Collooney GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km^2)
35 Sligo/Mayo Co. Co.	**Rivers**: Owenboy, Dunneill, Ballymeeny, Easky, Gowlan, Ballysodare, Buncrowey, Doonbeakin. **Lakes**: Belcloghy, Carrownaskeagh, Cloonacool North, Folleesh, Doo, Aghree, Anlaba, Arquilla, Brallee, Bree, Brickeagh, Croane, Keola, Minnaun, Nabrackmore, Nacrowagh, Nafullow, Rumduff, Weeloge, Loughannatoran, Loughnambrahen, Tonaloughan, Dargan.	Ballygawley Lough (001909), Ballysadare Bay (000622), Corhawnagh Lough (001902), Dunneil River (001664), Lough Dargan (001906), Ox Mountain Bogs (002006), Unshin River (001898) (O'Riain, 2004).	233

Topography	The GWB stretches from east of Bunnyconnellan to Collooney in the east of the GWB, and north to Drumore West. The land surface is characterised by the mountainous terrain of the Ox Mountain range, running along the spine of the GWB. Elevations range from 10-520 mAOD. It is bounded to the south by the Dinantian Pure Bedded Limestones of the Balleygawley GWB. The eastern and western boundaries are surface water divides with hydrometric area 34. The northern boundary is the coastline of Sligo Bay.	
Geology and Aquifers	**Aquifer categories**	**Pl:** Poor aquifer, generally unproductive except for local zones. **Ll:** Locally important aquifer, moderately productive only in local zones **Pu:** Poor aquifer, generally unproductive. **Lm:** (Locally important aquifer, generally moderately productive. 1 rock unit pending classification (Ballina Limestone Formation (Upper) (9 km^2)
	Main aquifer lithologies	The GWB is predominantly composed of Precambrian Quartzites, Gneisses & Schists. See Table 1 for a full list.
	Key structures	The key structural trend is SW-NE, subparallel to the southern boundary of the GWB. In the eastern part of the GWB, faults trending NNW-SSE, crosscut the main trend, with an approximate spacing of 1-3 km. Foliation and bedding dip 20-60^o to the south. In the vicinity of Drumore West, a NE-SW trending fault separates the younger Dinantian rocks which strike almost N-S, where a N-S trending anticline and a NE-SW trending syncline are present.
	Key properties	There are no data specific to the Precambrian Quartzites, Gneisses & Schists. However, data in the neighbouring Foxford GWB indicate low transmissivities, in the range of 0.1-10 m^2/d. 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, however, these are generally expected to be greater than 0.01. Aquifer properties are expected to be higher in the limestone and sandstone area, in the vicinity of Drumore West and Templeboy. The gradients are expected to be greater than 0.005.
	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.
Overlying Strata	**Lithologies**	The subsoil is predominantly Blanket Peat. Till predominates on the northern flank of the GWB toward the coastline. On the southern side of the GWB, the blanket peat also passes into till.
	Thickness	Rock outcrops along the spine of the GWB. The data are sparse (n=3). On the lower slopes the thickness ranges from 0-7 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**	Diffuse recharge occurs via rainfall percolating through the subsoil and rock outcrops. Due to the low permeability of much of the subsoil (blanket peat) and the aquifers, a high proportion of the available recharge will discharge to the streams. In addition, the steep slopes in the mountainous areas promote surface runoff. The stream density is high, indicating the high proportion of surface runoff.
	Est. recharge rates	*[Information to be added at a later date]*
Discharge	**Large springs and high yielding wells (m^3/d)**	No large springs or good wells 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	There are no data available for the Precambrian rocks. However, limited data (n=1) from the Foxford GWB is given as follows. Alkalinity (mg/l as $CaCO_3$): 95. Total Hardness (mg/l): 96. Conductivity (μS/cm): 267. Iron (mg/l): 0.1. Manganese (mg/l): 0.01. Limited data are available for the Dinantian Upper Impure Limestones, at Dromore West GWS, where conductivity is presented as follows (n=10). Conductivity (μS/cm): range 298-708; median 686. The GWB is expected to have a $CaHCO_3$ signature.
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, although there is one record of 33 m below ground in the vicinity of Drumore West. Flow paths are likely to be up to 300 m, with groundwater discharging rapidly to nearby streams and small springs. There are observed deep water strikes, indicating that there is a component of deep groundwater flow, however shallow groundwater flow is dominant. 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	• The GWB stretches from east of Bunnyconnellan to Collooney in the east of the GWB, and north to Drumore West. The spine of the GWB is characterised by the mountainous terrain of the Ox Mountain range. Elevations range from 10-520 mAOD. • It is bounded to the south by the Dinantian Pure Bedded Limestones of the Balleygawley GWB. The eastern and western boundaries are surface water divides with hydrometric area 34. The northern boundary is the coastline of Sligo Bay. • 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 peat and 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 overall flow direction is to the north. • The rock units in GWB are generally of low permeability and baseflow to rivers and streams is likely to be relatively low.
Attachments	Table 1 and Figure 1.
Instrumentation	**Stream gauges:** 35002, 35006, 35016. **EPA Water Level Monitoring boreholes:** None **EPA Representative Monitoring points:** None
Information Sources	Long, B., Mac Dermot, C.V., Morris, J.H., Sleeman, A.G., Tietzsch-Tyler, D., (1992). *A geological description to accompany the Bedrock Geology 1:100,000 Scale Map Series, Sheet 6, North Mayo.* Geological Survey of Ireland Map Series Report. Geological Survey of Ireland: The Dinantian (early) Sandstones, Shales and Limestones, The Dinantian Upper Impure Limestones, Precambrian Aquifer Chapters. Unpublished. O' Riain, G., (2004). *Water Dependent Ecosystems and Subtypes Draft Report.* WFD Support Projects. Compass Informatics in association with National Wildlife and Parks Service (DEHLG).
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

Code	Unit Name	Description	Unit Group	Aq Class
Am	Amphibolite (northeast Ox Mountains)	Amphibolite of unknown association	Precambrian Quartzites, Gneisses & Schists	Pl
UY	Attymass Formation (undifferentiated)	Upper and Lower Attymass Formations	Precambrian Quartzites, Gneisses & Schists	Pl
UX	Attymass Group (undifferentiated)	Undifferentiated schist & amphibolite	Precambrian Quartzites, Gneisses & Schists	Pl
BL	Ballina Limestone Formation (Lower)	Dark fine-grained limestone & shale	Dinantian Upper Impure Limestones	Ll
BU	Ballina Limestone Formation (Upper)	Grey limestone, thin shale	Dinantian Pure Bedded Limestones	Pending
BgTo	Ballygawley Tonalitic Gneiss	Tonalitic gneiss, foliated	Precambrian Quartzites, Gneisses & Schists	Pl
mkBS	Ballyshannon Limestone Formationr& Mudbank Lst	Pale grey calcarenite limestone	Dinantian Pure Unbedded Limestones	Ll
BB	Benbulben Shale Formation	Calcareous shale with minor calcarenite	Dinantian Shales and Limestones	Ll
BN	Bundoran Shale Formation	Dark shale, minor fine-grained limestone	Dinantian Shales and Limestones	Ll
CO	Carrick OHara Formation	Semi-pelitic, minor psammitic, schist	Precambrian Quartzites, Gneisses & Schists	Pl
CD	Corradrishy Formation	Schist, thin marble & metavolcanics	Precambrian Quartzites, Gneisses & Schists	Pl
EaAd	Easky Adamellite	Monzogranite, pink	Granites & other Igneous Intrusive rocks	Pl
GC	Glencar Limestone Formation	Dark fine limestone & calcareous shale	Dinantian Upper Impure Limestones	Ll
UMme	Meelick Member	Schist, aluminous schist, pebble beds	Precambrian Quartzites, Gneisses & Schists	Pl
Mb	Metabasite	variably altered	Precambrian Quartzites, Gneisses & Schists	Pl
SWC	Metalimestones	Calc-silicate schist, gneiss & marble	Precambrian Quartzites, Gneisses & Schists	Pl
MO	Moy Sandstone Formation	Sandstone, pebbly conglomerate	Dinantian Sandstones	Lm
MU	Mullaghmore Sandstone Formation	Sandstone, siltstone & shale	Dinantian Sandstones	Lm
UMna	Newantrim Member	Amphibolitic basic metavolcanics	Precambrian Quartzites, Gneisses & Schists	Pl
Pe	Pegmatite	Granitic pegmatite	Granites & other Igneous Intrusive rocks	Pl
SWK	Pelitic & semi-pelitic paragneiss	Granoblastic kyanite pelite/ -semipelite	Precambrian Quartzites, Gneisses & Schists	Pu
SWQ	Psammitic paragneiss	Granoblastic quartzofeldspathic psammite	Precambrian Quartzites, Gneisses & Schists	Pl
SWB	Semi-pelitic biotite schists		Precambrian Quartzites, Gneisses & Schists	Pu
S	Serpentinite	Serpentinite	Granites & other Igneous Intrusive rocks	Pl
TW	Twigspark Formation	Sandstone, sandy limestone & mudstone	Dinantian (early) Sandstones, Shales and Limestones	Pl

Figure 1. Location and Boundaries of GWB