

Castlereia GWB: Summary of Initial Characterisation.

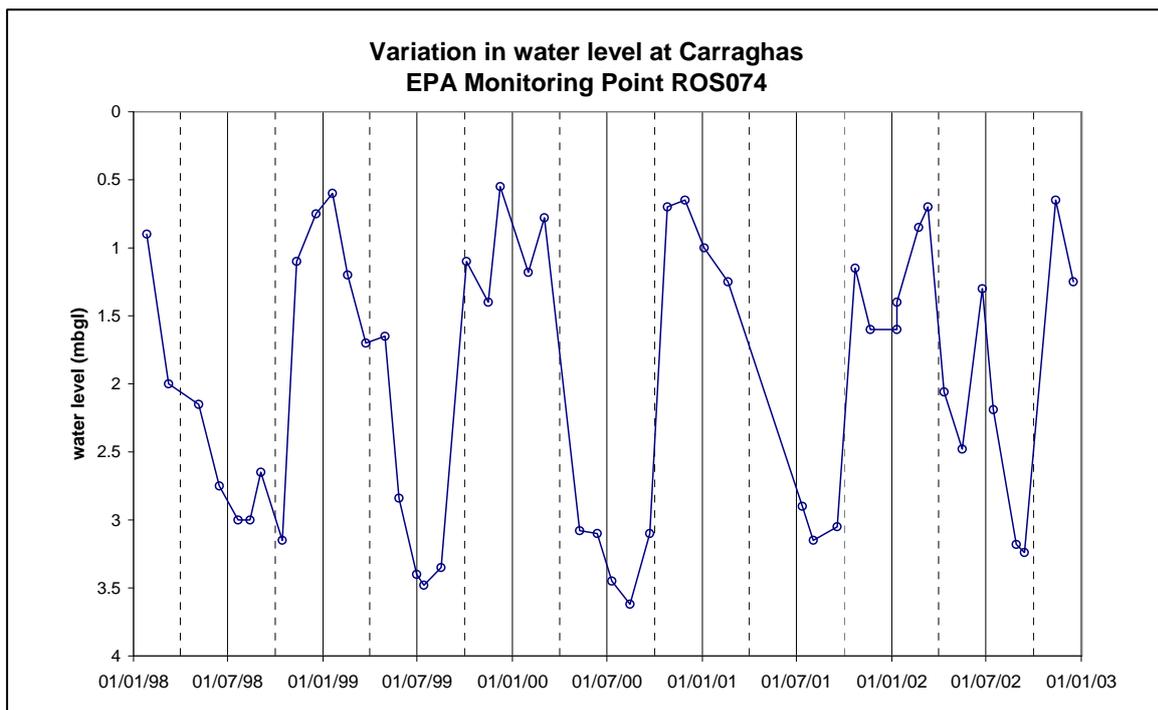
QUESTIONS – what to say about general flow direction? Likelihood of flow to surrounding Visean?

Castlerea GWB: Summary of Initial Characterisation.

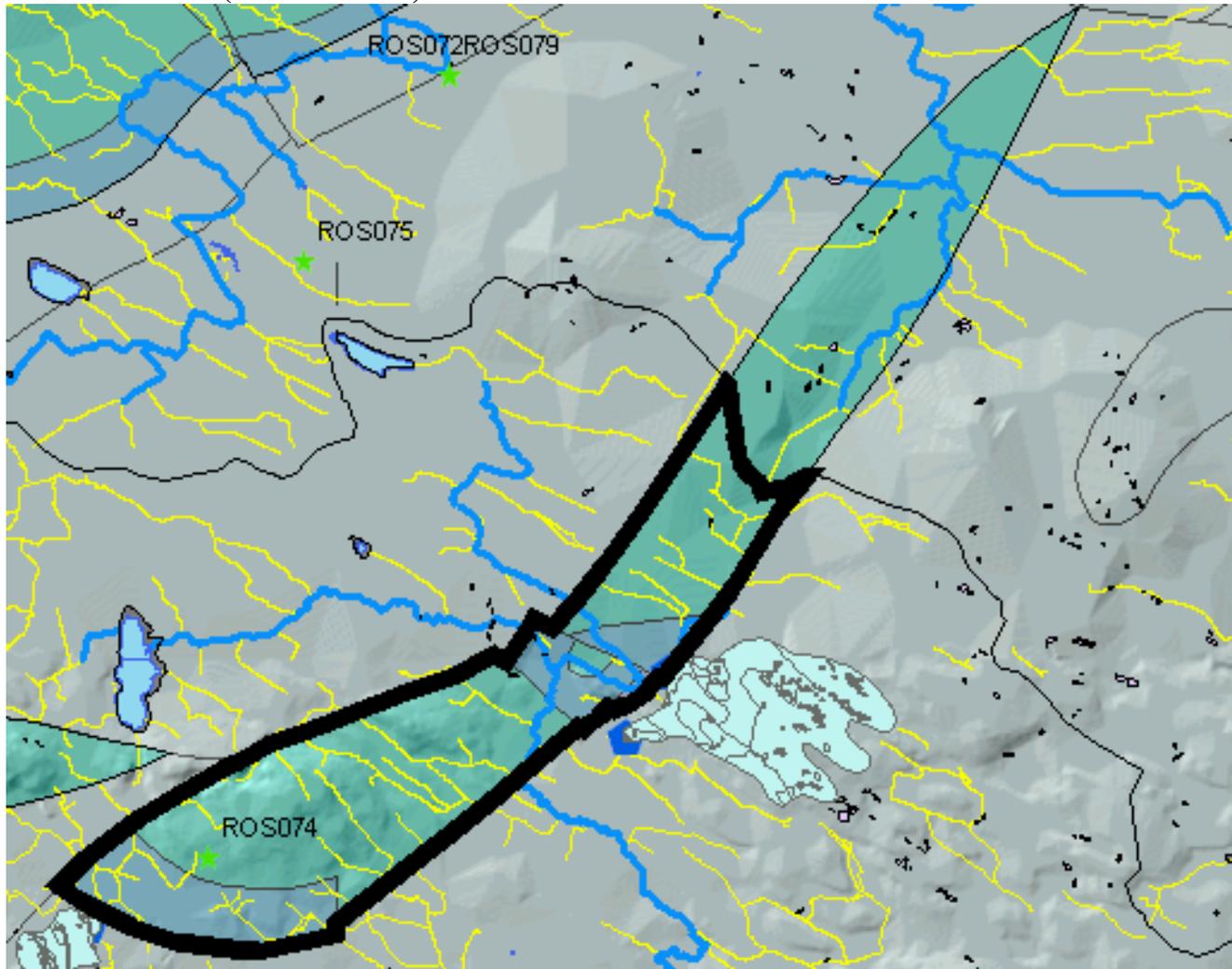
Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km ²)
26 – Suck Roscommon Co. Co.	Rivers: Termon; Cloonard; Francis; Suck; Island	Ballanagare Bog (NHARO592), Coruskea/Trien/Cloonfelliv Bog (NHARO2110) Lough na Mucka Bog (NHARO220)	52
Topography	The body occupies a northeast southwest trending area in County Roscommon with Castlerea at its center. The highest ground is in the southwest of the body where the highest point is approximately 150 mAOD at Slieve O'Flynn. Around Castlerea ground elevation is lower ranging from 60-80 mAOD. Ground elevation rises slightly northeast of Castlerea where there is a topographic high forming the catchment boundary between the Suck and the Shannon Upper Roosky Catchments at Brackloon. The Termon Stream flows south to Castlerea. The lowest point is approx. 60-70 mAOD in the river valley near Castlerea. Drainage density is high, with lots of small tributaries flowing across the GWB in addition to the named rivers. To the north of the western end of the main part of the GWB is a small area that is included in the GWB due to its proximity and similarity to the main part of this GWB. Elevations range from 90-150 mAOD. The ground slopes to the east away from the topographic boundary and surface water divide that forms the western boundary of this part of the GWB.		
Geology and Aquifers	Aquifer categories	LI: Locally important bedrock aquifer that is productive in local zones;	
	Main aquifer lithologies	Dinantian Mixed Sandstones, Shales, Limestones, Dinantian Lower Impure Limestones and a very small area of Dinantian Pure Unbedded Limestones.	
	Key structures	The rock units of this GWB occur as a fault bounded inlier in surrounding Dinantian Pure Bedded Limestones. This elongate GWB trends northeast southwest. Northwest southeast trending faults cross-cut the body at Castlerea. Boyle Sandstone (Dinantian Mixed Sandstones, Shales and Limestones) dips south southeast.	
	Key properties	No data on hydrogeological properties specific to this GWB are available. Transmissivities ranging from 2-76m ² /d have been recorded in the Boyle Sandstone (Dinantian Mixed Sandstones, Shales and Limestones) with a median value expected to be in the lower end of the range. Typical transmissivities in the Dinantian Lower Impure Limestones are usually in the range from 5-10 m ² /d. The Dinantian Mixed Sandstones, Shales and Limestones and the Dinantian Lower Impure Limestones are not considered to be major aquifers although local zones of enhanced permeability occur.	
	Thickness	In general, the effective thickness of this aquifer is likely to be not more than 15 m below the bedrock surface, comprising a weathered zone of a few metres and a connected fracture zone below this of up to 10 m, although deeper flow can occur in areas which have undergone a higher degree of structural deformation and faulting.	
Overlying Strata	Lithologies	<i>Shallow Rock (Rck); Cut Peat (Cut); Sandstone Till (TDSs) Alluvium (A) Sandstone and Shale Till (TDCSSs) and small areas of (BasEsk) (GLs) (GDSs)</i> [Information to be added at a later date]	
	Thickness	The thinnest subsoils (<3 m) occur on the upland areas southwest of Castlerea and on Slieve O'Flynn as well as just northwest of Castlerea and in the extreme north of the body. South and southeast of Slieve O'Flynn subsoil depth of 5-10 m have been recorded. A similar thickness of subsoil is expected in the lowlying area north of Castlerea.	
	% area aquifer near surface	[Information to be added at a later date]	
	Vulnerability	Areas of Extreme vulnerability occur on the upland areas southwest of Castlerea and on Slieve O'Flynn, as well as just north west of Castlerea and in the extreme north of the body. Areas of High vulnerability occur west and southwest of Castlerea. Areas of Moderate vulnerability occur in the south of the body and north of Castlerea. These areas also include some limited areas of Low vulnerability.	
Recharge	Main recharge mechanisms	Recharge is diffuse. Most of the recharge is likely to occur on the higher ground in the southeast of the body where the subsoil is thinnest.	
	Est. recharge rates	[Information to be added at a later date]	
Discharge	Springs and large known abstractions (m ³ /d)	[Information to be added at a later date]	
	Main discharge mechanisms	Groundwater will discharge to the rivers and streams that cross the GWB. As the rock units in this body are of relatively low permeability, baseflow is expected to be generally low. There may also be some discharge to the surrounding karstified Carrick-on-Shannon GWB.	
	Hydrochemical Signature	The groundwater is likely to have a calcium-bicarbonate signature. The rock units in this GWB, the Boyle Sandstone, Kilbryan Limestone and Waulsortian Limestones, are calcareous.	

Groundwater Flow Paths	These rocks are devoid of intergranular permeability; groundwater flow occurs in faults fractures and joints. Groundwater flow will be of a local nature. While local zones of enhanced permeability will occur these zones will generally be isolated from each other limiting the development of regional flow systems. Groundwater flow paths will be short, in general between 30 and 300 m, with groundwater discharging to streams and rivers. Groundwater flow will generally be concentrated at the top of the rock, in a weathered zone of a few metres and below this a zone of fissured zone. However, deeper inflows can occur.
Groundwater & Surface water interactions	The rock units in this body are of moderate to low permeability and baseflow to rivers and streams is likely to be relatively low.
Conceptual model	<ul style="list-style-type: none"> • This northeast-southwest trending GWB is bounded on all sides except for the northeast by the contact with surrounding Dinantian Pure Bedded Limestones which are part of the Suck GWB. The northeastern boundary is marked by a topographic high which forms the catchment boundary between the Suck and the Shannon Upstream Roosky catchments (and the boundary with the Castlerea/Bellanagare GWB). To the north of the western end of the main part of the GWB is a small wedge shaped area that is included in the GWB due to its small size, proximity and similarity in lithology to the main part of this GWB. The western boundary of this separate segment of the GWB if formed by a topographic boundary that coincides with a surface water catchment boundary and the boundary of the River Basin District. • The body includes both hilly areas (Slieve O'Flynn) and more low-lying, boggy areas. • The GWB is composed of relatively low permeability rock which have local zones of enhanced permeability. • Groundwater flow will be concentrated in fractured and weathered zones, and in the vicinity of fault zones. • Recharge will occur diffusely through the subsoils and via outcrops, primarily in the higher ground where the subsoil is thinnest. • Groundwater within the body is generally unconfined. Most flow will occur near the surface of the rock. The effective thickness of the aquifer is likely to be not more than 15 m, comprising a weathered zone of a few metres and a connected fracture zone below this. Groundwater flow will be of a local nature. Flow path lengths will be relatively short, and in general are between 30 and 300 m. Local flow directions are controlled by local topography. • Groundwater discharges to the streams crossing the aquifer where the subsoil is not too thick or impermeable. There is likely to be a certain amount of discharge to the surrounding Dinantian Pure Bedded Limestones of the Suck GWB.
Attachments	(Figure 1) Groundwater hydrograph.
Instrumentation	Stream gauges: 26121 (Francis River); 26313 (Coney Island, Stream Termon) EPA Water Level Monitoring boreholes: Carraghas (ROS074) EPA Representative Monitoring boreholes: n/a
Information Sources	Lee, M. & Daly D. (2003) <i>County Roscommon Groundwater Protection Scheme</i> . Main Report. Roscommon County Council & Geological Survey of Ireland, 54pp. Aquifer Chapters: Dinantian Mixed Sandstones, Shales and Limestones & Dinantian Lower Impure Limestones, Dinantian Pure Unbedded 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

Figure 1: Groundwater hydrograph



Castlereia GWB (For Reference)



List of Rock units in Castlerea GWB

Rock unit name and code	Description	Rock unit group
Boyle Sandstone (BO)	Sandstone, siltstone, black mudstone	Dinantian Mixed Sandstones, Shales and Limestones
Kilbryan Limestone (KL)	Dark nodular calcarenite & shale	Dinantian Lower Impure Limestones
Waulsortian Limestone (LI)	Massive unbedded lime-mudstone	Dinantian Pure Unbedded Limestones

NOTES ON NOTES ON GWB DESCRIPTIONS

From text sheet 12 – boyle It also occurs within a fault-bounded strip near Castlerea in the western part of the map.

Inlier of basal clastics with small isolated mudbank limestone

Associated surface water bodies
Cloonard River, Francis River, Termon River, River Suck + tributaries of Island River (Suck/156 – SubCatchment No. 181); Carricknabraher River, Oweenaforeesha River, Breedogue River (Shannon Upr/155a – SubCatchment No. 168)

