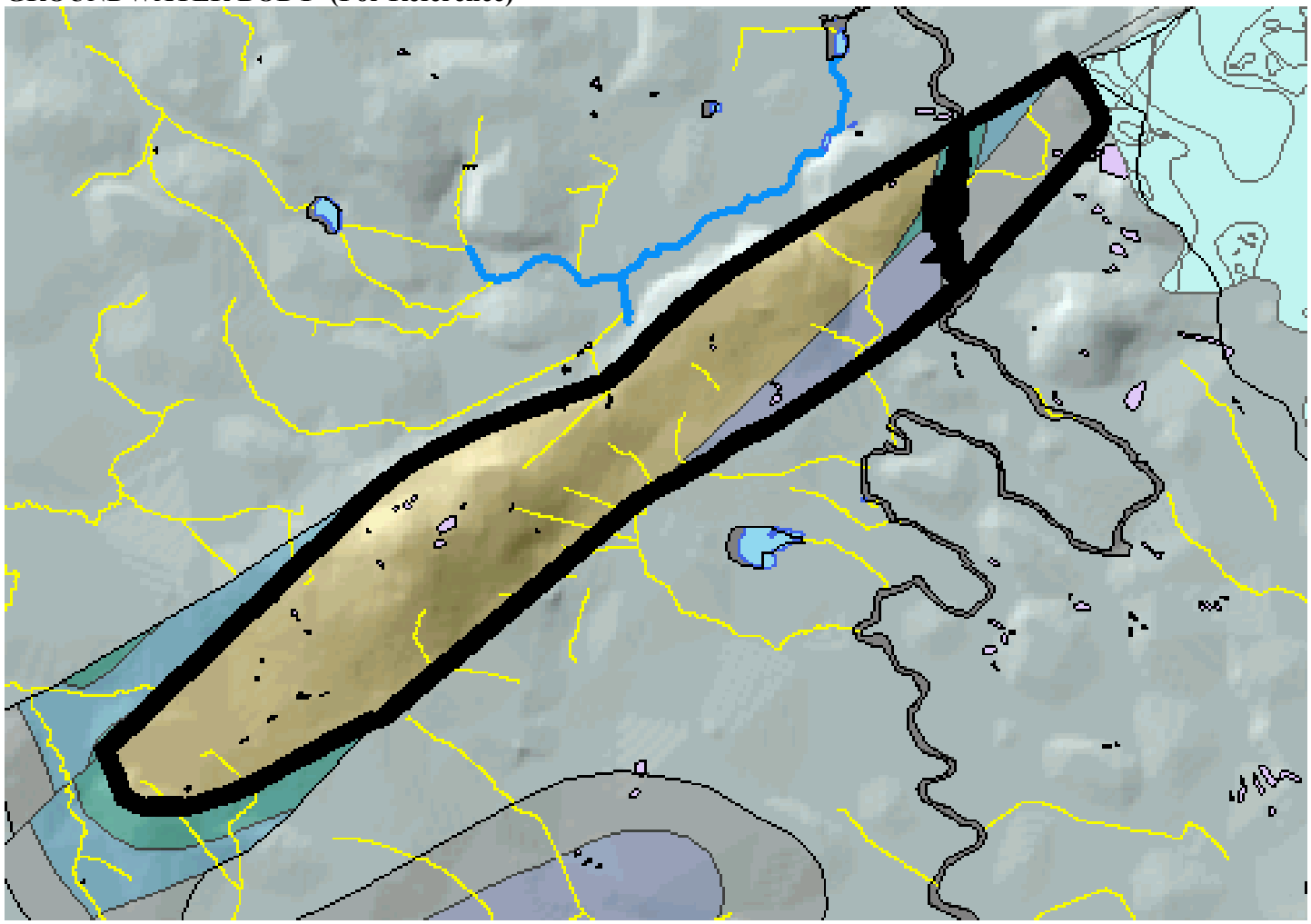
Mount Mary Groundwater Body: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km^2)
26 – Shannon Upper Galway & Roscommon Co. Co.'s.	Rivers: Suck. Streams:Tributaries of Killian River,	(000222) Suck River Callows, Castlecoote-Shannonbridge;	24

Topography	This body occupies a northwest-southeast trending ridge which has Mount Mary as the highest peak (163 mAOD). The ridge is underlain by Dinantian Sandstones (Fearnaght Sandstone Formation). At the northeastern end of the body a small area (5km^2) of more low-lying ground (50-60 mAOD) is underlain by a variety of Dinantian Limestones. A small number of streams flow off the ridge into the surrounding Dinantian Pure Bedded Limestones of the Suck GWB. The River Suck flows south across the northeastern end of the body.	
Geology and Aquifers	Aquifer categories	**Lm:** Locally important aquifer which is generally moderately productive. **Ll:** Locally important aquifer which is moderately productive only in local zones.
	Main aquifer lithologies	Dinantian Sandstones. A small area underlain by a variety of Dinantian Limestones occurs in the northwestern end of the body. This area includes rock types from the Dinantian (early) Sandstones, Shales and Limestones, Dinantian Lower Impure Limestones, Dinantian Pure Unbedded Limestone and Dinantain Upper Impure Limestones rock unit groups. These Dinantian Limestones are considered as part of the Mount Mary GWB as they are isolated from similar Dinantian Limestones in the Ballygar GWB (south of Mount Mary), and comprise too small an area to be considered separately as a groundwater body.
	Key structures	This groundwater body occurs in a relatively small fault-bounded inlier within a larger area of Dinantian Pure Bedded Limestone (Suck Groundwater Body). 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 are likely to have been accompanied by secondary faulting and jointing which may act to improve the permeability of these rocks.
	Key properties	No data on hydrogeological properties specific to this groundwater body are available. In general, Dinantian Sandstones, given their dominant sandstone lithology which generally results in a higher fissure permeability, would be expected to have a transmissivity of >10 m^2/d. The small area of limestone at the northeastern end of the body is expected to have a much lower transmissivity and to act as a confining layer over the Dinantian Sandstones. 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 in the Dinantian Pure Unbedded Limestones transmissivities can be higher.
	Thickness	This groundwater body is composed primarily of the Fearnaght Sandstone Formation (Dinanatian Sandstone). Having a dominantly sandstone lithology the permeability of individual fractures and the degree of interconnection is expected to be generally high. Based on experience in other Irish aquifers this aquifer is expected to have a broken and weathered rock zone of a few metres thick. Beow this, a zone of more interconnected fissures of up to 30 m is expected, with deeper flow in areas of higher structural deformation and faulting. The various Dinantian Limestones that occupy a small area at the northeastern end of the body. In these rocks, the zone of more interconnected fissures is expected to be typically 10 m thick although deeper flow can occur in areas which have undergone a higher degree of structural deformation and faulting. These rocks act as a confining layer to the underlying Dinantian Sandstones.
Overlying Strata	Lithologies	*Sandstone Till, Limestone Till, Cut Peat and Outcrop and Shallow Rock.[Information will be added at a later date]*
	Thickness	*One depth to bedrock data point of 12 m near the River Suck. Areas of outcrop and shallow rock recorded along the Mount Mary ridge. [More information will be added at a later date]*
	% area aquifer near surface	*[Information will 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 subsoils are thinner.
	Est. recharge rates	*[Information to be added at a later date]*
Discharge	Springs and large known abstractions (m^3/d)	Castlecoote (ROS15) - EPA list of groundwater sources (March 2002). *[More information to be added at a later date]*

	Main discharge mechanisms	The main groundwater discharges will be to the River Suck and to the streams that flow off the ridge. There is likely to be some groundwater discharge into the surrounding Dinantian Pure Bedded Limestones which form the Suck GWB.
	Hydrochemical Signature	No relevant hydrochemical data are available in this GWB for assessment. The body is composed of Dinantian Sandstone.
Groundwater Flow Paths		Groundwater flow in the Dinantian Sandstones is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. The dominant sandstone lithology and limited shale content will generally result in a higher frequency of more open fractures and consequently higher fissure permeability. Where there has been more intense faulting and folding these zones of high permeability will be more common. The degree of interconnection of fissures is expected to be relatively high in Dinantian Sandstones, enabling an element of regional groundwater flow. Flow path lengths in such high permeability rocks can be up to 500-2000 m. Regional groundwater flow is expected to be to the south and east towards the River Suck. On a more local scale groundwater flow in the Dinantian Sandstones will be generally to the streams and rivers crossing the body. The Mount Mary inlier, in particular the impure limestones, is likely to act as a barrier to flow in the surrounding Karstic Groundwater Body.
Groundwater & Surface water interactions		
Conceptual model		• The groundwater body is bounded to the north, east and south by contact with the surrounding high permeability Dinantian Pure Bedded Limestones of the Suck GWB, and to the west by the contact with the lower permeability Ballygar GWB. The Strokestown fault forms part of the northern boundary. • The body occupies a northwest-southeast trending ridge which has Mount Mary as the highest peak. • The groundwater body is composed primarily of Dinantian Sandstone which is considered to have the potential for relatively high fissure permeability. The dominant sandstone lithology means that fractures where they occur are more likely to remain open. The Dinantian Sandstone is, however, less permeable than the surrounding karstified Dinantian Pure Bedded Limestone. A small area at the northeastern end of the body is composed of various low permeability Dinantian Limestones, isolated from similar Dinantian Limestones south of this body and too small to be considered separately as a groundwater body. These rocks are likely to act as a confining layer to the underlying Dinantian Sandstone. • Groundwater flow will occur along fractures, joints and major faults. • Recharge occurs diffusely through the subsoils and via outcrops • Groundwater is generally unconfined within this GWB, but may become locally confined beneath the small area of lower permeability limestones in the northeastern end of the body. 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 30m, 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. Regional groundwater flow is expected to be towards the River Suck, but on a local scale, flow will be generally to the streams and rivers crossing the aquifer. In a higher permeability rock such as the Dinantian Sandstones, flow path lengths can be up to 500-2000 m while in lower permeability rocks such as those in the northeastern end of the body, flow path lengths are relatively short, and in general are between 30 and 300 m. • Groundwater discharges to the small streams crossing the body, to the surrounding Karstic Groundwater body and to the River Suck in the east of the body.
Attachments		None
Instrumentation		Stream Gauges: None EPA Water Level Monitoring boreholes: None EPA Representative Monitoring boreholes: None
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 Sandstones, Dinantian (early) Sandstones, Shales and Limestones, Dinantian Lower Impure Limestones, Dinantian Pure Unbedded Limestone and Dinantain Upper Impure Limestones
Disclaimer		Note that all calculation 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 Mount Mary Groundwater Body

Rock unit name and code	Description	Rock unit group
Fearnaght Sandstone Formation (FT)	Pale conglomerate & red sandstone	Dinantian Sandstones
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