

Recess GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km²)
31 Galway County Council	Rivers: Recess, Owentooey, Glencoaghan, Gleninagh, Screeb, Tooreenacoona. Lakes: An Loch Ard, Athry, Ballynahinch, Dean's Island, Derryclare, Garroman or Glendollagh, Illion, Lehanagh, Lehanaghbeg, Loch na Cuige Rua, Inagh, Nabluckan, Naboley, Nagasser, Shindilla, Loughaun, Loughaunnagrevagh, Loughbegcanadroma, Oorid.	The Twelve Bens / Garraun Complex (002031), Connemara Bog Complex (002034) (O'Riain, 2004).	~110
Topography	The land surface is characterised by steep slopes and mountainous terrain along the northwest and northeastern boundary of the GWB, flattening in a southerly direction toward Recess and toward the centre of the GWB. Elevations range from 10-720 mAOD.		
Geology and Aquifers	Aquifer categories	The main aquifer category in this GWB is: PI: Poor aquifer which is generally unproductive except for local zones.	
	Main aquifer lithologies	This GWB is composed primarily (99%) of Precambrian Quartzites, Gneisses & Schists. Table 1 gives a full listing of units and the area occupied within the GWB.	
	Key structures	The rocks have undergone intense deformation, comprising faults and folds. The main fold axes trend E-W and the main fault trend is NW-SE.	
	Key properties	No transmissivity data are available for the Precambrian Quartzites, Gneisses & Schists in the GWB, however in the Clifden GWB, the data indicate low transmissivities – in the range of 0.7-20 m ² /d. In the vicinity of faults, transmissivity may be higher. The rocks are characterised by the absence of an intergranular permeability and the presence of low fissure permeability (Daly, 1985). Storativity is expected to be low (<0.5%). The data are inadequate to calculate groundwater gradients, however, these are expected to be greater than 0.01.	
	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	A full list of subsoil classification for the GWB is given in Table 2. Blanket Peat covers 41% of the area, rock at the surface 45%.	
	Thickness	The thickness of peat ranges from 0-6 m depending on topography (Daly, 1985). It is expected that subsoil thickness is greater in the valleys.	
	% 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. Due to the low permeability of much of the subsoil (blanket peat) and the aquifers, a high proportion of the available recharge will discharge rapidly to the streams. In addition, the steep slopes in the mountainous areas promote surface runoff. Evidence for this is the stream density, which is greater than 1 km/km ² .	
	Est. recharge rates	[Further Information to be added at a later date]	
Discharge	Large springs and large known abstractions (m³/d)	There are no known large springs or abstractions in the GWB. [Information to be added to and checked]	
	Main discharge mechanisms	Shallow groundwater is likely to discharge to streams and lakes, but the limited bedrock transmissivity means that the baseflow component of the total streamflow will be low. Small springs and seeps are likely to issue at the stream heads and along their course.	
	Hydrochemical Signature	It has a calcium-magnesium bicarbonate signature (Ca-MgHCO ₃). Wells north of Clifden have [n=8]: Alkalinity (mg/l as CaCO ₃): range = 32-180, median = 88; Total Hardness (mg/l): range 82-336, median 117 (slightly Hard).	
Groundwater Flow Paths	Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. Flow paths are likely to be up to 100 m, with groundwater discharging rapidly to nearby streams and small springs. Overall, flow directions follow topography, generally to the south. Water levels are generally 0-6 m below ground level.		

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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. Lakes comprise approximately 9% of the GWB.
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Conceptual model	<ul style="list-style-type: none"> • The GWB is bounded to the northeast and northwest surface water catchment divides. The southern boundary is marked by the Precambrian Marbles. The terrain is mountainous along the northwestern and northeastern areas, flattening toward the centre of the GWB and to the southern boundary toward Recess. • The GWB is composed primarily of low transmissivity rocks. Most of the groundwater flux is in the uppermost part of the aquifer: comprising a broken and weathered zone typically less than 3m thick; a zone of interconnected fissuring typically less than 10m; and a zone of isolated fissuring typically less than 150m. • Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. • 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. • Flow paths are likely to be short (0-100 m) with groundwater discharging rapidly to nearby streams and small springs and flow directions are expected to follow topography. Overall flow direction is southwards. • 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, 2 and Figure 1.
Instrumentation	Stream gauges: 31001, 31005. EPA Representative Monitoring points: None
Information Sources	Daly, D. (1985) <i>Groundwater in County Galway with particular reference to its Protection from Pollution</i> . Geological Survey of Ireland report for Galway County Council. 98pp. Pracht, M., Lees, A., Leake, B., Feely, M., Long, B., Morris, J., McConnell, B., (2003). <i>A geological description to accompany the Bedrock Geology 1:100,000 Scale Map Series, Sheet 14, Galway Bay</i> . Unpublished Geological Survey of Ireland Map Series Report. Geological Survey of Ireland Aquifer Chapters: The Precambrian Aquifer. Unpublished O' Riain, G., (2004). <i>Water Dependent Ecosystems and Subtypes Draft Report</i> . 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

RockUnit	%area GWB	Description	Code	Unit Name
Granites & other Igneous Intrusive rocks	0.39%	Medium/coarse non-porphyritic granite	OuGr	Oughterard Granite
Precambrian Quartzites, Gneisses & Schists	99.55%	Psammitic pelitic & semi-pelitic schists	ST	Streamstown Schist Formation
Silurian Metasediments and Volcanics	0.05%	Calcareous psammite, quartzite at top	LN	Lough Nacorra Formation
Precambrian Marbles	0.00%	Marbles, schists and grits	LM	Lake Marbles Formation

Table 2. Subsoil types

Parent Material	Code	% Area
Alluvium	A	0.06%
Blanket Peat	BktPt	41.40%
Lakes	Lake	8.65%
Islands	Lk_isle	0.17%
Madeground	Made	0.01%
Rock at surface	Rck	45.34%
scree	Scree	0.03%
Metamorphic Till	TMp	4.34%

Figure 1. Boundaries and Location of Recess GWB.

