### Topography

There are two sand/gravel deposits that are considered as a single gravel GWB group, located immediately north (3.5 km²) and south (5.7 km²) of Clogher Head. The location and boundaries of the sands/gravels are shown in Figure 1. The aquifers are considered together because they have a similar configuration, i.e., similar morphology and topographic setting. The deposits are adjacent to the coast in flat, low-lying areas, at elevations of a few metres to just over 10 m OAD. Inland from the deposits, the ground rises gently to elevations of up to 40 m AOD in the north and 100 m AOD south of Clogher Head. Surface drainage is to the east, to the sea. Surface drainage is good.

### Aquifer categories

The deposits are between 1 and 10 km², and the saturated thickness is unknown. Accordingly, the deposits are classified as **Locally Important Sand and Gravel Aquifers (Lg)** (DELG/EPA/GSI (1999). The sands/gravels overlie bedrock aquifers which are **Generally Unproductive** except for **Local Zones (Pl)**, except in the southernmost part, where karstified limestone (Rkd) underlie the gravels.

### Main aquifer lithologies

The deposits north of Clogher Head comprise marine sands and gravels (MGs) (Meehan, 2004). South of Clogher Head, the deposits comprise marine sands and gravels (MGs), windblown sand (Ws), beach sand (Mbs); these deposits are described as being composed predominantly of fine-grained lagoonal and offshore silts and beach deposits, which are interbedded with sands and gravels (NERDO, 1981).

### Key structures

N/A

### Key properties

The deposits south of Clogher Head are described as being similar to those at Dundalk (NERDO, 1981). Here, sand and gravel deposits are known to be highly but variably productive, with transmissivities ranging from 3-1000 m²/d (NERDO, 1981). Windblown sands will have a low proportion of fines and are, therefore, likely to have high permeability. North of Clogher Head, the marine sands and gravels are also likely to have high permeabilities and transmissivity. Sand/gravel aquifers generally consist of unconsolidated coarse grained material, usually containing less than 8% fines (O’Suilleabháin, 2000). Storativity is expected to be high (0.1 to 0.2). There are no water level data, but from topographic considerations, groundwater gradients are likely to be on the order of 0.01 or less. Groundwater is unconfined.

### Lithologies

N/A.

### Thickness

There are no thickness data for these deposits.

### Overlying Strata

N/A.

### % area aquifer near surface

[Further Information to be added at a later date]

### Vulnerability

[Further Information to be added at a later date]

### Main recharge mechanisms

Diffuse recharge occurs via rainfall percolating through the unsaturated sand/gravel. Due to the high permeability of sand/gravel, a high proportion of the available recharge will percolate down to the water table. The streams flowing through the aquifers may also provide additional recharge.

### Est. recharge rates

[Information to be added to and checked]

### Large springs and large known abstractions (m³/d)

Baltray golf course (???); Termonfeckin golf course (??).

### Main discharge mechanisms

Groundwater discharges to streams that flow through and adjacent to the deposits. Ultimately, groundwater discharges to the sea.

### Hydrochemical Signature

Data available for four sampling points within this GWB indicate that the groundwaters have a calcium bicarbonate signature. Values are given below for certain parameters at four locations:

- Alkalinity (mg/l) (n=19) average = 233, range 114-346
- Hardness (mg/l) (n=19) average = 288, range 206-394
- Conductivity (µS/cm) (n=19) average = 698, range 615-882.

### Groundwater Flow Paths

Groundwater flow path length depends on the size and dimensions of the sand/gravel deposit, and also upon the spacing of internal groundwater divides and the distance between streams. Due to the geometry of the bodies, flow path lengths are <1000 m, and will mainly be <500 m. Overall, groundwater flows eastwards towards the coast. Groundwater flow directions may vary locally if groundwater discharges to streams.
Groundwater & Surface water interactions

Hydraulic connection between the groundwater in the aquifer and streams/rivers/lakes is expected to be very high, thus water will be able easily to move in and out of the aquifer depending on the relative water level in the surface water body. The streams may be losing when they cross onto the sands/gravels and gaining further downstream.

Conceptual model

- The GWB Group consists of two sand/gravel deposits in the vicinity of Clogher Head.
- The deposits are located next to the coast, adjacent to the beach, and are situated at elevations ranging from a few metres to just over 10 m A OD. Overall, the surface drainage is eastwards to the sea. Surface drainage is good.
- The aquifers are comprised primarily of marine sands and gravels and windblown sands. The thickness of the deposits is unknown.
- The depositional processes of the sands/gravels indicate that the permeability of windblown deposits, and the deposits north of Clogher Head is likely to be high. Transmissivities are likely to be on the order of 1000 m²/d. South of Clogher Head, offshore and lagoonal fine-grained sediments may be interbedded with the sands and gravels. Transmissivities probably range from about 3-1000 m²/d. Storativities are likely to be about 0.1.
- Ground surface data indicate that groundwater flows overall from west to east and that gradients are less than 0.01. The groundwater is unconfined.
- Diffuse recharge occurs via rainfall percolating through the unsaturated sand/gravel. Low drainage densities indicate that actual recharge is a high proportion of potential recharge.
- Groundwater discharges to the streams that flow through and adjacent to the deposits, and to the sea. Groundwater flow is eastwards towards the coast, except in areas of the aquifers where rivers/streams cross or neighbour the deposits.
- Groundwater-surface water interaction is likely to be high. Streams crossing the deposits may be losing when they cross onto the gravels and gaining further downstream.
- Due to the geometry of the deposits, groundwater flow paths are likely to be less than 1000 m, and frequently <500 m.
- Groundwater is moderately to very hard and has a calcium bicarbonate type signature.

Attachments

- Figure 1 – Location map; Figure 2 – Hydrochemical signature.

Instrumentation

- Stream gauges: none
- EPA Water Level Monitoring boreholes: none
- EPA Representative Monitoring points: LOU26, LOU33, LOU50, LOU55.

Information Sources


Disclaimer

Note that all calculations and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae.
Figure 2 Durov Plot

Chemical Signature of Groundwater from Clogher Head Gravel GWB Group (expanded Durov Plot)

- Samples with calcium signature
- Samples with magnesium signature
- Samples with sodium/potassium signature
- Samples with chloride signature
- Samples with sulphate signature
- Samples with bicarbonate/nitrate signature

Signature Boundaries
- Collier
- Shevlin
- Woods