Tobercurry GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km^2)
34 Sligo / Mayo Co. Co.	Rivers: None Lakes: Two listed but no names given.	Moylough Turlough (001677)	39

Topography	The GWB occupies a small area centred on Tobercurry. The land surface is low-lying, with elevations at approximately 50 mAOD. The western boundary comprises the poorer aquifers of the Kilkelly GWB. The eastern boundary is a topographic divide. The main drainage is to the west. 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. Table 1 gives the rock units for the GWB.
	Key structures	The nose of an open syncline (Ballymote syncline) gently plunging to the NE occupies the GWB, whilst the beds dip 4 to 5° to the SW on the northern limb and beds dip 3-5° to the NE. A NW-SW fault is present in the northern part of the GWB.
	Key properties	Karstification is widespread throughout, and recorded features include caves and turloughs. Yield data are sparse, there is 1 "good" (100-400 m^3/d) well present. 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. Tracer tests have been carried out in the karstified limestones in the Geevagh GWB (Shannon RBD), where groundwater velocities of 3 to 90 m/hr have been recorded (Thorn *et. al.*, 1990). Thus similar velocities are expected in the limestones of this GWB. 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 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 whilst cutover peat is present in the western part of the GWB. 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	Data are sparse (n=1), with thickness less than 3 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 in this GWB. Diffuse recharge occurs over the GWB via rainfall percolating through permeable subsoil and rock outcrops. Despite the presence of peat and till, point recharge to the underlying aquifer occurs by means of swallow holes and caves. Recharge may also occur along 'losing' sections of streams.
	Est. recharge rates	*[Information to be added at a later date]*
Discharge	**Large springs and high yielding wells (m^3/d)**	Good wells : Doocastle – 327 m^3/d.
	Main discharge mechanisms	The main discharges are to the small springs, streams, rivers and lakes.

	Hydrochemical Signature	There are no data for the GWB, however, it is expected to have a $CaHCO_3$ signature, similar to the adjoining karst Ballymote GWB. Alkalinity, electrical conductivity and hardness are high. The range and median values are given below for two sources. carrowagark (n=14) / achonry (n=7) Alkalinity (mg/l CaCO3): 238-428, 360 / 404-416, 412 Hardness (mg/l CaCO3): 364-436, 388 / 404-456, 440 Conductivity (microsiemens/cm): 684-827, 731 / 837-889, 863
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. 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 to the west, but the karstified nature of the bedrock means that locally, groundwater flow directions can be highly variable. Groundwater may be confined locally.
Groundwater & Surface water interactions		There is a high degree of interconnection between groundwater and surface water. Numerous karst features are recorded, in particular caves and swallow holes. Because of the close interaction between surface water and groundwater in karstified aquifers, surface water and groundwater quality are also closely linked. Any contamination of surface water is rapidly transported into the groundwater system, and vice versa.

Conceptual model	• The GWB occupies a small area centred on Tobercurry. The land surface is low-lying, with elevations at approximately 50 mAOD. The western boundary comprises the poorer aquifers of the Kilkelly GWB. The eastern boundary is a topographic divide. The main drainage is to the west. • The aquifer is a Regionally important karstified aquifer (**Rk^c**). • Several karst features are recorded, and these include turloughs, caves and swallow holes. • Transmissivities are expected to variable, ranging from 1 to greater than 2000 m^2/d. Storativity is 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, rivers and lakes. • The groundwater is likely 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:** 34036 **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. 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. List of Rock units in GWB

Rock unit name and code	Description	Rock unit group	Aquifer Classification
Bricklieve Limestone Formation (lower) (BKL)	Bioclastic cherty limestone	Dinantian Pure Bedded Limestones	Rkc
Bricklieve Limestone Formation (upper) (BKU)	Bioclastic cherty limestone	Dinantian Pure Bedded Limestones	Rkc

Figure 1 Location and boundaries of GWB