



SCOTTISH EXECUTIVE

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**METOC**

**Note: This document is only a section of the Final Environmental Report**

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# Glossary & Abbreviations

Bathymetry	The study of underwater depth (third dimension) of lake beds and seafloors
m	meter
Marine Renewables	Devices that exploit the nature energy produced by waves and the tidal stream
Nautical Mile (nm)	A unit of length equivalent to 1852 meters used for maritime and aviation purposes around the world

# C1 Bathymetry

## C1.1 Introduction

The bathymetry of the SEA study area is typically characterised by deep waters which rapidly shelf steeply away from the coastline. However, on a smaller scale the bathymetry is far more complex.

Although it is not expected that marine renewable energy development will impact upon bathymetry per se, there are potential effects on seabed morphology and coastal processes. These issues are discussed in Section C, Chapter C2 – Geology, Seabed Sediments and Sediment Transport, and Section C, Chapter C3 – Marine and Coastal Processes. Therefore, rather than presenting a typical impact assessment, this chapter has been written to give a high level overview of the bathymetry of the SEA study area which helps to set the context for subsequent chapters.

Furthermore, bathymetry will affect the site selection of renewable devices based on the water depth ranges at which the various devices can operate. The appropriate water depths for marine renewable energy development are discussed in Section B, Chapter B2: Device Information.

## C1.2 Baseline Environment

An overview of the bathymetry in the study area is given in Figure C1.1, and an overview description is given below.

At a simplified scale the bathymetry of the study area comprises water depths ranging from 0 m to greater than 100m, often steeply shelving to 50m water depth within 1 kilometre of the coast.

The bathymetry of the region on a small scale is however far more complex. This complexity is mainly due to the deepening of sea lochs and major channels caused by ice scour, which has created locally enclosed deeps with shallower seaward terminations ('sills').

**North Channel and Solway Firth:** Between the Solway Firth area and the North Channel the water depths vary from approximately 10 m, at the mouth of the Solway Firth, to 50 m at the coast of the Mull of Galloway. To the west within the North Channel the waters rapidly deepen reaching depths greater than of 240 m in the centre of the channel approximately 13 kilometres from the coast of the Rhinns of Galloway.

**Argyll & Bute:** The bathymetry in this region is complicated by the numerous sea lochs and channels scoured out during glaciations which have created locally enclosed deeps and shallower seaward terminations ('sills'). The seafloor is further complicated by differences in the lithology of the bedrock which has resulted in the common occurrence of localised bodies of highly resistant rocks (Barne, J. *et al*, 1996). The seaward area to the west of Islay and Mull is generally flat between 40 – 80 m in depth. To the east, narrow deep channels separate the islands and continue into the lochs with depths in excess of 240 m.

**Western Isles & Inner Isles:** West of the Western Isles the sea bed slopes uniformly and gently away from the land to a depth of about 80 m at the 12 nautical mile (nm) limit and western edge of the study area.

To the east of the Western Isles the area contains the Sea of the Hebrides in the south, the Little Minch in the centre and the Minch in the north. This region, like that of Argyll & Bute, is an extension of the glacially over deepened waters off the mainland west coast. Enclosed deeps reach water depths in excess of 240 m. However, in the north the Minch, a smoother sea floor at a depth of about 100 m less than the seabed to the south is displayed.

The waters off this part of the coast of Scotland, running along the western extents of the Inner and Western Isles, exhibit a wide variety of water depths. These include deep sea lochs in excess of 100 m with sills as shallow as 20 m deep, linear offshore basins of up to about 320 m depth, and locally rocky shoals and islands.

**North Coast and Pentland Firth:** Along the north coast the sea floor slopes away from the land to a depth of 60 m at about 5 - 10 km offshore.

**Orkney and Shetland:** To the west of Orkney the sea floor slopes away steeply to about 100 m depth at the 12 nm limit. In contrast, the channels between the islands and the firths and sounds are relatively shallow, often less than 20 m deep. The sea floor slopes steeply away from the mainland and the northern islands of Shetland to 80 m depth, often within a few kilometres of the shore. Beyond 10 km from most of the Shetland Isles, the sea floor lies more than 100 m below mean sea level.

**Outer Isles:** The waters surrounding the isles of St Kilda, Rona and Sula Sgeir slope steeply from the rocky shores to depths of approximately 50 – 100 m within a few kilometres of the shore. The waters around Sule Skerry, and Stack Skerry are a little more variable with water depths between 20 and 40 m occurring around the rocky outcrops of land, deepening to approximately 50 m further offshore. Of particular note is the Nun Bank which is a submerged pinnacle of rock covered by only 4 m of water (at lowest astronomical tide).

### C1.3

#### Effects

No significant effects on seabed bathymetry are expected to result from development of marine renewable energy, during either installation or operation of arrays of marine renewable energy devices.

However, the water depth/availability of the water column for navigation and other sea uses is likely to be affected by the installation of arrays of marine renewable energy devices. The effects upon shipping and navigation are discussed in Chapter C15 – Shipping and Navigation.

Potential effects on seabed morphology and coastal processes are discussed in Chapter C2 – Geology, Seabed Sediments and Sediment Transport, and Chapter C3 – Marine and Coastal Processes.

### C1.4

#### Confidence and Knowledge Gaps

There is a high level of confidence both in the baseline data and predicted level of effects for bathymetry. Knowledge gaps with regards impacts on seabed morphology and coastal processes are reported in Chapter C2 – Geology, Seabed Sediments and Sediment Transport, and Chapter C3 – Marine and Coastal Processes.

# References

Barne, J.H. et al, (1997), Regions 15 & 16. North-west Scotland: the Western Isles and west Highland, 261 pages A4 hardback, ISBN 873701 89 6

SeaZone (2005) UK Hydrographic Office Charted Bathymetry Data

# Figures

