

Glenville GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km <sup>2</sup> )
18 Cork, Waterford, Kerry Co. Cos.	<b>Rivers:</b> Funshion, Douglas, Araglin, Fermoy, Glen, Rathcool, Finnow, Blackwater, Clyda, Owenbaun, Nad, Bunnaglanna, Bride, Glashanabrack, Flesk, Tourig, Owennashad, Owbeg, Ross, Bridge, Rathcool, Lyre, Knoppoge, Coom, Owenagloo, Curraheen, Glenaboy, Awnaskirtaun, Glendine, Womanagh. <b>Streams:</b> Glencorra <b>Lakes:</b> Murtagh, Gortavehy, Kippagh, Comeenatrush	Ballindangan Marsh (000899), Blackwater River and Estuary (000072), Glanworth Ponds (000085)? Ballinaltig Beg Pond (001829)? Black Water River Callows (000073)	1107
<b>Topography</b>	This GWB occupies the upland ridges between elongate east-west trending valleys in County Cork. The GWB is bounded to the north by the Mitchelstown karstic GWB, and to the south by the Ballinhassig GWB. The Tallow karstic GWB intrudes deep into this GWB. Ground elevations range from sea level at Youghal to over 200 m OD.		
<b>Geology and Aquifers</b>	<b>Aquifer categories</b>	<b>LI:</b> Locally important aquifer which is moderately productive only in local zones (99%) <b>PI:</b> Poor aquifer which is generally unproductive except for local zone (1%)	
	<b>Main aquifer lithologies</b>	Devonian Old Red Sandstones (98%), Dinantian (early) Sandstones, Shales and Limestones (2%) and some very small areas of Dinantian Lower Impure Limestones and Basalts & other Volcanic rocks (<1%).	
	<b>Key structures</b>	During the Variscan Orogeny (mountain building episode), rocks in the South Munster region were compressed from the south into a series of folds on east west axes. Subsequent erosion stripped the more soluble Carboniferous Limestones from the fold crests or ridges (anticlines) exposing the harder, more resistant sandstones underneath. The Carboniferous Limestones were preserved in the fold troughs (synclines) which today line elongate east-west trending valleys separated by the intervening sandstone ridges. Extensive fracturing and faulting accompanied the folding of the rocks. The ridges and valleys are cut by series of shear faults trending approximately north-south and a series of thrust faults with a general east-west trend. The major north-south shear faults are paralleled by a very well developed system of vertical or near-vertical north-south joints.	
	<b>Key properties</b>	Permeability generally decreases rapidly with depth in all aquifers. In general, the ORS and Lower Impure Limestone aquifer transmissivities will be in the range 2-20 m <sup>2</sup> /d, with median values occurring towards the lower end of the range. However, 'Excellent' yielding wells (>400 m <sup>3</sup> /d) are known in some of the ORS units – particularly the Gyleen Formation - these yields are usually associated with boreholes being situated on fault zones. Summer yields are sometimes unsustainable. Aquifer storativity will be low in all rock units. Groundwater gradients are likely to be in the range 0.01 to 0.04.	
<b>Overlying Strata</b>	<b>Lithologies</b>	<i>Subsoil Types identified in Glenville GWB by Teagasc Parent Material Mapping (Draft): Alluvium (A); Blanket Peat (BktPt); Cutover Peat (Cut); Sandstone sands and gravels (Devonian) (GDSs); Lake sediment (undifferentiated) (L); Made Ground (Made); Rock outcrop and rock close to surface (Rck); Till – Devonian Sandstone Till (TDSs), Limestone Till (TLs), Namurian Sandstone and Shale Till (TNSSs).</i> This GWB is primarily covered by glacial till.	
	<b>Thickness</b>	There are many areas within this GWB with subsoils of <3m and where rock outcrop is common, particularly along the higher ridges and in the incised stream valleys. Elsewhere subsoil depths of 5-10m are frequently recorded, although isolated points of deep and shallow subsoil do occur. Subsoil depths in these areas can therefore be highly variable within short distances.	
	<b>% area aquifer near surface</b>		
	<b>Vulnerability</b>	Vulnerability has not been mapped for a GWPS, but by analogy with the neighbouring South Cork area, this GWB probably has many areas of Extreme Vulnerability.	
<b>Recharge</b>	<b>Main recharge mechanisms</b>	In the GWB diffuse recharge will occur over the entire GWB via rainfall percolating through the subsoil. In general, the probably generally 'moderate' permeability subsoils not restrict percolation of recharge. However, the lack of permeability in most of the aquifer will tend to restrict recharge.	

*1<sup>st</sup> Draft Glenville GWB Description – .... 2004*

	<b>Est. recharge rates</b>	
<b>Discharge</b>	<b>Large springs and high yielding wells (m<sup>3</sup>/d)</b>	<p><i>Note: The following data need to be checked and updated by RBD Project Consultants.</i></p> <p>Data from GSI Well Database:            Excellent BHs- Kilcorney (436 m<sup>3</sup>/d), Ballyduff (436 m<sup>3</sup>/d)            Good BHs- Ballymacask (109 m<sup>3</sup>/d), Ballycolman (164 m<sup>3</sup>/d), Coolquane (109 m<sup>3</sup>/d), Mountcatherine (218 m<sup>3</sup>/d), Scart (109 m<sup>3</sup>/d), Killeenagh South (109 m<sup>3</sup>/d), Doonpeter (109 m<sup>3</sup>/d), Nadanuller Beg (273 m<sup>3</sup>/d), Ballyclough (327 m<sup>3</sup>/d), Shanakill (262 m<sup>3</sup>/d), Glantane (305 m<sup>3</sup>/d), Clashagannin (109 m<sup>3</sup>/d), Deerpark Hill (218 m<sup>3</sup>/d), Gooldshill (218 m<sup>3</sup>/d), Lisnabrinlodge (196 m<sup>3</sup>/d), Ballynageehy (109 m<sup>3</sup>/d), Kilbarry (170 m<sup>3</sup>/d), Moorepark (164 m<sup>3</sup>/d), Killavullen WS (360 m<sup>3</sup>/d), Rathmore WS (spring) (455 m<sup>3</sup>/d)            4 Good BHs in Killea, Dunmoon, Kilcourney and Sheanbeag.            Fermoy UDC WSS- (gallery) 3000 m<sup>3</sup>/d and 2 BHs in Coolroe with abstraction rates of 1982 m<sup>3</sup>/d and 1050 m<sup>3</sup>/d            Additional data from EPA Groundwater Sources List:</p>
	<b>Main discharge mechanisms</b>	Groundwater discharges to springs within the GWB and to the rivers and streams crossing the GWB.
	<b>Hydrochemical Signature</b>	<p>In the Old Red Sandstone rocks and the sandstones and mudstones of the Cork Group, Alkalinity generally ranges from 10 to 300 mg/l (as CaCO<sub>3</sub>) and hardness ranges from 40 to 220 mg/l (moderately soft to moderately hard).</p> <p>The Old Red Sandstone formations largely contain calcium bicarbonate type water. This indicates that these groundwaters largely contain the more readily dissolved ions such as calcium and bicarbonate. Conductivities in these units are relatively low ranging from 125 to 600 µS/cm, with an average of 300 µS/cm. Conductivities in the Cork Group rocks are quite similar with an average of 380 µS/cm and a range from 160 to 430 µS/cm.</p> <p>Iron (Fe) and manganese (Mn) commonly occur in groundwater derived from sandstone and shale formations, due to the dissolution of Fe and Mn from the sandstone/shale where reducing conditions occur.</p>
<b>Groundwater Flow Paths</b>	These rocks have no intergranular permeability. Groundwater flow occurs in faults and joints. Most groundwater flow probably occurs in an upper shallow weathered zone. Below this in the deeper zones water-bearing fractures and fissures are less frequent and less well connected. The water table is generally within 10 m of the surface. Groundwater in this GWB is generally unconfined. Local groundwater flow is towards the rivers and streams, and flow path will not usually exceed a few hundred metres in length.	
<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>• This GWB occupies the upland ridges between elongate east-west trending valleys in County Cork. The body is generally between sea level and 200 m OD in elevation and is predominantly an upland area.</li> <li>• The GWB is bounded to the north by the Mitchelstown karstic GWB, and to the south by the Ballinhassig GWB</li> <li>• The GWB is composed mainly of Old Red Sandstone rocks which are poor to locally important in character, and generally of low transmissivity and storativity.</li> <li>• The regional structural deformation that created the characteristic South Munster sandstone ridge (anticline)-limestone valley (syncline) topography was accompanied by intense fracturing and jointing (N-S jointing dominates).</li> <li>• Groundwater in this body is unconfined. The water table is generally less than 10 metres below the surface with an annual fluctuation up to 20 metres. Overall groundwater flow is to the rivers and streams.</li> <li>• Recharge to this GWB is diffuse, and occurs over the entire GWB via rainfall percolating through the subsoil. Through-flow into this GWB from adjacent GWBs is likely to be negligible.</li> <li>• There are many areas of Extreme Vulnerability within this GWB. Elsewhere, the remainder of the body is probably mostly of High Vulnerability.</li> <li>• There is probably limited interaction between surface water and groundwater in this GWB.</li> </ul>	
<b>Attachments</b>	Hydrochemical Signature (Figure 1); Groundwater Hydrograph (Figure 2)	
<b>Instrumentation</b>	<p><b>Stream gauges:</b> 18002*, 18011*, 18013, 18018, 18019, 18020, 18022, 18028, 18029, 18042, 18043, 18045, 18052, 18059, 18060, 18104.            * ADWF data available</p> <p><b>EPA Water Level Monitoring boreholes:</b> Ballyclough Co-op (CON 84), (CON 141).  <b>EPA Representative Monitoring points:</b> Fermoy UDC WS (CON 82), Rathmore WS (KER 53), Ballymoate WS (WAT 15), Tallow WS (WAT 95)</p>	

