Beltra Lough South GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km^2)
32 Mayo Co Council	**Rivers**: Moyour, Rossow, Owennabrockagh, Newport, Glaishwy, Carrowsallagh, Ballyteige Skerdagh, Crumpaun, Boghadoon. **Lakes**: Beltra, Bleachyard, Cuilmore, Derrintaggert, Derryibbeen, Derryloughan, Derrynafreva, Doogan, Doontrusk, Duffy,s, Drumgoney, Furnace, Arrow, Fadda, Tully, Nacreeva, Strikeen.	Clew Bay Complex (001482)	58

Topography		The GWB occupies an area from Beltra to Newport, comprising two limbs, trending NE-SW and E-W, with L. Beltra in the centre. The land surface comprises a NE-SW trending valley named Glen Hest, present between the Nephin Beg Mountain range and the high ground between Newport and Castlebar. Elevations range from 0-60 mAOD. It is relatively narrow, ranging between 1-5 km, sandwiched by the poorly productive aquifers of the Mallaranny GWB to the north, and by the Clifden-Louisburgh GWB to the southeast. The northeastern boundary is a surface water divide with hydrometric area 34 and is the boundary with the Beltra Lough North GWB. Surface drainage is to the southwest via the Newport river.
Geology and Aquifers	**Aquifer categories**	The main aquifer category in this GWB is: **Lm**: Locally important aquifer which is generally moderately productive.
	Main aquifer lithologies	This GWB is predominantly composed of Dinantian Sandstones. There are approximately 6 km^2 in total of Dinantian Pure Bedded Limestones, in the vicinity of Beltra Lough and the northeastern boundary. See table 1 for a list of rock units.
	Key structures	Faults trending SW-NE are the main fault sets. The beds dip $10-20^o$ to the SW in the southern limb and $10-15^o$ to the NW and SE in the northern limb, indicating a SW-NE trending syncline along L. Beltra.
	Key properties	In general, Dinantian Sandstones, given their dominant sandstone lithology, which generally results in a higher fissure permeability, has the potential to be a transmissive aquifer. Data are sparse (1 well), with a reported yield of 76 m^3/d and a specific capacity of 11 m^3/d/m. The data suggests a transmissivity in the order of 10-20 m^2/d. In the vicinity of faults, it may be higher. Storativity in the aquifer is expected to be relatively high, in the order of 2%. Water levels are 0-7 m below ground level. Gradients are expected to be greater than 0.001. There are no data for the Dinantian Limestones. Transmissivities are expected to range from 1 m^2/d to greater than 250 m^2/d. Storativity is expected to be low - approximately 0.01-0.02 (Daly, 1985). Gradients are expected to be greater than 0.0005.
	Thickness	Most groundwater flux is likely to be in the upper part of the aquifer, comprising three broad zones: a zone comprising a broken and weathered zone typically less than 3 m thick; a zone of interconnected fissuring up to 30 m thick; and a zone of isolated poorly connected fissuring typically less than 150 m.
Overlying Strata	**Lithologies**	The subsoils are dominated by till (70%). Table 2 gives a list of subsoil types present.
	Thickness	Available data indicate that the thickness are 0-14 m.
	% area aquifer near surface	*[Further Information to be added at a later date]*
	Vulnerability	*[Further Information to be added at a later date]*
Recharge	**Main recharge mechanisms**	Diffuse recharge occurs via rainfall percolating through the subsoil and rock outcrops. A high proportion of the available recharge will discharge to the streams where there is blanket peat and low permeability till present.
	Est. recharge rates	*[Information to be added to and checked]*
Discharge	**Large springs and large known abstractions (m^3/d)**	None identified.
	Main discharge mechanisms	The main groundwater discharges are to the streams, rivers and lakes.
	Hydrochemical Signature	There are no data available, however, data from the Deel-Mayo GWB is presented as follows. It has a $CaHCO_3$ signature. [n=2] Alkalinity (mg/l as $CaCO_3$): 250, 262; Total Hardness (mg/l): 252, 262; Conductivity (μS/cm): 552, 577; Iron 0.5, 3.0 mg/l; Manganese 0.07, 0.78 mg/l. High alkalinities and hardness (in the order of 300 and 350 mg/l $CaCO_3$) are expected for the Limestones. Electrical conductivity is also expected to be high, approximately 700 μS/cm.

Groundwater Flow Paths		Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. There is a well connected fissured zone, enabling an element of regional groundwater flow. Flow paths can be expected to be relatively long, and are likely to be up to 2000 m. Groundwater flow directions are expected to follow topography, generally to the southwest.
Groundwater & Surface water interactions		Groundwater will contribute baseflow to the streams, rivers and lakes.
Conceptual model		• The GWB occupies an area from Beltra to Newport, comprising a NE-SW trending valley named Glen Hest. Elevations range from 0-60 mAOD. Surface drainage is to the southwest via the Newport river. • The groundwater body is composed of Dinantian Sandstones and Dinantian Pure Bedded Limestones. Transmissivity in the sandstones is in order of 10-20 m^2/d. In the vicinity of faults, it may be higher. Storativity in the aquifer is expected to be relatively high, in the order of 2%. • Transmissivities are expected to range from 1 m^2/d to greater than 250 m^2/d in the Dinantian Pure Bedded Limestones. Storativity is expected to be low - approximately 0.01-0.02. • Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. Gradients are expected to be greater than 0.0005. Water levels are generally 0-7 m below ground level. • Recharge occurs diffusely through the subsoils and rock outcrops. • It has a $CaHCO_3$ signature. • Flow paths can be expected to be relatively long, and are likely to be up to 2000 m. Groundwater flow directions are expected to follow topography, generally toward Newport. • Groundwater will discharge to and contribute baseflow to streams, rivers and lakes.
Attachments		Table 1, 2 & Figure 1.
Instrumentation		**Stream gauges:** None **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. Aquifer Chapters: The Dinanatian Sandstone Aquifers.
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

Code	Unit Name	Description	Rock Unit	Aquifer Cat
CP	Capnagower Formation	Grey sandstone and siltstone	Dinantian Sandstones	Lm
MO	Moy Sandstone Formation	Pale sandstone, siltstone, conglomerate	Dinantian Sandstones	Lm
RF	Rockfleet Bay Limestone Formation	Dark fine limestone and calcareous shale	Dinantian Pure Bedded Limestones	Rkc
AI	Aille Limestone Formation	Dark fine-grained limestone, shale	Dinantian Pure Bedded Limestones	Rkc

Table 2 Subsoils

Parent Material	Code	% Area gwb
Alluvium	A	3.55
Alluvium undifferentiated Silty	Asi	0.01
Blanket peat	BktPt	22.08
cutover peat	Cut	4.66
Metamorphic sands and gravels	GMp	0.49
Lake sediments undifferentiated	Lake	0.52
Bedrock at surface	Rck	0.41
Sandstone till (Devonian)	TDCSs	52.91
Sandstone till (Devonian)	TDSs	14.21
Limestone till (Carboniferous)	TLs	1.17

Figure 1. Boundaries and Location of GWB