Beltra -Sligo GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km^2)
35 Sligo Co. Co.	River: Ardnaglass, Dunmoran, Doonflin. Lakes: No lakes names given	Ballysadare Bay (000622)	46

Topography	The GWB occupies an area on the western side of Ballysadare Bay. The land surface is generally low lying, with elevations ranging from 0-170 mAOD. The GWB is bounded to the east and north by the coast. The poor aquifers of the Collooney GWB bounds the rest of the GWB. Figure 1 illustrates the location and boundaries. Surface drainage flows from south to north.	
Geology and Aquifers	**Aquifer categories**	**Rk^c:** Regionally important karstified aquifer dominated by conduit flow (87%). The 'c' signifies conduit flow. **Lm:** Locally important aquifer, generally moderately productive. **Ll:** Locally important aquifer, moderately productive only in local zones.
	Main aquifer lithologies	Dinantian Pure Bedded Limestones, Dinantian Shales and Limestones, Dinantian Sandstones, Dinantian Upper Impure Limestones.
	Key structures	The GWB is located to the north of the Ox Mountain Inlier. A major NE-SW trending fault (Ox Mountains-Pettigoe Fault) bounds the southern side of the GWB. A syncline runs through the GWB with the rocks on both limbs dipping approximately 5^o. Faults trending E-W and NE-SW cross the GWB.
	Key properties	There are no karst features other than several springs recorded, however, it is expected that the karstification is widespread, due to the similarity of the rocks to those of the Carrowmore East and West GWB's. Transmissivities are expected to be variable, ranging from 1 to greater than 2000 m^2/d. Storativity is likely to be low - approximately 0.01-0.02. Groundwater velocities are expected to be in the order of 20-50 m/hr. General flow directions are likely to be to the north under hydraulic gradients that are expected to be greater than 0.0005.
	Thickness	Most groundwater 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.
Overlying Strata	**Lithologies**	Till is the dominant subsoil type.
	Thickness	Data are sparse (n=2) and indicate that the thickness are less than 6 m.
	% 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. Diffuse recharge occurs via rainfall percolating through permeable subsoil and rock outcrops. Although there is no evidence for point recharge, it is expected to occur. Point recharge to the underlying aquifer occurs by means of swallow holes.
	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 springs, streams, rivers, lakes and to the coast.
	Hydrochemical Signature	There are no data available. The groundwater is expected to have a calcium bicarbonate signature similar to the Carrowmore West GWB, with high alkalinites, hardness and electrical conductivity.

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. A tracer test carried out by Higgins (1987) illustrates that water crosses a surface water catchment. Flow velocities can be rapid and variable, both spatially and temporally. Rapid groundwater flow velocities indicate that a large proportion of groundwater flow takes place in enlarged conduit systems. Flow path lengths can be up to a several kilometres in length. Overall groundwater flow will be towards the rivers and lakes, generally north toward the coast, 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. Any contamination of surface water is rapidly transported into the groundwater system, and vice versa.
Conceptual model	• The GWB occupies an area on the western side of Ballysadare Bay. The land surface is generally low lying, with elevations ranging from 0-170 mAOD. • The GWB is bounded to the east and north by the coast. The poor aquifers of the Collooney GWB bounds the rest of the GWB. Surface drainage flows from south to north. • The aquifer is a Regionally important karstified aquifer (**Rk^c**). • There are no karst features other than several springs recorded, however, it is expected that the karstification is widespread, due to the similarity of the rocks to those of the Carrowmore East and West GWB's. • Transmissivities are expected to be variable, ranging from 1 to greater than 2000 m^2/d. Storativity is likely 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 springs, streams, rivers, lakes and the coast. • The groundwater is likely to have calcium bicarbonate signature. • There is a high degree of interconnection between groundwater and surface water.
Attachments	Table 1 – Rock Units in GWB.
Instrumentation	**Stream gauge:** None **EPA Water Level Monitoring boreholes:** None **EPA Representative Monitoring points:** None
Information Sources	Daly, E. (1975) *Report on the groundwater potential of the area around Sligo town*. Geological Survey of Ireland. Higgins, T. (1987) *An Assessment of the Impact of Human activity on groundwater quality in the Carrowmore area of County Sligo*. BSc thesis. Sligo Regional Technical College. MacDermot, C.V. Long C.B. and Harney S.J (1996) *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*. With contributions from K. Carlingbold, G. Stanley, D. Daly and R. Meehan. Geological Survey of Ireland, 100pp. Thorn, R., Drew, D. and Coxon, C. (1990). *The Hydrology and Caves of the Geevagh and Bricklieve Karsts, Co. Sligo. Irish Geography* 23(2) (1990) 120-135. Geographical Society of Ireland, Dublin. Thorn, R. (1987). The Geevagh Karst. *Irish Speleology.* Journal of the Speleological Union of Ireland. Vol. 4 No. 1 1987. Thorn, R., Doyle, M., Henry, H. (1986). *The Groundwater Resources of South County Sligo – A Preliminary Appraisal.* Sligo Regional Techincal College. Report Number 86/1. ISBN 0 948870 01 X.
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 Rock units in GWB

StratCode	UnitName	Description	RockUnit	Aquifer Class
BS	Ballyshannon Limestone Formation	Pale grey calcarenite limestone	Dinantian Pure Bedded Limestones	Rkc
BN	Bundoran Shale Formation	Dark shale, minor fine-grained limestone	Dinantian Shales and Limestones	Ll
DA	Dartry Limestone Formation	Dark fine-grained cherty limestone	Dinantian Pure Bedded Limestones	Rkc
GC	Glencar Limestone Formation	Dark fine limestone & calcareous shale	Dinantian Upper Impure Limestones	Ll
MU	Mullaghmore Sandstone Formation	Sandstone, siltstone & shale	Dinantian Sandstones	Lm
BSrh	Red Hill Member	Sandy calcarenite, pebble beds	Dinantian Pure Bedded Limestones	Rkc

Figure 1 Location and boundaries of GWB