters. Unpublished. O' Riain, G., (2004). <i>Water Dependent Ecosystems and Subtypes Draft Report</i> . WFD Support Projects. Compass Informatics in association with National Wildlife and Parks Service (DEHLG).
Disclaimer	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae.

Table 1. List of Rock units in GWB

StratCode	UnitName	Description	RockUnit	Aquifer Class
BB	Benbulbin Shale Formation	Calcareous shale with minor calcarenite	Dinantian Shales and Limestones	L1
GC	Glencar Limestone Formation	Dark fine limestone & calcareous shale	Dinantian Upper Impure Limestones	L1
MU	Mullaghmore Sandstone Formation	Sandstone, siltstone & shale	Dinantian Sandstones	Lm

Figure 1 Location and boundaries of GWB

