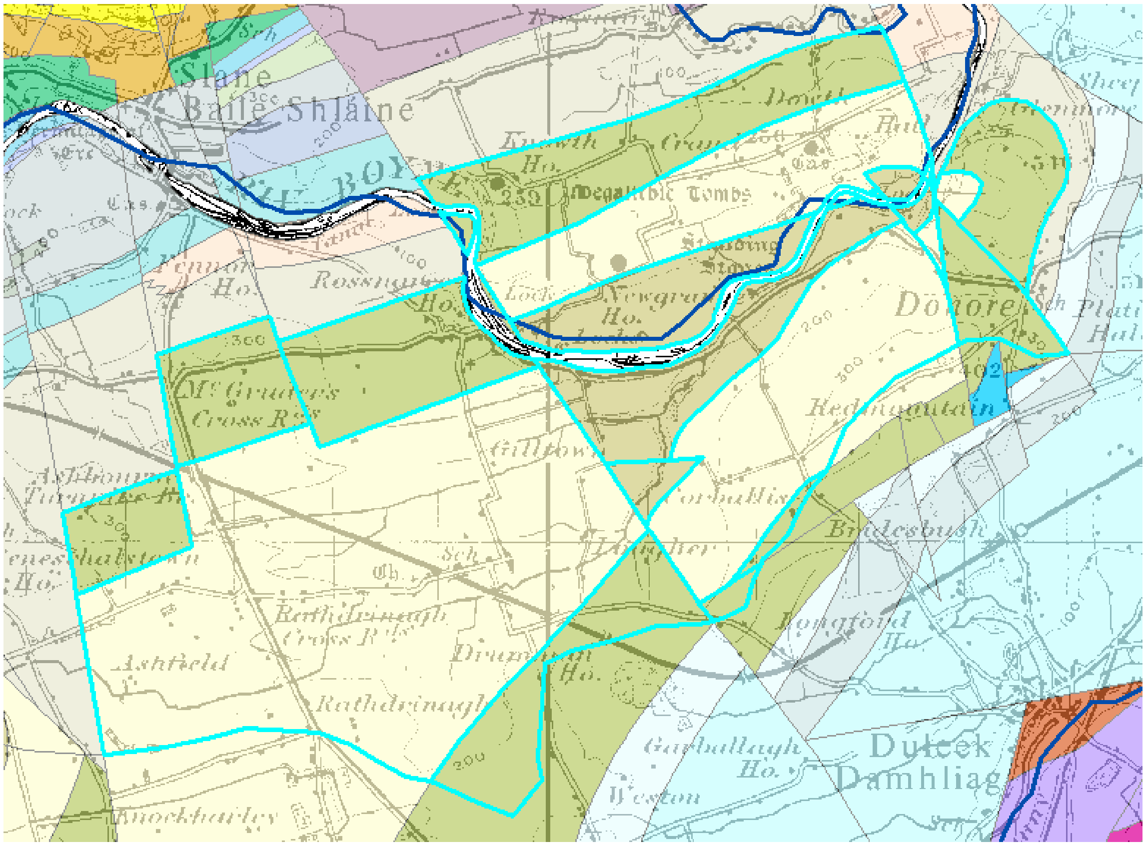
Donore GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority		Associated surface water bodies	Associated terrestrial ecosystems	Area (km^2)
Meath Hydrometric Area 07		Boyne	Crewbane Marsh (SAC - 553)	37
Topography		This GWB, in County Meath near Slane, is low-lying to the west, with higher elevations in the east. The River Boyne crosses onto this GWB 2.5 km southeast of Slane. From there the river cuts a deep valley in the hilly area, of which the highest elevations rise to 120 m OD at Redmountain.		
Geology and Aquifers	Aquifer type(s) Main aquifer lithologies	**LI:** Locally important aquifer, moderately productive only in local zones Undifferentiated Namurian Rock		
	Key structures.	At the end of the Carboniferous Period, the Variscan Orogeny uplifted and folded the Namurian rocks into a series of broad shallow folds, which are also cut by faults. The deformation front was located in the south of the country, meaning that its effects are seen most strongly in the southwest, diminishing further north. Faulting in the Namurian appears to be less common than in the underlying rocks, faults are likely to have become in filled by weathered shale.		
	Key properties	There are no data on aquifer properties in this GWB. Transmissivity and storativity are expected to be low but enhanced in local zones. The gravels located along the River Boyne will augment the storage in the aquifer.		
	Thickness	The depth to which open fractures are encountered below ground will determine the depth of significant groundwater flow in the aquifer since the rock has no primary porosity. In such low permeability rocks it is considered that the majority of groundwater flow will occur in the upper 3 m and groundwater flow in fractures does not typically occur below 10 m.		
Overlying Strata	Lithologies	The dominant subsoil lithology overlying this GWB is till. There are smaller areas of alluvial gravel deposits along the flood plains of the River Boyne. The till is mainly derived from Namurian sediments although there are some limestone tills seen closer to the contact with the limestone.		
	Thickness	Thickness of the subsoils increases from the areas of outcrop along the eastern boundary to thicker deposits in the west.		
	% Area aquifer near surface	Thin subsoils are present at the tops of the hills, which are located along the eastern boundary of the body.		
	Vulnerability	The vulnerability is mostly Moderate with some areas of Extreme in the hilly areas.		
Recharge	Main recharge mechanisms	Diffuse recharge will occur via rainfall percolating through the subsoil. The proportion of the effective rainfall that recharges the aquifer is largely determined by the thickness and permeability of the soil and subsoil, and by the slope. Due to the generally low permeability of the aquifers within this GWB, a high proportion of the recharge will then discharge rapidly to surface watercourses via the upper layers of the aquifer, effectively reducing further the available groundwater resource in the aquifer.		
	Est. recharge rates	*[Information will be added at a later date]*		
Discharge	Springs and large known abstractions	Beauparc GWS		
	Main discharge mechanisms	Groundwater will discharge from this GWB to the streams overlying the aquifer where the rock is in hydraulic continuity with the riverbed. This discharge is the baseflow flow of the rivers, which supports summer flows. Dry Weather flow values from GWBs with similar geology suggest the summer baseflow is quite low and therefore it is likely that discharge from this aquifer will be peaky and the majority of flow to the river will occur shortly after a rainfall event. Groundwater may also discharge from this aquifer along the geological contact with the limestone, which forms the boundary of the body.		
	Hydrochemical Signature	There are no hydrochemical data available for this GWB nor in any Namurian rocks in the E RBD. The groundwater is expected to be soft to moderately hard with a calcium bicarbonate signature. It is expected the groundwater will be **Siliceous**.		
Groundwater Flow Paths		In general, groundwater movement in these rocks is expected to occur relatively rapidly and at shallow depths. The rock unit's permeability depends on the presence of faults and joints along which groundwater can flow. In the shaly portions of the unit, movement of water along faults and joints is likely to be impeded by clay. The more productive portions of the unit are likely to be the thicker beds of sandstone, where brittle fracturing is likely to have occurred, and where groundwater flow is likely to be better developed. The flow is generally in localised systems with little continuity between them. Examination of data in the GSI well database shows that water levels in these Namurian rocks are shallow, usually less than 10 m below surface, although deeper levels are encountered which may be a reflection of the higher topography. Local groundwater flow directions will be dictated by local topographic, and hence hydraulic gradients, will converge at rivers. On a more regional scale groundwater flows from the higher elevations in the west and south towards the River Boyne.		

Groundwater & surface water interactions	Typically, swallow holes and collapse features are located at the boundary between Namurian and Limestone Rocks. This is due to the acidic waters from the Namurian flowing on to the pure limestones and causing increased dissolution over a small area. Such features are of great importance to the surface water and groundwater interactions of the adjacent water body. Special care must be taken in consideration of the pressures on the adjacent limestone GWB because of the ability of surface pollutants in rivers from the Namurian to pass directly into the groundwater of the limestone with out any attenuation in the unsaturated zone.
Conceptual model	This GWB is located in south Co. Meath south of Slane. This is a moderately hilly area with elevations ranging from 120 m OD along the catchment boundary to 30 m OD on the river floodplain. The extent of the body is defined to the south and east by the Boyne river catchment and elsewhere by the extent of the Namurian rocks. The GWB is composed primarily of low permeability rocks, although localized zones of enhanced permeability do occur. Recharge occurs diffusely through the subsoils and via outcrops. It takes place mainly in the upland areas where subsoils are thinner and more permeable. The aquifers within the GWB are generally unconfined, but may become locally confined where the subsoil is thicker and/or lower permeability. Most flow in this aquifer will occur near the surface. In general, the majority of groundwater flow will occur in the upper 10 m, comprising a weathered zone of a few metres and a connected fractured zone below this. However, deep-water strikes in more isolated faults/ fractures can be encountered at 30-50 mbgl. Flow path lengths are relatively short, and in general are between 100 and 500 m. Groundwater discharges to the River Boyne as it crosses the aquifer, and directly to the limestone.
Attachments	
Instrumentation	Stream gauge: None Borehole Hydrograph: None EPA Representative Monitoring boreholes: None
Information Sources	McConnell B, Philcox M & Geraghty M, 2001. *Geology of Meath: A geological description to accompany the bedrock geology 1:100,000 scale map series, Sheet 13, Meath*. Geological Survey of Ireland. 77 p. Woods L, Meehan R & Wright G R, 1998. *County Meath Groundwater Protection Scheme*. Report to Meath County Council. Geological Survey of Ireland. 54 p
Disclaimer	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae

Formation Name	**Code**	**Description**	**Rock Unit Group**	**Aquifer Classification**
Balrickard Formation	BC	Coarse sandstone, shale	Namurian Undifferentiated	Pl
Donore Formation	DR	Shale, sandstone, limestone	Namurian Undifferentiated	Pl
Walshestown Formation	WL	Shale, sandstone, limestone	Namurian Undifferentiated	Pl


Slane
Baile Shláine
Donore
Duleek
Damhlíag
Mc Gruder's
Cross Rds
Ashfield
Rathdrinagh
Garballagh
Ho.
Weston
Longford
Ho.
Redmountain