

Killarga GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features		Associated terrestrial ecosystem(s)	Area (km ²)
35 Leitrim / Sligo Co. Co.	Rivers: Bonet, Skoanda, Owenmore, Killanummery. Lakes: Lee, Killaleen, Anarry, Carrigeencor.		None	46
Geology and Aquifers	Topography	The GWB occupies a relatively narrow area orientated NE-SW, located between the L. Allen Uplands to the south and the Ox mountains to the north, stretching from just south of Ballintogher to just south of Manorhamilton. It tapers toward either end. The location and boundaries are given in Figure 1. Killarga is located toward the centre. The land surface is hilly, with elevations ranging from 30-280 mAOD, sloping toward the northwest. The boundaries at either end are topographic divides which act as surface water divides, and include the divide between the Western and Borders RBD areas. It is bounded to the north and south by the karst aquifers of the Ballintogher and Killarga South GWB's. The rivers and streams flow in a northwesterly direction toward Lough Gill.		
	Aquifer categories	Ll: Locally important aquifer, moderately productive only in local zones. Lm: Locally important aquifer, generally moderately productive (9%).		
	Main aquifer lithologies	Dinantian Shales and Limestones, Dinantian Pure Unbedded Limestones, Dinantian Sandstones, Dinantian Upper Impure Limestones. Table 1 presents a list of rock units in the GWB.		
	Key structures	The key structural trend is SW-NE, parallel to the northern and southern boundaries, with the beds striking NE-SW and dipping 2-5° to the SE. Faults trending E-W cross the GWB toward the northern end and faults trending NW-SE cross the GWB toward the southern end.		
	Key properties	There are no data specific to the GWB. Two caves are reported in the Dinantian Upper Impure Limestones north of Killarga close to the boundary with the Dinantian Pure Bedded Limestones. Karstification is generally limited in the Dinantian Upper Impure Limestones. Transmissivity is expected to be low across the entire GWB, however, in the vicinity of faults, transmissivity may be higher. Storativity is expected to be low (<0.5%). The data are inadequate to calculate groundwater gradients, these are expected to be greater than 0.005.		
Overlying Strata	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.		
	Lithologies	<i>[Information to be added at a later date]</i>		
	Thickness	There are no depth to bedrock data available.		
	% area aquifer near surface	<i>[Information to be added at a later date]</i>		
Recharge	Vulnerability	<i>[Information to be added at a later date]</i>		
	Main recharge mechanisms	Diffuse recharge occurs via rainfall percolating through the subsoil and rock outcrops. Due to the low permeability of much of the aquifers, a high proportion of the available recharge will discharge to the streams.		
Discharge	Est. recharge rates	<i>[Information to be added at a later date]</i>		
	Large springs and high yielding wells (m³/d)	None identified		
	Main discharge mechanisms	The main groundwater discharges are to the streams, rivers and lakes. Small springs and seeps are likely to issue at the stream heads and along their course. The generally poor aquifer properties indicate that the baseflow component of total streamflow is likely to be low.		
	Hydrochemical Signature	Data are sparse, with 12 samples from one sampling point located in the Dinantian Shales and Limestones. It has a MgHCO ₃ signature, which is illustrated in Figure 2. Alkalinity (mg/l as CaCO ₃): 184-340; mean 300. Total Hardness (mg/l): 200-365; mean 342 (hard). Conductivity (µS/cm): 474-731; mean 713. Iron (mg/l): 0.31-0.91; mean 0.45.		

1st Draft Killarga Description August 2004

Groundwater Flow Paths	Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. Generally, water levels are 0-10 m below ground level. Flow paths are likely to be up to 300 m, with groundwater discharging rapidly to nearby streams and small springs. Groundwater flow directions are expected to follow topography.
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 a relatively narrow area orientated NE-SW, located between the L. Allen Uplands to the south and the Ox mountains to the north. Killarga is located toward the centre. The land surface is hilly, with elevations ranging from 30-280 mAOD, sloping toward the northwest. • It is bounded to the north and south by the karst aquifers of the Ballintogher and Killarga South GWB's. The boundaries at either end are topographic divides which act as surface water divides, and include the divide between the Western and Borders RBD areas. The rivers and streams flow in a northwesterly direction toward Lough Gill. • 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: comprising a broken and weathered zone typically less than 3m thick; a zone of interconnected fissuring 10-15m; and a zone of isolated, poorly connected fissuring typically less than 150m. • Storativity is expected to be low (<0.5%). 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 the low permeability bedrock, thus most of the available recharge 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. Generally, water levels are 0-10 m below ground level. Flow paths are likely to be up to 300 m, with groundwater discharging rapidly to nearby streams and small springs. • The rock units in GWB are generally of moderate to low permeability and baseflow to rivers and streams is likely to be relatively low.
Attachments	Table 1 and Figure 1 and 2.
Instrumentation	Stream gauge: None EPA Water Level Monitoring boreholes: (LEI 057) EPA Representative Monitoring points: (LEI 057)
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. Geological Survey of Ireland: The Dinantian (early) Sandstones, Shales and Limestones, The Dinantian Upper Impure Limestones, Precambrian Aquifer Chapters. Unpublished.
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	LI
mkBKI	Bricklieve Limestone Formation lower & Mudbank lime	Bioclastic cherty limestone	Dinantian Pure Unbedded Limestones	LI
BN	Bundoran Shale Formation	Dark shale, minor fine-grained limestone	Dinantian Shales and Limestones	LI
GC	Glencar Limestone Formation	Dark fine limestone & calcareous shale	Dinantian Upper Impure Limestones	LI
LG	Lisgorman Shale Formation	Thin-bedded calcareous shale, limestone	Dinantian Shales and Limestones	LI
MU	Mullaghmore Sandstone Formation	Sandstone, siltstone & shale	Dinantian Sandstones	Lm

Figure 1 Location and Boundaries of GWB

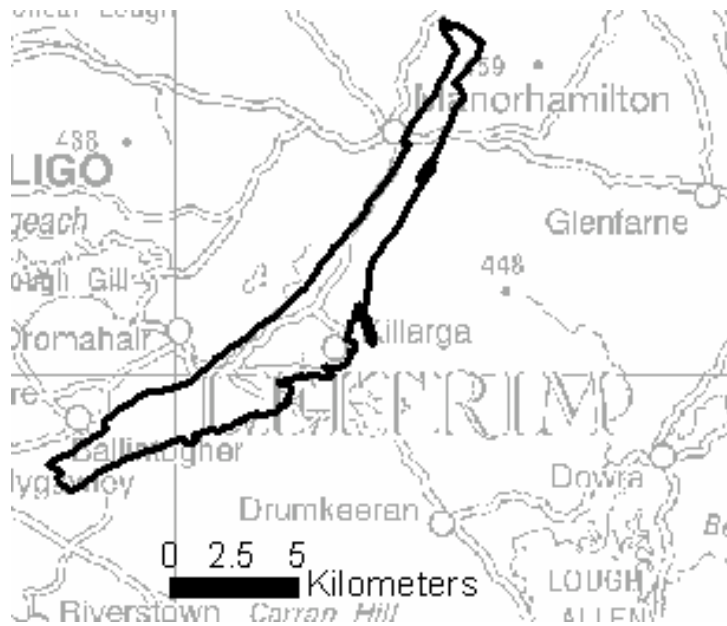


Figure 2

Chemical Signature of Relatively Uncontaminated Waters (expanded Durov Plot)

