

*1<sup>st</sup> Draft Bangor( north Mayo) GWB Description July .2004*

**Bangor (north Mayo) GWB: Summary of Initial Characterisation.**

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km <sup>2</sup> )
33 Mayo Co Council	<b>Rivers:</b> Altnabrocky, Owenmore, Glencullin, Glenglassera, Glenulra. <b>Lakes:</b> Lugnalettin, Loughawaum, Nagorage, Nabullaun, Nabrock, Doo, Boleynagee.	Glenamoy Bog Complex (000500), Slieve Fyagh Bog (000542), Bellacorick Bog Complex (001922), Carrowmore Lake Complex (000476), Owenduff / Nephin Complex (000534).	61
<b>Topography</b>	The land surface is characterised by the relatively mountainous terrain of the Nephin Beg range. This GWB follows the eastern slopes of the Nephin Beg range northwestwards to Slieve Fyagh near Bangor, then northeastwards to the Ceide Fields. Elevations range from sea level to 380 mAOD. It is a relatively narrow GWB, ranging between 1-3 km, sandwiched by the poorly productive aquifers of the Belmullet GWB to the east and west, and by the coastline to the north.		
	<b>Geology and Aquifers</b>	<b>Aquifer categories</b>	The main aquifer category in this GWB is: <b>Lm:</b> Locally important aquifer which is generally moderately productive.
<b>Main aquifer lithologies</b>		This GWB is composed of Dinantian Sandstones.	
<b>Key structures</b>		There are numerous faults mapped in the GWB. In the southern half of the GWB the faults trend NE-SW and in the northern half the trend is more northerly. The faults are roughly spaced at approximately 1.5-2.0 km apart. Generally the rocks dip at 5-10° to the northeast.	
<b>Key properties</b>		In general, Dinantian Sandstones, given their dominant sandstone lithology, which generally results in a higher fissure permeability, has the potential to be a transmissive aquifer. There are no transmissivity data available for this GWB. In the vicinity of faults, transmissivity may be higher. A hydrograph, given in Figure 1, is available for a borehole located in the Dinantian Sandstones north of Ballycastle. The annual variation of the water level is generally less than 2 m. Storativity in the aquifer is expected to be relatively high, in the order of 2%. The data are inadequate to calculate groundwater gradients, but are expected to be greater than 0.001.	
<b>Thickness</b>		Most groundwater flux is likely to be in the upper part of the aquifer, comprising three broad zones: a zone comprising a broken and weathered zone typically less than 3 m thick; a zone of interconnected fissuring up to 40 m thick; and a zone of isolated poorly connected fissuring typically less than 150 m. Water strikes at 15, 34, 40 and 42 m below rock head are recorded within the GWB and indicate a well connected network within the rock mass. Fissure permeability is generally more developed in the top 20 to 30 metres of fractured weathered rock and close to fault zones.	
<b>Overlying Strata</b>	<b>Lithologies</b>	The subsoils are dominated by Blanket Peat.	
	<b>Thickness</b>	Available data indicate that near the coastline the thickness is approximately 10 m.	
	<b>% area aquifer near surface</b>	<i>[Further Information to be added at a later date]</i>	
	<b>Vulnerability</b>	<i>[Further Information to be added at a later date]</i>	
<b>Recharge</b>	<b>Main recharge mechanisms</b>	Diffuse recharge occurs via rainfall percolating through the subsoil and rock outcrops. Due to the low permeability of much of the subsoil (blanket peat), a high proportion of the available recharge will discharge to the streams. In addition, the steeper slopes promote surface runoff.	
	<b>Est. recharge rates</b>	<i>[Information to be added to and checked]</i>	
<b>Discharge</b>	<b>Large springs and large known abstractions (m<sup>3</sup>/d)</b>	One reportedly 'Good' well (109 m <sup>3</sup> /d) at Behy	
	<b>Main discharge mechanisms</b>	The main groundwater discharges are to the streams, rivers and lakes.	
	<b>Hydrochemical Signature</b>	Limited data are available but are similar to the national data available for the Dinantian Sandstones. It has a calcium bicarbonate signature (Ca HCO <sub>3</sub> ) signature [n=2]. Alkalinity (mg/l as CaCO <sub>3</sub> ): 84, 252; Total Hardness (mg/l): 248; Conductivity (µS/cm): 331, 592. Iron 0.1, 2 mg/l. Manganese 1.6, 3.9 mg/l. Chlorides 52, 60 mg/l, however, the wells are all within 1 km of the coastline..	
<b>Groundwater Flow Paths</b>	Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. There are frequent water strikes up to 40 m, indicating that there is a well connected fissured zone, enabling an element of regional groundwater flow. Flow paths can be expected to be relatively long, and are likely to be up to 2000 m. Groundwater flow directions are expected to follow topography, generally in an easterly direction.		

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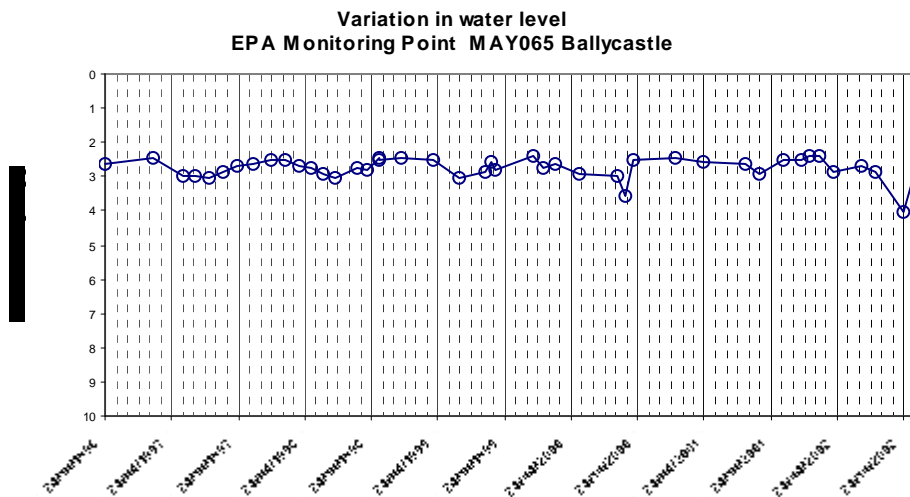
<b>Groundwater &amp; Surface water interactions</b>	The GWB is crossed by ecosystems that are dependent on groundwater (Bellacorick Bog Complex / Owenduff – Nephin Bog Complex / Slieve Fyagh Complex) (Duchas national heritage data). Groundwater will contribute baseflow to the streams and rivers.
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<b>Conceptual model</b>	<ul style="list-style-type: none"> <li>• The land surface is characterised by mountainous terrain. This GWB follows the eastern slopes of the Nephin Beg range northwestwards to Slieve Fyagh near Bangor, then northeastwards to the Ceide Fields. Elevations range for sea level to 380 mAOD.</li> <li>• The GWB is bounded to the west and east by the Belmullet GWB and to the north by the coastline.</li> <li>• The groundwater body is composed primarily of Dinantian Sandstone which is considered to have the potential for relatively high fissure permeability.</li> <li>• Most groundwater flux is likely to be in the upper part of the aquifer. Frequent water strikes up to 40 m below rock head are recorded within this GWB and indicate a well connected network within the rock mass.</li> <li>• Recharge occurs diffusely through the subsoils and rock outcrops.</li> <li>• It has a calcium bicarbonate signature (CaHCO<sub>3</sub>).</li> <li>• Flow paths can be expected to be relatively long, and are likely to be up to 2000 m.</li> <li>• Groundwater will discharge and contribute baseflow to streams and rivers crossing the GWB.</li> </ul>
<b>Attachments</b>	Table 1, Figure 1 and 2.
<b>Instrumentation</b>	<b>Stream gauges:</b> None <b>EPA Water Level Monitoring boreholes:</b> None <b>EPA Representative Monitoring points:</b> None
<b>Information Sources</b>	Long, B., Mac Dermot, C.V., Morris, J.H., Sleeman, A.G., Tietzsch-Tyler, D., (1992). <i>A geological description to accompany the Bedrock Geology 1:100,000 Scale Map Series, Sheet 6, North Mayo</i> . Geological Survey of Ireland Map Series Report. Geological Survey of Ireland. Aquifer Chapters: The Dinanatian Sandstone Aquifers. Unpublished.
<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.

**Table 1. Rock units GWB**

Code	Unit name	Description	Rock unit	Aquifer class
BN	Broad Haven Formation	Monotonous massive to banded psammities.	Precambrian Quartzites, Gneisses & Schists	Pl
MN	Minnaun Sandstone Formation	X-bedded sandstone and siltstone.	Dinantian Sandstones	Lm

**Figure 1. Groundwater hydrograph**



**Figure 2 Boundaries and Location of GWB**

