

1st Draft Ballygawley GWB Description August 2004

Ballygawley GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority		Associated surface water features	Associated terrestrial ecosystem(s)	Area (km ²)
35 Co. Co.		Rivers: Owenboy, Owenmore, Ballysadare, Owenbeg, Unshin, Streams: Killoran Lough Stream. Lakes: Dargan, Knockadoo.	Lough Dargan (001906), Unshin River (001889), Knockmullen Fen (001904)	40
Topography	The GWB occupies a relatively narrow rectangular area orientated NE-SW, between Ballintogher and just south of Coolaney, with Ballygawley located toward the western end. It is essentially a continuation of the northern arm of the Swinford GWB. The land surface is low-lying, with elevations ranging from 30-190 mAOD, sloping in an northeasterly direction. The western and eastern boundaries are topographic divides. The northern and southern boundaries comprise the poor aquifers of the Collooney and Lavagh-Ballygawley GWB's. The rivers and streams in the western half of the GWB flow northeasterly parallel to the long axis of the GWB as far as Ballygawley where they turn north toward Sligo Bay. Streams in the northeastern area flow southwest toward Ballygawley and then north. The location and boundaries are given in Figure 1.			
Geology and Aquifers	Aquifer categories	Rk ^c : Regionally important karstified aquifer dominated by conduit flow. The 'c' signifies conduit flow.		
	Main aquifer lithologies	Dinantian Pure Bedded Limestones dominate the GWB.		
	Key structures	The key structural trend is NE-SW, with the beds striking NE-SW and dipping 2-5° to the SE.		
	Key properties	Only one swallow hole is recorded, but is considered to represent only a fraction of existing features. There are no hydrogeological data available. Transmissivities are expected to be variable, ranging from 1 to greater than 2000 m ² /d. Storativity is expected to be low - approximately 0.01-0.02. There are no data to calculate groundwater velocities, but these are expected to range from 10-100m/hr. Flow directions are likely to be from south to north under hydraulic gradients that are expected to be greater than 0.0005.		
	Thickness	Most groundwater flow is expected 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.		
Overlying Strata	Lithologies	Till is the dominant subsoil type. The presence of blanket peat/cutover peat is unexpected over the karstified limestone. It may be due to the presence of low permeability till.		
	Thickness	There are no depth to bedrock data available. Depth to bedrock is expected to increase in the valleys. Rock outcrops occur in the upland areas.		
	% area aquifer near surface	[Information to be added at a later date]		
	Vulnerability	[Information to be added at a later date]		
Recharge	Main recharge mechanisms	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 to the underlying aquifer occurs by means of swallow holes and caves.		
	Est. recharge rates	[Information to be added at a later date]		
Discharge	Large springs and high yielding wells (m ³ /d)	None identified		
	Main discharge mechanisms	The main discharges are to the small springs, streams and rivers.		
	Hydrochemical Signature	There are no data for the GWB, however, it is expected to have a similar signature to the Swinford and Ballymote GWB's. The groundwater is likely to have a CaHCO ₃ signature with high alkalinity, electrical conductivity and hardness. The range and median values are given below for two sources in the Ballymote GWB.		
		carrowagark (n=14)	achonry (n=7)	
	Alkalinity (mg/l CaCO ₃)	238-428, 360	404-416, 412	
	Hardness (mg/l CaCO ₃)	364-436, 388	404-456, 440	
	Conductivity (microsiemens/cm)	684-827, 731	837-889, 863	

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Groundwater Flow Paths	These rocks are generally devoid of intergranular permeability. 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. Groundwater can flow across surface water catchment divides and beneath surface water channels. Flow velocities can be rapid and variable, both spatially and temporally. Overall groundwater flow will be towards the rivers and lakes, but the karstified nature of the bedrock means that locally, groundwater flow directions can be highly variable.
Groundwater & Surface water interactions	Generally, there is a high degree of interconnection between groundwater and surface water in karstified limestone areas. The karst features represent the close interaction between surface water and groundwater. The stream density is relatively high, which is due to the relatively low permeability subsoils. Any contamination of surface water is rapidly transported into the groundwater system, and vice versa.

Conceptual model	<ul style="list-style-type: none"> • The GWB occupies a relatively narrow rectangular area orientated NE-SW, between Ballintogher and just south of Coolaney, with Ballygawley located toward the western end. It is essentially a continuation of the northern arm of the Swinford GWB. The land surface is low-lying, with elevations ranging from 30-190 mAOD, sloping in an northeasterly direction. • The western and eastern boundaries are topographic divides. The northern and southern boundaries comprise the poor aquifers of the Collooney and Lavagh-Ballygawley GWB's. The rivers and streams in the western half of the GWB flow northeasterly parallel to the long axis of the GWB as far as Ballygawley where they turn north toward Sligo Bay. Streams in the northeastern area flow southwest toward Ballygawley and then north. • The aquifer is a Regionally important karstified aquifer (Rk^c). • Only one swallow hole is recorded, but is considered to represent only a fraction of existing features. • Transmissivities are expected to be variable, ranging from 1 to greater than 2000 m²/d. Storativity is expected to be in the range of 1-2%. • Most groundwater flux is likely to be in the upper part of the aquifer. • Till is the dominant subsoil type. • Recharge occurs via point and diffuse mechanisms. Point recharge to the underlying aquifer occurs by means of swallow holes. • The main discharges are to the small springs, streams and rivers. • The groundwater is expected to have a calcium bicarbonate signature. • There is a high degree of interconnection between groundwater and surface water.
Attachments	Figure 1.
Instrumentation	Stream gauges: 35003. EPA Water Level Monitoring boreholes: None EPA Representative Monitoring points: None
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> . Geological Survey of Ireland, 100pp.
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 GWB

