

Ross Lake GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km <sup>2</sup> )
30 Galway Co. Co.	<b>Rivers:</b> Lough Kip, Knockbane, Folore, Knockauranny, Drimeen. <b>Lakes:</b> Domhain, Goflacarnaun, Gortachalla, Illaunavee, Chaolaigh, Orain, Beag, Bhaile Ui Choirc, Pairce, Sheamais Mhic Conraoi, Aleen, Boreenaturly, Corrib, Dolloug, Hullinagh, Naniveen, Parkyflaherty, Ross.	Lough Corrib (000297), Ross Lake and Woods (001312), Drimcong Wood (001260), Ballycurke Lough (000228)	85
<b>Topography</b>	The GWB occupies an area to the east of the road between Oughterard and Menlough, with Ross Lake located in the midwest of the GWB. Location and boundaries of the GWB are illustrated in Figure 1. The land surface is low-lying, with elevations ranging from 10 mAOD to 30 mAOD. The shores of L. Corrib form the eastern boundary. The western boundary comprises the poorer aquifers of the Maam_Clonbur GWB. The drainage is to the east toward Lough Corrib.		
<b>Geology and Aquifers</b>	<b>Aquifer categories</b>	<b>Rk<sup>c</sup>:</b> Regionally important karstified aquifer dominated by conduit flow. The ‘c’ signifies conduit flow.	
	<b>Main aquifer lithologies</b>	Dinantian Pure Bedded Limestones dominate the GWB. Table 2 presents all the rock units in the GWB.	
	<b>Key structures</b>	The bedding strikes NE-SW in the northern part of the GWB, generally dipping at 2-5° to the southeast.	
	<b>Key properties</b>	Four swallow holes are recorded along the western boundary in the vicinity of Moycullen (Drew and Daly, 1993). Yield data are sparse, there is one “excellent” (>400 m <sup>3</sup> /d) and five “good” (100-400 m <sup>3</sup> /d) wells present. Transmissivities are expected to be variable, ranging from 1 to greater than 2000 m <sup>2</sup> /d. Storativity is likely to be low - approximately 0.01-0.02. Groundwater velocities are expected to range from 10-100m/hr. Flow directions are likely to be to the east under hydraulic gradients that are expected to be greater than 0.0005.	
	<b>Thickness</b>	Most groundwater flow is likely to be in an epikarstic layer a couple of metres thick and in a zone of interconnected solutionally-enlarged fissures and conduits that extends approximately 30 m below this. Deeper inflows can occur in areas associated with faults or dolomitisation.	
<b>Overlying Strata</b>	<b>Lithologies</b>	Till is the dominant subsoil type, though there are large areas of rock at the surface. The presence of blanket peat/cutover peat is unexpected over the karstified limestone. It may be due to the presence of low permeability till. There is an esker present in the northwestern part of the GWB, north of Ross Lake.	
	<b>Thickness</b>	Depth to bedrock data varies from 0-10 m and there are areas of rock at the surface in the central and northern parts of the GWB.	
	<b>% area aquifer near surface</b>	<i>[Information to be added at a later date]</i>	
	<b>Vulnerability</b>	<i>[Information to be added at a later date]</i>	
<b>Recharge</b>	<b>Main recharge mechanisms</b>	Both point and diffuse recharge occur in this GWB. Diffuse recharge occurs over the GWB via rainfall percolating through permeable subsoil and rock outcrops. Point recharge occurs by means of swallow holes located to the western side of the GWB, where rivers and streams draining the granite areas to the west sink on meeting the limestones. The streams that occur within the GWB coincide with the areas of cutover peat and till.	
	<b>Est. recharge rates</b>	<i>[Information to be added at a later date]</i>	
<b>Discharge</b>	<b>Large springs and high yielding wells (m<sup>3</sup>/d)</b>	Sources: None Excellent wells : Rosscahill – 545 m <sup>3</sup> /d. Good wells: 109 m <sup>3</sup> /d (3), 218 m <sup>3</sup> /d, 116 m <sup>3</sup> /d. Springs: No Large flows identified.	
	<b>Main discharge mechanisms</b>	The main discharges are to small springs, streams, rivers and lakes.	
	<b>Hydrochemical Signature</b>	There are no data, however, the groundwater is expected to have a calcium bicarbonate signature, with high alkalinities and hardness (in the order of 300 and 350 mg/l CaCO <sub>3</sub> ). Electrical conductivity is also expected to be high, approximately 700 µS/cm. Elevated levels of radon are possible.	

*1<sup>st</sup> Draft Ross Lake Description August 2004*

<b>Groundwater Flow Paths</b>	Groundwater flows through fissures, faults, joints and bedding planes. In pure bedded limestones these openings are enlarged by karstification which significantly enhances the permeability of the rock. Karstification can be accentuated along structural features such as fold axes and faults. Groundwater flow through karst areas is extremely complex and difficult to predict. As flow pathways are often determined by discrete conduits, actual flow directions will not necessarily be perpendicular to the assumed water table contours. Flow velocities can be rapid and variable, both spatially and temporally. Overall groundwater flow will be towards Lough Corrib, but the karstified nature of the bedrock means that locally, groundwater flow directions can be highly variable.
<b>Groundwater &amp; Surface water interactions</b>	Generally, there is a high degree of interconnection between groundwater and surface water in karstified limestone areas. Rivers flowing from the west sink in swallow holes in the vicinity of Moycullen, which represent the close interaction between surface water and groundwater. Any contamination of surface water is rapidly transported into the groundwater system, and vice versa.
<b>Conceptual model</b>	<ul style="list-style-type: none"> <li>• The GWB occupies an area to the east of the road between Oughterard and Menlough, with Ross Lake located in the midwest of the GWB. The land surface is low-lying. Elevations range from 10 mAOD to 30 mAOD..</li> <li>• The shores of L. Corrib form the eastern boundary. The western boundary comprises the poorer aquifers of the Maam_Clonbur GWB. The drainage is to the east toward Lough Corrib.</li> <li>• The aquifer is a Regionally important karstified aquifer (<b>Rk<sup>c</sup></b>).</li> <li>• Swallow holes are recorded in the vicinity of Moycullen.</li> <li>• Transmissivities are expected to be variable, ranging from 1 to greater than 2000 m<sup>2</sup>/d. Storativity is likely to be in the range of 1-2%.</li> <li>• Most groundwater flux is likely to be in the upper part of the aquifer.</li> <li>• Till is the dominant subsoil type.</li> <li>• Recharge occurs via losing streams, point and diffuse mechanisms. Point recharge to the underlying aquifer occurs by means of swallow holes.</li> <li>• The main discharges are to the small springs, streams, rivers and lakes.</li> <li>• The groundwater is expected to have a calcium bicarbonate signature.</li> <li>• There is a high degree of interconnection between groundwater and surface water.</li> </ul>
<b>Attachments</b>	Table 1. Figures 1.
<b>Instrumentation</b>	<b>Stream gauges:</b> 30054, 30098. <b>EPA Water Level Monitoring boreholes:</b> None <b>EPA Representative Monitoring points:</b> None
<b>Information Sources</b>	Daly, D. (1985) <i>Groundwater in County Galway with particular reference to its Protection from Pollution</i> . Geological Survey of Ireland report for Galway County Council. 98pp. Drew D.P. and Daly D. (1993) <i>Groundwater and Karstification in Mid-Galway, South Mayo and North Clare</i> . A Joint Report: Department of Geography, Trinity College Dublin and Groundwater Section, Geological Survey of Ireland. Geological Survey of Ireland Report Series 93/3 (Groundwater), 86 pp Geological Survey of Ireland: The Pure Bedded Limestones Aquifer Chapters. Unpublished. Mac Dermot, Pracht, M., McConnell, B.J. (2003). <i>A geological description to accompany the Bedrock Geology 1:100,000 Scale Map Series, Sheet 14, Geology of Galway Bay</i> . Geological Survey of Ireland Map Series Report.
<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**

StratCode	UnitName	Description	RockUnit	Aquifer Class
AS	Ardnasillagh Formation	Dark cherty limestone, thin shale	Dinantian Pure Bedded Limestones	Rkc
AU	Aughnanure Oolite Formation	Cross-bedded massive oolitic limestone	Dinantian Pure Bedded Limestones	Rkc
CT	Coranellistrum Formation	Medium to thick-bedded pure limestone	Dinantian Pure Bedded Limestones	Rkc
CG	Cregg Limestone Formation	Coarse sandy limestone & oolite	Dinantian Pure Bedded Limestones	Rkc
IL	Illaunagappul Formation	Limestone, thin shale partings	Dinantian Pure Bedded Limestones	Rkc
OC	Oldchapel Limestone Formation	Dark fine limestone & calcareous shale	Dinantian Pure Bedded Limestones	Rkc
VIS	Visean Limestones (undifferentiated)	Undifferentiated limestone	Dinantian Pure Bedded Limestones	Rkc

**Figure 1. Location and Boundaries of GWB**

