



SEDIMENT ASSESSMENT OF THE BARROW RESERVOIRS

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Aim: To assess the sediment depth and character at ten pre-determined locations in the Barrow reservoirs.

METHODS

To ensure an accurate sediment depth was obtained, the water depth was first determined by lowering a lightweight metal disk (20 x 20 cm) attached to a measuring tape, to the sediment surface. The disk settles at the water/sediment interface and thus an accurate measurement of water depth is obtained. With a known water depth, extendible metal rods (25 mm diameter) were then lowered into the water from an inflatable raft and pushed into the sediment by hand using reasonable force. The total sediment depth was then determined by subtracting the water depth from the total depth to the water surface marked on the rods. This process was repeated over an area of approximately 5 x 5 m to ensure both the water depth and the sediment depth remained uniform.

Sediment cores were collected using a gravity corer (Glew Corer) which can collect up to 40 cm of sediment. The sediment was extruded at 5 cm intervals and density measurements were made on the wet sediments using a calibrated 2 cm³ vial and four figure Avery balance.

The location of each marker buoy was taken with a Garmin eTrex Legend GPS and values are given as OS grid references. It should be noted that although grid references are given to the nearest metre, they can only be assured to within ± 25 m.

RESULTS

SEDIMENT DEPTH

Barrow 1

Buoy 1

GPS Location: ST 53613 67395 \pm 25 m
Water Depth: 8.00 m
Sediment Depth: 0.33 – 0.53 m
Comments: A flat area of at least 5 by 5 m extends to the NW of the Buoy. Most of the sediment depths were in the region of 33 cm, but pockets of up to 53cm were recorded. Below the sediment there is a layer of hard material which could not be penetrated with the metal rods. There is a sharp decrease in water depth to the south and south-west side of the marker buoy.

Buoy 2

GPS Location: ST 53602 67312 \pm 25 m
Water Depth: 8.00 m
Sediment Depth: 0.48 – 0.58 m
Comments: A flat area of at least 5 by 5 m extends to the NW of the Buoy. The sediment depths varied by only 10 cm. Below the sediment there is a layer of hard material which could not be penetrated with the metal rods.

Buoy 3

GPS Location: ST 53638 67346 \pm 25 m
Water Depth: 7.80 m
Sediment Depth: 0.45 – 0.55 m
Comments: A flat area of at least 5 by 5 m extends to the NW of the Buoy. The sediment depths varied by only 10 cm. Below the sediment there is a layer of hard material which could not be penetrated with the metal rods.

Barrow 2

Buoy 1

GPS Location: ST 53666 67516 \pm 25 m
Water Depth: 8.20 m
Sediment Depth: 0.48 – 0.55 m
Comments: A flat area of at least 5 by 5 m extends to the north of the Buoy. The sediment depths varied by only 8 cm. Below the sediment there is a layer of hard material which could not be penetrated with the metal rods. There is a gradual decrease in water depth towards the dam wall to the west side of the marker buoy, but the area around the buoy is relatively flat.

Buoy 2

GPS Location: ST 53745 67547 \pm 25 m
Water Depth: 8.00 m
Sediment Depth: 0.40 – 0.45 m
Comments: A flat area of at least 5 by 5 m extends to the NW of the Buoy. The sediment depths varied by only 5 cm. Below the sediment there is a layer of hard material which could not be penetrated with the metal rods.

Buoy 3

GPS Location: ST 53816 67500 \pm 25 m
Water Depth: 7.75 m
Sediment Depth: 0.45 – 0.55 m
Comments: A wide flat area of at least 5 by 5 m extends to the NW of the Buoy. The sediment depths varied by only 10 cm. Below the sediment there is a layer of hard material which could not be penetrated with the metal rods.

Barrow 3

Buoy 1

GPS Location: ST 54256 68091 \pm 25 m
Water Depth: 11.93 m
Sediment Depth: 0.36 – 0.46 m
Comments: A flat area of at least 5 by 5 m extends to the north of the Buoy. The sediment depths varied by only 10 cm. Below the sediment there is a layer of hard gravel (up to 10 cm thick) which could be penetrated in places with the metal rods if force was applied. Below the hard gravel was a clay layer which could be penetrated a further 15 cm. An area 5m north of the buoy had a hard base which could not be penetrated.

Buoy 2

GPS Location: ST 54163 68055 \pm 25 m
Water Depth: 10.20 m
Sediment Depth: 0.30 – 0.40 m
Comments: A flat area of at least 5 by 5 m extends to the north of the Buoy. The sediment depths varied by only 10 cm. Below the sediment there is a layer of hard gravel which could not be penetrated with the metal rods.

Buoy 3

GPS Location: ST 54367 68010 \pm 25 m
Water Depth: 10.44 m
Sediment Depth: 0.27 – 0.35 m
Comments: A flat area of at least 5 by 5 m extends to the north-west of the Buoy. The sediment depths varied by only 8 cm. Below the sediment there is a layer of hard gravel (up to 10 cm thick) which could be penetrated in places with the metal rods if force was applied. Below the hard gravel was a clay layer which could be penetrated a further 20 cm.

Buoy 4

GPS Location: ST 54245 67954 \pm 25 m
Water Depth: 10.13 m
Sediment Depth: 0.60 – 0.70 m
Comments: A flat area of at least 5 by 5 m extends to the north-west of the Buoy. The sediment felt very flocculent for the top 20 cm, but gave more resistance to the pole below 20 cm. The sediment depths varied by 10 cm. Below the sediment there is a layer of hard gravel which could not be penetrated with the metal rods.

SEDIMENT CHARACTER

Barrow 3

Buoy 1

Core Depth (cm)	Wet Density (g cm ⁻³)
0 - 5	1.1258
5 - 10	1.1560
10 - 15	1.2315
15 - 20	1.2566
20 - 25	1.3878

Buoy 2

Core Depth (cm)	Wet Density (g cm ⁻³)
0 - 5	1.1736
5 - 10	1.2250
10 - 15	1.2663
15 - 19	1.3283

Buoy 3

Core Depth (cm)	Wet Density (g cm ⁻³)
0 - 5	1.1304
5 - 10	1.1999
10 - 15	1.2354
15 - 20	1.3318
20 - 25	1.3710
25 - 27	1.3712

Buoy 4

Core Depth (cm)	Wet Density (g cm ⁻³)
0 - 5	1.1760
5 - 10	1.2069
10 - 15	1.2213
15 - 20	1.3468
20 - 22	1.3912