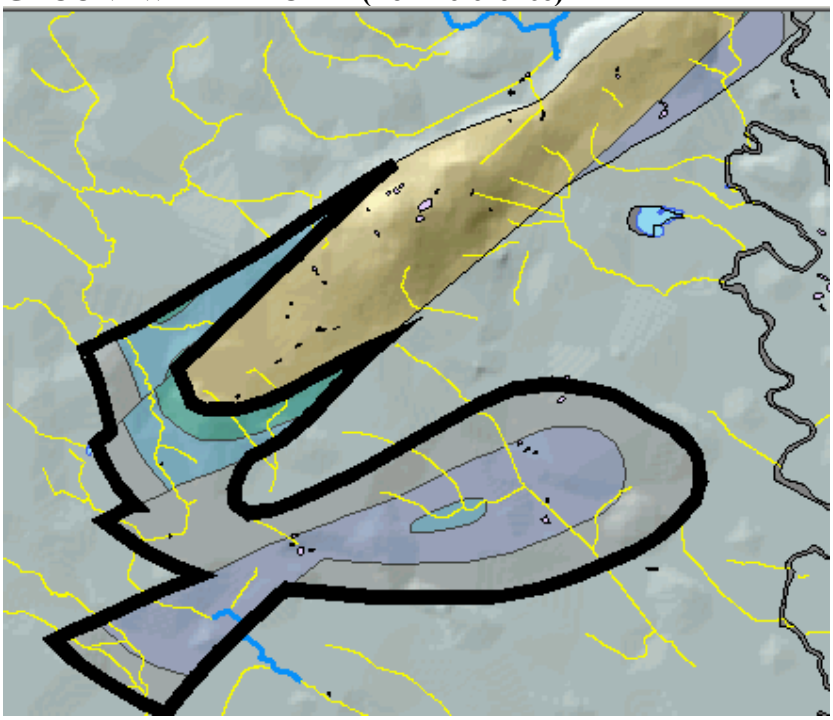
Ballygar Groundwater Body: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km^2)
26 – Shannon Upper Galway & Roscommon Co. Co.'s.	Rivers: Killian; Shiven; Cloonlyon; Woodbrook; Kingstown Loughs: Ernaul;	(000229) Ballygar Bog; (000283) Kilmore Bog; (001242) Carrownagappul Bog (small part); (000240) Camderry Bog (v. small part).	34

Topography	This body occupies a generally flat-lying area to the west and south of the Mount Mary Groundwater body. The highest point of over 100 mAOD occurs on the lower slopes of the Mount Mary ridge. Elevations are lowest (45-50 mAOD) near Ballygar in the southeast of the body. The body is composed of a variety of impure or mixed Dinantian Limestones. These overlie the Dinantian Sandstones of the Mount Mary Groundwater body. The body is crossed from north to south by the Shiven and Killian Rivers and the smaller Cloonlyon River just east of Ballygar. Large parts of the body are covered by cut peat, some of which are forested. The Mount Mary and the Ballygar Groundater Bodies are surrounded by a Karstic Groundwater Body.	
Geology and Aquifers	Aquifer categories	**Ll:** Locally important aquifer which is moderately productive only in local zones.
	Main aquifer lithologies	Dinantian (early) Sandstones, Shales and Limestones, Dinantian Lower Impure Limestones, Dinantian Pure Unbedded Limestone and Dinantain Upper Impure Limestones
	Key structures	This groundwater body occurs in a relatively small fault bounded inlier within a larger area of Dinantian Pure Bedded Limestone (Suck GWB). The major northeast southwest trending Strokestown Fault forms the northwest boundary of the inlier. The intense stresses that would have accompanied such a structural movement may have been accompanied by secondary faulting and jointing.
	Key properties	No data on hydrogeological properties specific to this groundwater body are available. Based on experience in other areas transmissivities in the rock units of this groundwater body would be expected to be relatively low. Typical transmissivities in the Dinantian Lower Impure Limestones are usually in the range from 5-10 m^2/d. Transmissivities ranging from 10-40 m^2/d have been recorded for the Dinantian Pure Unbedded Limestones (Northern Region) with the median expected to be in the lower end of the range. However, in areas where there is a high level of structural deformation, transmissivities in the Dinantian Pure Unbedded Limestones can be higher. Transmissivity in the Upper Impure Limestones will be in the range 5-20 m^2/d (Dinantian Upper Impure Limestone aquifer chapter).
	Thickness	This groundwater body is composed of a variety of impure which are classified as a locally important aquifer which is moderately productive only in local zones (Ll). In general, the effective thickness of this aquifer is likely to be not more than 15 m, comprising a weathered zone of a few metres and a connected fracture zone of up to 10 m below this. Although deeper flow can occur in areas which have undergone a higher degree of structural deformation and faulting.
Overlying Strata	Lithologies	*Sandstone Till, Alluvium, Cut Peat and some Outcrop and Shallow Rock [More information will be added at a later date]*
	Thickness	One dtb data point of 11m
	% 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 will occur over the entire groundwater body via rainfall soaking through the subsoil. More recharge will occur where overlying strata are thinner.
	Est. recharge rates	*[Information to be added at a later date]*
Discharge	Springs and large known abstractions (m^3/d)	Creeveroe GWS (109m^3/d); Lisquill West GWS – Lohans Bore (27m^3/d)
	Main discharge mechanisms	The main discharges will be to the Rivers Killian, Shiven and Cloonlyan crossing the groundwater body. There may be some small discharges to the surrounding Karstic GWB.
	Hydrochemical Signature	No relevant hydrochemical data are available in this GWB for assessment. The body is composed of a variety of Dinantian Limestones. By analogy with results from other GWBs, the groundwater is hard (300–400 mg/l $CaCO_3$), with corresponding high alkalinity (250–340 mg/l $CaCO_3$) and high electrical conductivity. The pH will be neutral. The groundwater is likely to have a calcium–bicarbonate signature. The Argillaceous Limestone, Waulsortian Limestone, Ballysteen Formation and Moathill Formation rock units are calcareous.

Groundwater Flow Paths	Groundwater flow in this groundwater body will be of a local nature. Groundwater flow will be concentrated in fractured and weathered zones and in the vicinity of fault zones (these rocks do not exhibit intergranular permeability). Groundwater flow paths will be short, in general between 30 and 300 m, with groundwater discharging to streams. Most groundwater flow is likely to circulate in the upper tens of metres of bedrock, recharging and discharging in local zones. The low permeability rocks of this groundwater body act as a barrier to groundwater flow within the surrounding Pure Bedded Limestones of the Suck GWB..
Groundwater & Surface water interactions	
Conceptual model	• The groundwater body is bounded to the northwest by contact with the adjoining Mount Mary GWB. The remainder of the body is surrounded by a high permeability 'Karstic GWB'. • The body occupies a generally flat lying area to the south of the Mount Mary ridge, as well as some of the lower slopes of the ridge. • The groundwater body is composed of various low permeability Dinantian Limestones which are likely to act as a confining layer close to the contact with the underlying Dinantian Sandstone of the adjoining Mount Mary GWB. • Groundwater flow will be concentrated in fractured and weathered zones and in the vicinity of fault zones. • Recharge occurs diffusely through the subsoils and via outcrops • Groundwater is generally unconfined within this GWB. Most flow in this aquifer will occur in a zone near the surface. In general the effective thickness of this aquifer is likely to be about 10m, comprising a weathered zone of a few metres and a connected fracture zone below this. However, deep-water strikes in more isolated faults/fractures can be encountered. Groundwater flow in this groundwater body will be of a local nature. Groundwater flow paths will be short in the order of between 30 and 300 m. • Groundwater discharges to the small streams crossing the body. A small amount may discharge to the surrounding Karstic Groundwater body but given the dominant local flow system in this groundwater body the contribution will not be particularly large.
Attachments	None
Instrumentation	Stream Gauges: None EPA Water Level Monitoring boreholes: None EPA Representative Monitoring boreholes: GAL9 Ballygar W. S.
Information Sources	Morris J.H., Somerville I.D. and MacDermot C.V. (2002). *Geology of Longford-Roscommon.* A Geological Description to Accompany the Bedrock Geology 1:100,000 Bedrock Series Sheet 12. With contributions by D.G. Smith, M. Geraghty, B. McConnell, K. Carlingbold, W. Cox, D. Daly. Geological Survey of Ireland, 121pp. (publication pending) Aquifer Chapters: Dinantian (early) Sandstones, Shales and Limestones, Dinantian Lower Impure Limestones, Dinantian Pure Unbedded Limestone and Dinantain Upper Impure Limestones
Disclaimer	Note that all calculations and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae

GROUNDWATER BODY (For Reference)



List of Rock units in BallygarGroundwater Body

Rock unit name and code	Description	Rock unit group
Moathill Formation (MH)	Limestone, calcareous sandstone, shale	Dinantian (early) Sandstones, Shales and Limestones
Ballysteen Formation (BA)	Dark muddy limestone, shale	Dinantian Lower Impure Limestone
Waulsortian Limestone (WA)	Massive unbedded lime mudstone	Dinantian Pure Unbedded Limestone
Argillaceous Limestone (AL)	Dark limestone & shale, chert	Dinantian Upper Impure Limestone