

1st Draft Ringarogy, Clear and Sherkin Island GWB Description September 2005

Ringarogy, Clear and Sherkin Island GWB Group: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km ²)
20 Cork Co Co	Lakes: Erzhul, Ordree (Sherkin). One unnamed stream on Clear.	No groundwater dependent terrestrial ecosystems (O'Riain, 2004).	~15
Topography	Ringarogy, Clear Island and Sherkin island are located in the Roaringwater Bay coastal water body. The islands have a population greater than 50. They are described as one groundwater body as they have similar geology and geomorphology. Ringarogy Island is linked to the mainland by bridge. Sherkin Island is located within a 1500 m of the mainland (Bandon GWB). Clear Island is located approximately 4km on the seaward side of Sherkin Island. Elevations range from 0-150mAOD, with the highest ground on Clear Island. The slopes are steeper on the southeast sides of each island. The islands are linear, orientated SW-NE, similar trend to the geology and to the peninsulas that define the southwestern coastline. They are essentially an extension of the mainland. Figure 1 shows the location and boundaries of the GWB. The islands are bordered by a rocky coastline interspersed with sandy beaches. There are several small streams and lakes.		
Geology and Aquifers	Aquifer categories	The main aquifer category is: LI: Locally important aquifer which is moderately productive only in local zones.	
	Main aquifer lithologies	Devonian Old Red Sandstones.	
	Key structures	The main structural trend is SW-NE. Widespread faulting and folding is associated with the Variscan Orogeny in the south of Ireland.	
	Key properties	There is one 'good' well with a recorded yield of 218 m ³ /d on Clear Island. There are no specific transmissivity data available for this GWB. In general, transmissivities will be in the range 2-20 m ² /d. In the vicinity of faults, transmissivity may be higher. 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. Permeability generally decreases rapidly with depth in these aquifers.	
	Thickness	Most groundwater flux is likely to be in the upper part of the aquifer, comprising three broad zones: a zone comprising a broken and weathered zone typically less than 3 m thick; a zone of interconnected fissuring up to 40 m thick; and a zone of isolated poorly connected fissuring typically less than 150 m. Water strikes up to 40 m below rock head are recorded and indicate a well connected network within the rock mass. Fissure permeability is generally expected to be more developed in the top 20 to 30 metres of fractured weathered rock and close to fault zones.	
Overlying Strata	Lithologies	Till is present. A large proportion of the islands comprises outcropping rock.	
	Thickness	Subsoil is generally less than 10 m thick within the GWB with large areas of less than 3 m. There are two boreholes on Clear Island that have depth to bedrock recorded to be 15m and 78m. These are present at the north western end of the island.	
	% 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 is expected to occur via rainfall percolating through the subsoil and rock outcrops.	
	Est. recharge rates	[Information to be added to and checked]	
Discharge	Large springs and large known abstractions (m³/d)	Data from GSI Well Database: GSI Well number: 0801NEW004 (218 m ³ /d),	
	Main discharge mechanisms	Shallow groundwater is likely to discharge mainly to the small lakes, streams or to seeps along the coastline, but the limited bedrock transmissivity means that the baseflow component of the total streamflow will be low.	
	Hydrochemical Signature	The Old Red Sandstone formations largely contain calcium bicarbonate type water. Alkalinity ranges 14-310 mg/l (as CaCO ₃) and hardness ranges 43-224 mg/l (moderately soft to moderately hard). Conductivities in these units are relatively low ranging 125-600 µS/cm, with an average of 312 µS/cm. Conductivities in the Cork Group rocks are quite similar with an average of 381 µS/cm and a range of 160-433 µS/cm. In general, high iron (Fe) and manganese (Mn) concentrations can occur in groundwater derived from ORS, due to the dissolution of Fe and Mn from the sandstone/shale where reducing conditions occur. This is often the case with domestic supplies. Background chloride concentrations in all aquifers will be higher than in the Midlands, due to the proximity to the sea. Where the influence of sea water incursion is responsible for high chloride levels pumping rates in such areas may need to be kept below a level with could cause sea water to be drawn into the boreholes.	

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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 short (30-300 m) with groundwater discharging rapidly to the two lakes, streams or to seeps along the coastline. Groundwater flow directions are expected to follow topography.
Groundwater & Surface water interactions	Groundwater will discharge locally to the small lakes, 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 is likely to be relatively low.
Conceptual model	<ul style="list-style-type: none"> • Clear Island and Sherkin island are located in the Roaringwater Bay coastal water body. Elevations range from 0-150mAOD, with the highest ground on Clear Island. The islands are bordered by a rocky coastline interspersed with sandy beaches. There are several small streams and lakes. • The GWB is composed primarily of low transmissivity rocks. • Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. • Diffuse recharge is expected to occur via rainfall percolating through the subsoil and rock outcrops. • Flow paths are likely to be short (30-300 m) with groundwater discharging rapidly to the two lakes, streams or to seeps along the coastline. • Flow directions are expected to follow topography. • Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater - surface water interactions occur.
Attachments	Figure 1.
Instrumentation	Stream gauges: None EPA Water Level Monitoring boreholes: None EPA Representative Monitoring points: None
Information Sources	Sleeman AG, Pracht M (1994) <i>Geology of South Cork. A geological description of South Cork to accompany the Bedrock Geology 1:100,000 Map Series, Sheet 25</i> , Geological Survey of Ireland, 59pp. 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.

Figure 1. Ringarogy, Clear and Sherkin Island GWB group.

