Yellow Strand GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km^2)
35 Sligo Co. Co.	Rivers: None Lakes: No lake names given 'waterbodies'	Cummeen Strand / Drumcliff Bay (000627)	26

Topography	The GWB occupies the tip of Lissadell peninsula, the main headland to the northern side of Sligo Bay and Drumcliff Bay. Elevations range from sea level to 50 mAOD. It is bounded to the north, south and west by the coastline. It is bounded to the east by the Grange West GWB. Figure 1 shows the location and boundaries.	
Geology and Aquifers	**Aquifer categories**	**Rk^c:** Regionally important karstified aquifer dominated by conduit flow. The 'c' signifies conduit flow. **Ll:** Locally important aquifer, moderately productive only in local zones.
	Main aquifer lithologies	Dinantian Pure Bedded Limestones dominate the GWB and there are a few outcrops of Dinantian Pure Unbedded Limestones and Dinantian Upper Impure Limestones along the northern coastline. See Table 1 for a list of rock units.
	Key structures	The GWB is located in the Rosses Point-Cuilcagh-Manorhamilton Fault Zone, which comprises several steep normal E-W trending faults, closely spaced. The beds are dipping at 5-30^o, mainly to the east and southeast.
	Key properties	There are no hydrogeological data specific to the GWB, however it is expected that rocks are karstified, as there is evidence of karstification in the nearby Glencar GWB. Karst features may be masked by the presence of thick tills and peat. Transmissivities are expected to 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 rapid. Groundwater gradients are expected to be greater than 0.0005. General flow directions are likely to be to the coast.
	Thickness	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.
Overlying Strata	**Lithologies**	Till is the dominant subsoil. There are also areas of cutover peat and wind blown deposits. The presence of peat is unusual over karstified limestones, however, an explanation is offered by Mac Dermot *et al* (1996), whom indicate that weathering of the Dartry Limestones leaves behind a "cherty residue" which provides a base for peat development. The peat may also form on top of low permeability till, however the stream density is relatively low, which may indicate relatively permeable till.
	Thickness	Depth to bedrock data are sparse. One borehole close to western edge has a depth to bedrock of 10 m recorded. It is likely that there are similar thicknesses across the GWB.
	% 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**	Diffuse recharge occurs via rainfall percolating through permeable subsoil and rock outcrops. There is no evidence for point recharge occurring, however there may be unrecorded karst features via which point recharge may be occurring.
	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 streams and to the coast. Stream density is relatively low.
	Hydrochemical Signature	There are no data available, however, the groundwater is expected to have a $CaHCO_3$ signature. Alkalinity, electrical conductivity and hardness are expected to be high. Water sampling carried out in the limestones in the vicinity of Carrowmore, Sligo report the following values in six samples (Higgins, 1987). Brackish water is likely close to the coast. Alkalinity (mg/l as $CaCO_3$): 113-163. Total Hardness (mg/l): 302-430. Conductivity (μS/cm): 580-725. Chloride (mg/l): 24-35.

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. Flow velocities can be rapid and variable, both spatially and temporally. Due to the relatively small size of the GWB, it is likely that flow paths will be shorter than other large karst GWB's. Overall groundwater flow will be towards the sea, 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. Any contamination of surface water is rapidly transported into the groundwater system, and vice versa.

Conceptual model	• The GWB occupies the headland to the northern side of Sligo Bay and Drumcliff Bay. Elevations range from sea level to 50 mAOD. • It is bounded to the north, south and west by the coastline. It is bounded to the east by the Grange West GWB. • The aquifer is a Regionally important karstified aquifer (**Rk^{c}**). There is no direct evidence of karstification but the lithology is the same as the nearby Glencar GWB, for which there is extensive karstification. • 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 diffuse mechanisms. Point recharge to the underlying aquifer may be occurring via as yet unrecorded karst features. • The main discharges are to streams and to the sea along the coastline. • The groundwater is expected to have a calcium bicarbonate signature. • There is a high degree of interconnection between groundwater and surface water.
Attachments	Table 1 and Figure 1.
Instrumentation	**Stream gauges:** None **EPA Water Level Monitoring boreholes:** None **EPA Representative Monitoring points:** None
Information Sources	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. 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.
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

Rock unit name and code	Description	Rock unit group	Aquifer Classification
Dartry Limestone Formation (DA)	Dark fine-grained cherty limestone	Dinantian Pure Bedded Limestones	Rkc
Glencar Limestone Formation (GC)	Dark fine limestone & calcareous shale	Dinantian Upper Impure Limestones	Ll
Benbulben Shale Formation & Mudbank Limestone (mkBB)	Calcareous shale with minor calcarenite	Dinantian Pure Unbedded Limestones	Ll

Figure 1 Location and boundaries of GWB