



Sep  
2022

# Quanterness Visual Survey Report

## 1. Introduction

This baseline visual survey report has been prepared by Cooke Aquaculture Scotland (CAS) in support of a SEPA CAR Licence application for a modification of an existing marine fish farm: Quanterness, Kirkwall, Orkney. The visual survey was completed on 31/08/2022 at the proposed location by Roving Eye Enterprises on behalf of CAS. The survey followed the procedure as per the methods outlined in SEPA's Aquaculture Manual (Baseline Survey, Visual – Standard).

This report used the video data collected at the location to describe and characterise the baseline benthic environment and in particular, highlight any species or habitats of conservation importance.

## 2. Survey Methodology

### 2.1 Survey Design

The visual transects for the proposed Quanterness site were determined using outputs from a particle tracking model and guidance stated in the Baseline Survey & Seabed and Quality Monitoring Plan Design (SEPA, 2019).

The five transects were identified to ensure a catalogue of the benthic environment in the immediate area beneath the site, whilst also extending beyond any likely impacted area. Planned survey transects are detailed in Table 2.1 and Figure 2.1. Actual survey transects are shown in Figure 2.2 and Table 2.2.

Table 2.1. The planned visual benthic survey transects at the proposed Quanterness site.

Transect	Start		End	
	Easting (OSGB)	Northing (OSGB)	Easting (OSGB)	Northing (OSGB)
1	342694.5	1014352.2	342699.7	1015385.6
2	342877.5	1015158.9	342378.6	1015168.1
3	342244.9	1014885.2	342982.3	1014861.9
4	342927.8	1014477.7	342366.6	1014494.3
5	342306.4	1015122.7	342179.3	1015045.1

Table 2.2. The actual visual benthic survey transects at the proposed Quanterness site.

Transect	Start		End	
	Easting (OSGB)	Northing (OSGB)	Easting (OSGB)	Northing (OSGB)
1	342701	1014351	342703	1015406
2	342836	1015177	342371	1015178
3	342335	1014904	342830	1014882
4	342937	1014481	342363	1014505
5	342305	1015126	342197	1015056



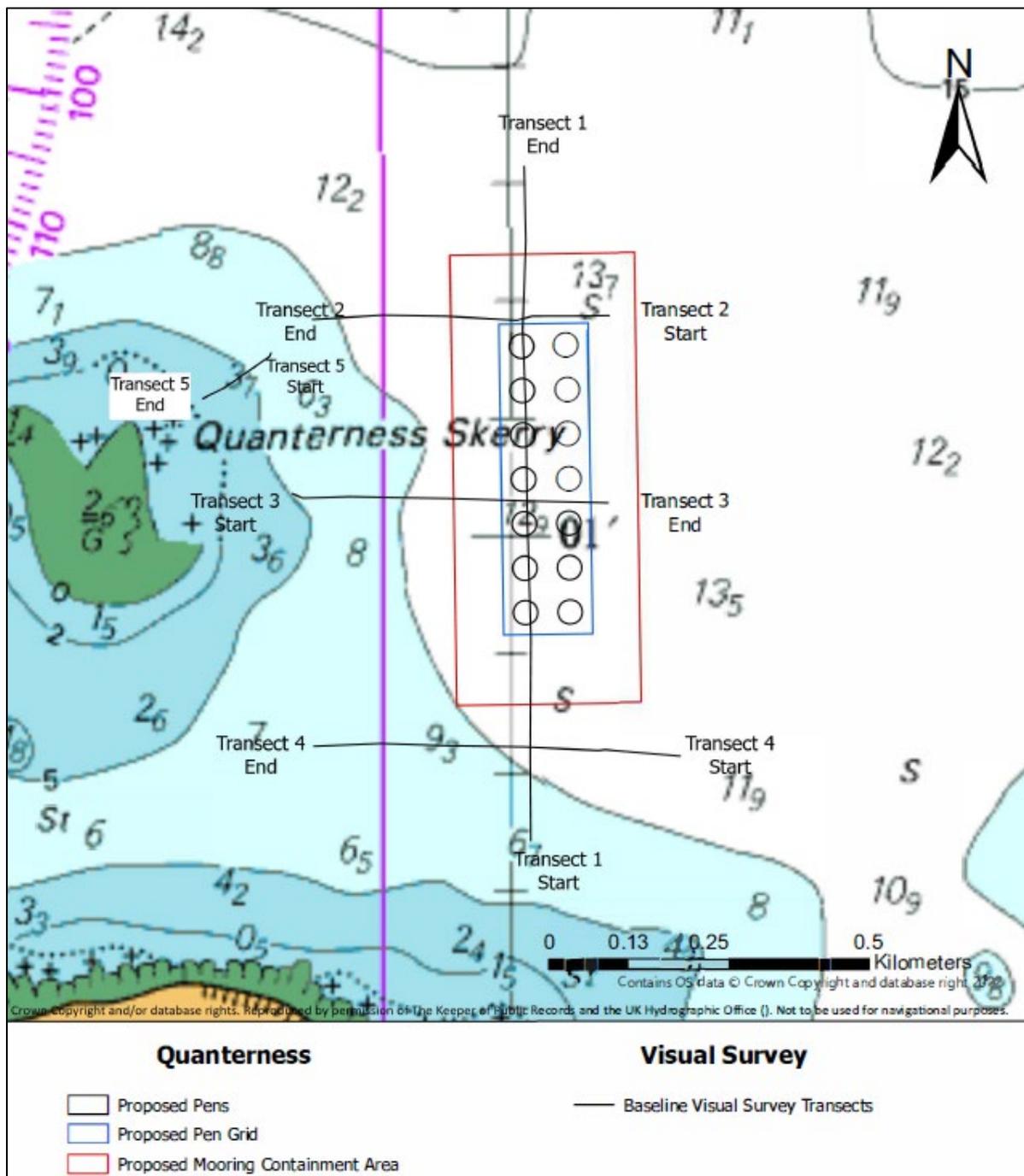


Figure 2.2. Quanterness Baseline visual survey locations

## 2.2 Survey Analysis and Interpretation

Survey video footage was inspected by CAS and used to describe the biota and seabed characteristics in the area. The Marine Nature Conservation Review SACFOR abundance scale was used to quantify any species found on the footage (Hiscock, 1996). Biotope types were identified and classified according to the JNCC Marine Habitat Classification for Britain and Ireland (JNCC, 2015).

### 3. Survey observations

#### 3.1 Seabed characteristics

The sediment type across the survey area was fairly uniform across transects 1 to 4 with fine sand being the predominant sediment, although there were some presence of shells. The shallower areas of the survey area including transect 5 were predominantly bedrock with large boulders present. Depth was variable across the survey area with transects 1 and 3 ranging from 6m to 15m, transects 2 and 4 ranging from 9m to 15m, and transect 5 between 2m and 8m.

#### 3.2 Biota

Species presence was moderate across all transects. The benthos across transects 1 to 4 was dominated by fan worms (*Myxicola infundibulum*) and peacock worms (*Sabella pavonina*) with horned wrack (*Fucus ceranoides*) present throughout. The shallow transect 5 was dominated by edible sea urchins (*Echinus esculentus*), sea lace (*Chorda filum*), and sugar kelp (*Saccharina latissima*). Sand masons (*Lanice conchilega*) were also noted throughout the transects. Lug worm casts and burrows (*Arenicola marina*) were frequently seen at the southern end of transect 1.

Footage photos can be found in Appendix 2 and the locations of these captures are shown in Figure 3.1. Appendix 1 has details of the biota descriptions for each photo.



### *Semi-permanent tube-building amphipods and polychaetes in sublittoral sand (SS.SSa.IFiSa.TbAmPo)*

The survey area of transects 1 – 4 are dominated by tube-forming polychaetes. At the sediment surface, *Arenicola marina* worm casts are visible and the seaweed *Saccharina latissima* is present. The sea lace (*Chorda filum*) is also present consistent with the biotope SS.SSa.IFiSa.TbAmPo. Many of the areas this biotope can be found are situated near fish farms and there is an existing fish farm, Quanterness, nearby.

### *Robust furoid and/or red seaweed communities (LR.HLR.FR)*

Transect 5 is situated in a moderately exposed rocky shore area. The survey found that the seabed consists of high energy littoral rock moving to fine sand with communities of sea lace (*Chorda filum*) consistent with the biotope LR.HLR.FR. Other green and red seaweeds consistent with the biotope seemed to be present but could not be identified from the footage.

## 5. References

Hiscock, K. (1996) Marine Nature Conservation Review: Rationale and methods. Coasts and seas of the United Kingdom. MNCR series. JNCC [online].

JNCC (2015) The Marine Habitat Classification for Britain and Ireland Version 15.03. Available from: <https://mhc.jncc.gov.uk/>

## Appendix 1

Table 3 describes the location, substrate and biota for each image shown in Appendix 2. The SACFOR scale of abundance (S = Superabundant, A = Abundant, C = Common, F = Frequent, O = Occasional, R = Rare) has been used to estimate abundance of individuals observed in each image (JNCC, 2015) and their corresponding percentage cover.

Table 3. Descriptions of images taken from the visual survey at the proposed Quanterness site.

Image	Easting	Northing	Depth (m)	Substrate	Biota	SACFOR	% cover
T1 – 1	342701	1014351	6.3	Bedrock, large boulders	Common sea urchin ( <i>Echinus esculentus</i> ) Sugar kelp ( <i>Saccharina latissima</i> )	F S	1-3% >80%
T1 – 2	342702	1014486	11.5	Fine sand	Lug worm ( <i>Arenicola marina</i> ) casts and burrows Hermit crab ( <i>Pagurus bernhardus</i> ) <i>Ceramium</i> Spp.	C O P	20-19% 2% -
T1 – 3	342702	1014484	11.4	Fine sand	Lug worm ( <i>Arenicola marina</i> ) casts and burrows	A	30%
T1 – 4	342706	1014672	12.5	Fine sand	Fan worm ( <i>Myxicola infundibulum</i> ) Fanworm ( <i>Acromegalomma vesiculosum</i> )	R O	<1% 1-5%
T1 – 5	342706	1014670	12.4	Fine sand	Peacock worm ( <i>Sabella pavonina</i> )	F	1-5%
T1 – 6	342703	1014856	13.8	Fine sand	Tube worms Fan worm ( <i>Myxicola infundibulum</i> )	R F	<1% 1-5%
T1 – 7	342703	1015028	14.3	Fine sand with shells	Peacock worm ( <i>Sabella pavonina</i> ) Fan worm ( <i>Myxicola infundibulum</i> )	C C	5-9% 5-9%
T1 – 8	342700	1015157	14.6	Fine sand with shells	Tube worm	R	<1%
T1 – 9	342707	1015297	14.7	Fine sand with shells	Peacock worm ( <i>Sabella pavonina</i> ) Hornwrack ( <i>Flustra foliacea</i> ) Fanworm ( <i>Acromegalomma vesiculosum</i> )	S A A	50% 20-39% 20-39%
T1 – 10	342703	1015406	15.2	Fine sand with shells	Fanworm ( <i>Acromegalomma vesiculosum</i> ) Peacock worm ( <i>Sabella pavonina</i> )	O O	1-5% 1-5%
T2 – 1	342836	1015177	14.4	Fine sand	Fan worm ( <i>Myxicola infundibulum</i> ) Sand mason ( <i>Lanice conchilega</i> ) Sugar kelp ( <i>Saccharina latissima</i> )	S O S	20-39% <1% 10-19%
T2 – 2	342788	1015177	14.7	Fine sand with shells	Fanworm ( <i>Acromegalomma vesiculosum</i> ) Hornwrack ( <i>Flustra foliacea</i> )	F R	5-9% 1-5%

T2 – 3	342716	1015178	14.5	Fine sand	No discernible biota	-	-
T2 – 4	342703	1015181	14.9	Fine sand with shells	Peacock worm ( <i>Sabella pavonina</i> )	O	1-5%
T2 – 5	342691	1015172	14.2	Fine sand	Sugar kelp ( <i>Saccharina latissima</i> )	S	20-39%
T2 – 6	342579	1015180	13.2	Fine sand with shells	Hornwrack ( <i>Flustra foliacea</i> )	S	20-39%
T2 – 7	342480	1015183	12.0	Fine sand with shells	Fanworm ( <i>Acromegalomma vesiculosum</i> )	F	5-9%
T2 – 8	342371	1015178	11.0	Fine sand with shells	Lug worm ( <i>Arenicola marina</i> ) casts	R	<1%
					Horned wrack ( <i>Fucus ceranoides</i> )	S	40-79%
					Fanworm ( <i>Acromegalomma vesiculosum</i> )	C	10-19%
T3 – 1	342335	1014904	6.1	Fine sand	Sea lace ( <i>Chorda filum</i> )	A	5-9%
					Mixed seaweeds	S	40-79%
T3 – 2	342351	1014897	7.1	Fine sand	Hornwrack ( <i>Flustra foliacea</i> )	A	40-79%
					Sea lace ( <i>Chorda filum</i> )	C	1-5%
T3 – 3	342425	1014897	9.4	Fine sand with shells	Unidentified sea cucumber	F	1-5%
T3 – 4	342425	1014898	9.2	Fine sand with shells	Hermit crab ( <i>Pagurus bernhardus</i> )	F	1-5%
					Horned wrack ( <i>Fucus ceranoides</i> )	F	5-9%
T3 – 5	342578	1014893	12.2	Fine sand	Fan worm ( <i>Myxicola infundibulum</i> )	A	10-19%
					Possible Hornwrack ( <i>Flustra foliacea</i> )	O	1-5%
T3 – 6	342704	1014887	14.7	Fine sand	Fan worm ( <i>Myxicola infundibulum</i> )	S	40-79%
					Peacock worm ( <i>Sabella pavonina</i> )	R	<1%
					Hermit crab ( <i>Pagurus bernhardus</i> )	R	<1%
					Horned wrack ( <i>Fucus ceranoides</i> )	R	1-5%
					Sand mason ( <i>Lanice conchilega</i> )	R	<1%
T3 – 7	342830	1014882	15.0	Fine sand	Sand mason ( <i>Lanice conchilega</i> )	O	1-5%
					Horned wrack ( <i>Fucus ceranoides</i> )	F	5-9%
					Fan worm ( <i>Myxicola infundibulum</i> )	A	10-19%
					Peacock worm ( <i>Sabella pavonina</i> )	O	1-5%
T4 – 1	342937	1014481	13.6	Fine sand	Common starfish ( <i>Asterias rubens</i> )	F	<1%
					Fanworm ( <i>Acromegalomma vesiculosum</i> )	A	20-39%
T4 – 2	342820	1014493	13.2	Fine sand	No discernible biota	-	-
T4 – 3	342809	1014492	12.6	Fine sand	Sugar kelp ( <i>Saccharina latissima</i> )	A	5-9%
T4 – 4	342693	1014499	12.5	Fine sand	No discernible biota	-	-
T4 – 5	342568	1014503	10.9	Fine sand	Sea lace ( <i>Chorda filum</i> )	P	-
T4 – 6	342468	1014508	10.1	Fine sand	No discernible biota	-	-
T4 – 7	342363	1014505	9.7	Fine sand	No discernible biota	-	-

T5 – 1	342305	1015126	7.6	Fine Sand	Sea lace ( <i>Chorda filum</i> ) Sugar kelp ( <i>Saccharina latissima</i> )	S S	50% 45%
T5 – 2	342303	1015121	7.1	Bedrock	Edible sea urchin ( <i>Echinus esculentus</i> ) Sea lace ( <i>Chorda filum</i> ) Sugar kelp ( <i>Saccharina latissima</i> ) Bladder wrack ( <i>Fucus serratus</i> )	F C S S	1-5% 1-5% 10-19% 40-79%
T5 – 3	342232	1015073	2.0	Bedrock, large boulders	Edible sea urchin ( <i>Echinus esculentus</i> )	P	-
T5 – 4	342197	1015056	2.5	Bedrock, large boulders	Sea lace ( <i>Chorda filum</i> )	S	20-39%

## Appendix 2

### TRANSECT 1



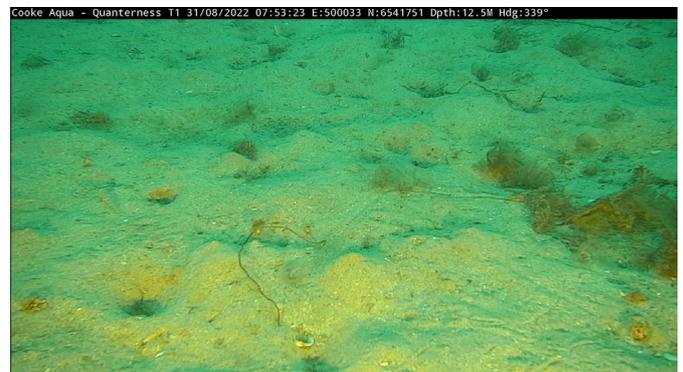
T1 - 1



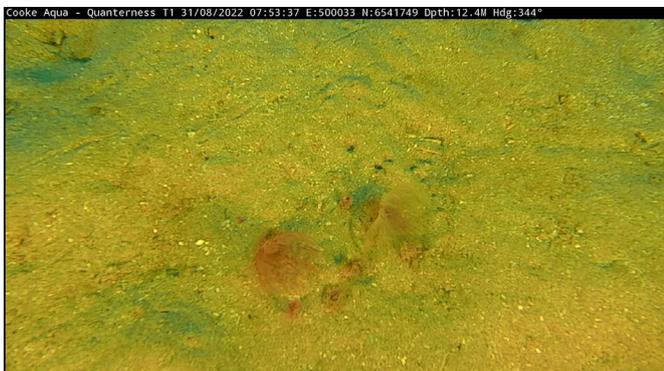
T1 - 2



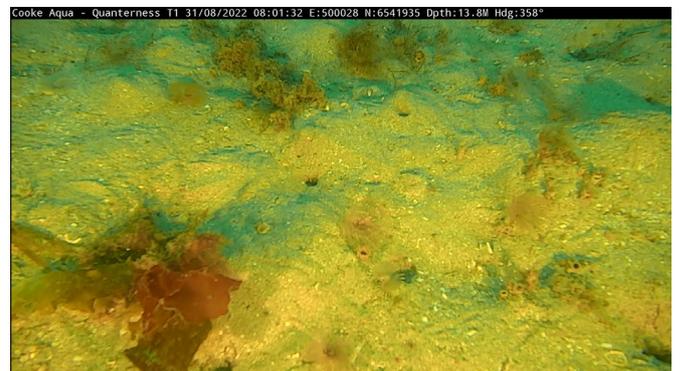
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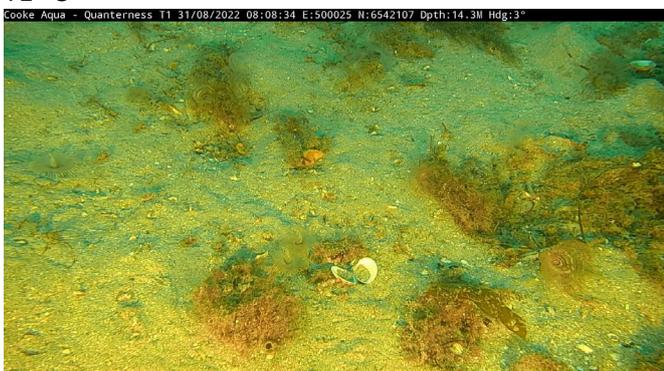
T1 - 4



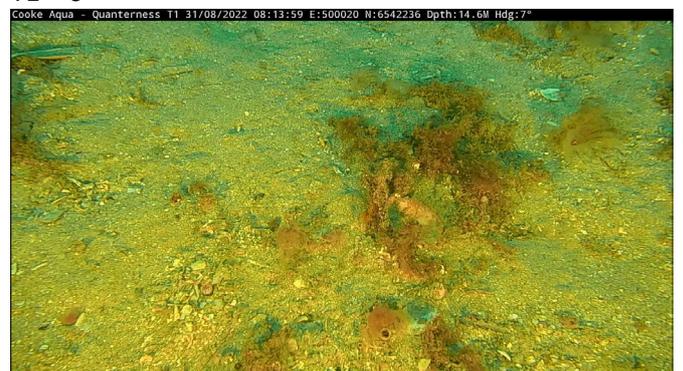
T1 - 5



T1 - 6



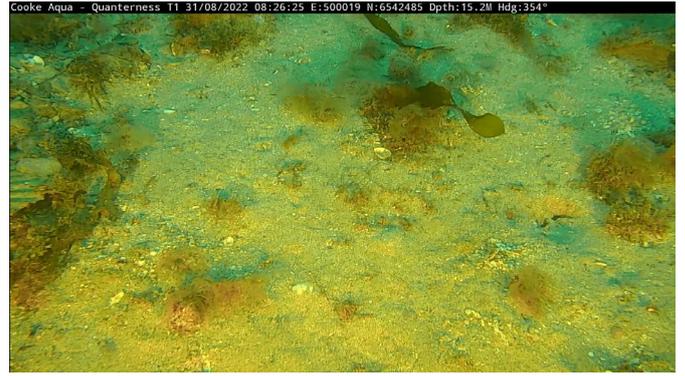
T1 - 7



T1 - 8



T1 - 9



T1 - 10

## TRANSECT 2



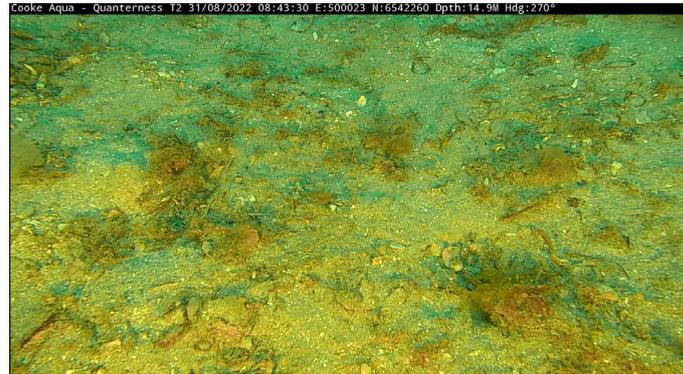
T2 - 1



T2 - 2



T2 - 3



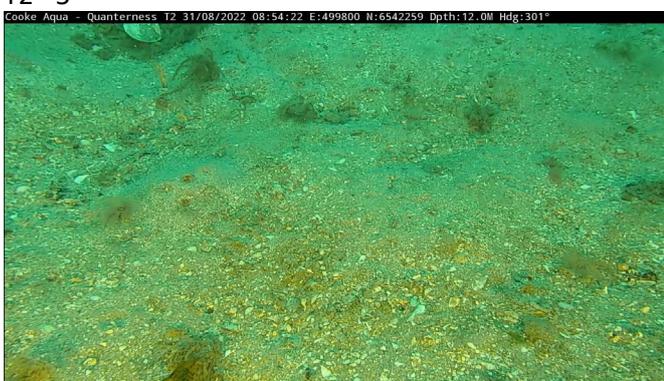
T2 - 4



T2 - 5



T2 - 6



T2 - 7



T2 - 8

# TRANSECT 3

Cooke Aqua - Quanterness T3 31/08/2022 09:22:24 E:499659 N:6541978 Dpth:6.1M Hdg:94°



T3 - 1

Cooke Aqua - Quanterness T3 31/08/2022 09:22:43 E:499675 N:6541971 Dpth:7.1M Hdg:65°



T3 - 2

Cooke Aqua - Quanterness T3 31/08/2022 09:25:48 E:499749 N:6541972 Dpth:9.4M Hdg:82°



T3 - 3

Cooke Aqua - Quanterness T3 31/08/2022 09:26:03 E:499749 N:6541973 Dpth:9.2M Hdg:7°



T3 - 4

Cooke Aqua - Quanterness T3 31/08/2022 09:30:31 E:499902 N:6541970 Dpth:12.2M Hdg:67°



T3 - 5

Cooke Aqua - Quanterness T3 31/08/2022 09:33:54 E:500028 N:6541966 Dpth:14.7M Hdg:79°



T3 - 6

Cooke Aqua - Quanterness T3 31/08/2022 09:37:28 E:500154 N:6541963 Dpth:15.0M Hdg:46°

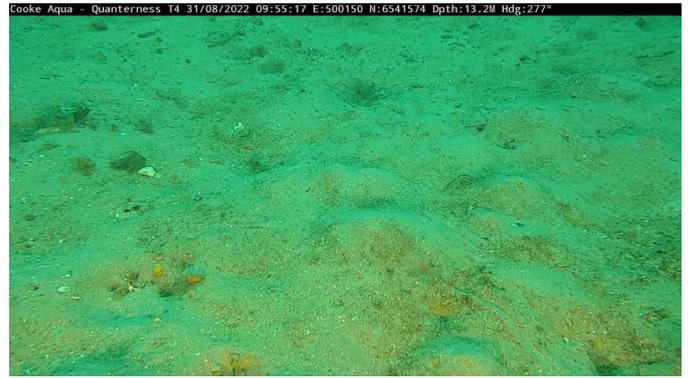


T3 - 7

## TRANSECT 4



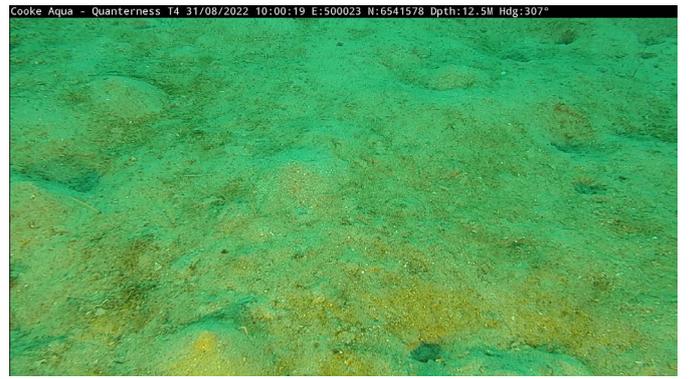
T4-1



T4-2



T4-3



T4-4



T4-5



T4-6



T4-7

## TRANSECT 5



T5 - 1



T5 - 2



T5 - 3



T5 - 4