
Scottish Sanitary Survey Project



Restricted Sanitary Survey Report Orasaigh East UB 488 April 2010



Report Distribution – Orasaigh East

Date	Name	Agency*
	Linda Galbraith	Scottish Government
	Mike Watson	Scottish Government
	Ewan Gillespie	SEPA
	Douglas Sinclair	SEPA
	Sarah Gillman	Scottish Water
	Alex Adrian	Crown Estate
	Alastair Maceachen	Comhairle nan Eilean Siar
	Samantha Muir	Comhairle nan Eilean Siar
	Duncan MacInnes	Harvester**

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1. Area Overview

The cockle bed at Orasaigh East is an intertidal zone on the east side of the Isle of Orasaigh in North Uist, which is located in the Outer Hebrides (see Figure 1.1). There are two fisheries located in this area, Orasaigh East and Orasaigh West, this report specifically addresses the eastern side. A restricted sanitary survey at Orasaigh East was conducted in response to receipt of an application to classify the area for commercial harvest of common cockles (*Cerostoderma edule*).

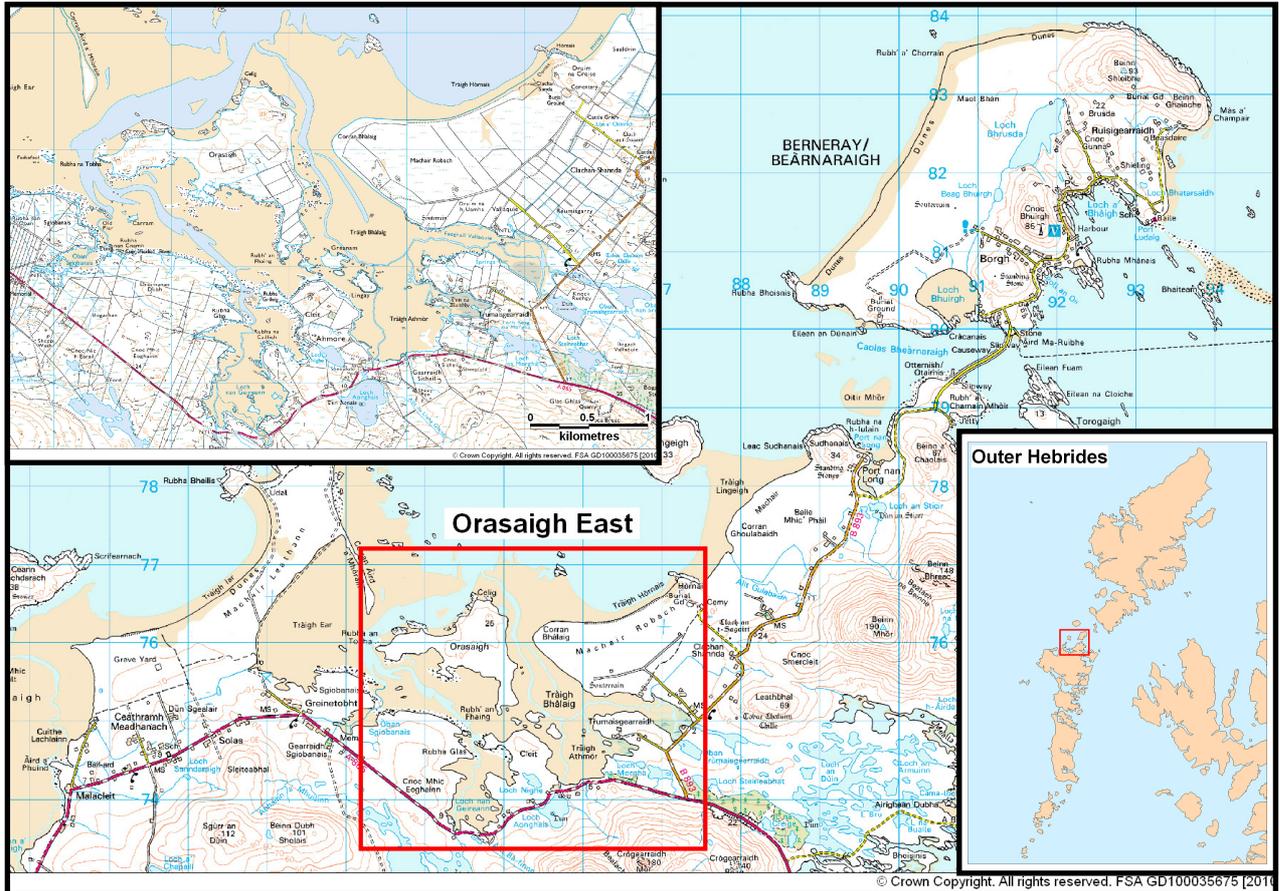


Figure 1.1 Location of Orasaigh East

1.1 Land Use

This area was not included in the Land Cover 2000 data. Observations made during the shoreline survey indicated that the land surrounding Orasaigh East was mainly croft land primarily used for grazing sheep and some cattle. The Ordnance Survey map which shows significant areas of croft land with areas of grass land, sand and coniferous plantations.

1.2 Human Population

Population data relating to the 2001 census was obtained from the General Records Office for Scotland for the area around Orasaigh East. Figure 1.2 shows the human population figures by census output area. The populations within each output area are not evenly distributed, so care must be exercised in interpreting the numbers presented. On the northern shoreline of North Uist there are several small

settlements scattered along the main road and on the shore east of Orasaigh, these have been labelled in Figure 1.2. Discharge consents provided by the Scottish Environment Protection Agency (SEPA) indicate that these smaller settlements could be a significant source of contamination to the shellfish bed (See Section 3). There is a range of tourist accommodation throughout North Uist, suggesting there is likely to be a seasonal increase in human population during the summer months. Berneray is linked to North Uist through a 900m long causeway and linked with Harris via a regular ferry service. Berneray is linked to the west coast of Lewis by a road bridge.

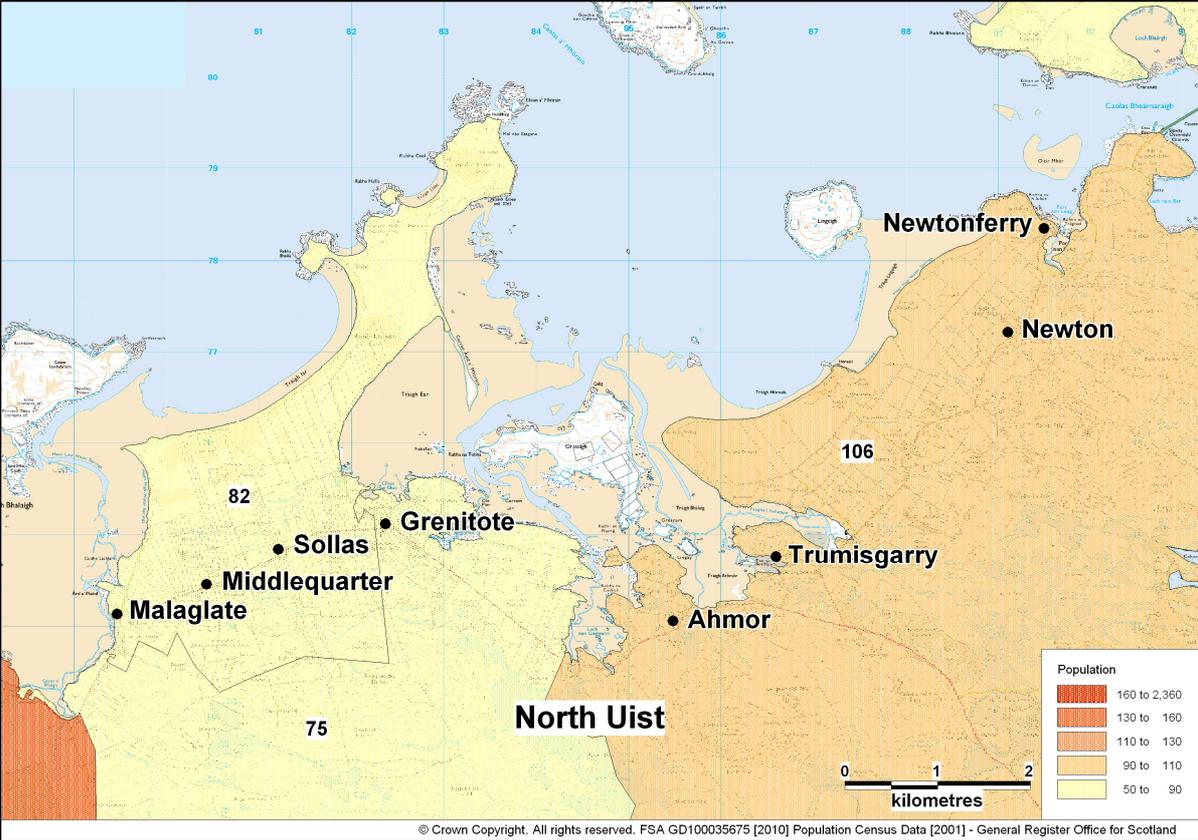


Figure 1.2 Human population surrounding the Isle of Orasaigh and Orasaigh East fishery

2. Fishery

The fishery at Orasaigh East (UB 488 844 04) is comprised of a wild common cockle (*Cerostoderma edule*) bed. The site has been given the name Traigh Bhalraig, however it also covers Traigh Athmor further south.

The cockle bed was identified by the harvester on the classification application form as the beaches surrounding Orasaigh at NF 845 760, east of Rubha an Tobha extending to the shore and north to Vallaquie.

On the 25th January 2010 a regulation (OPSI online, 2010) was put in place by the Scottish Government called The Inshore Fishing (Prohibition of Fishing for Cockles) (Western Isles) (Scotland) Order No.444. This order prohibits fishing for cockles less than 30mm in size within inshore areas throughout the Western Isles, which includes North Uist.

There is currently no representative monitoring point (RMP) assigned to this area. The cockle bed at Orasaigh East does not lie within a designated shellfish growing water.

The boundaries of the common cockle bed are mapped in Figure 2.1. The cockles will be hand raked and harvesting is weather dependent but planned to take place throughout the year.

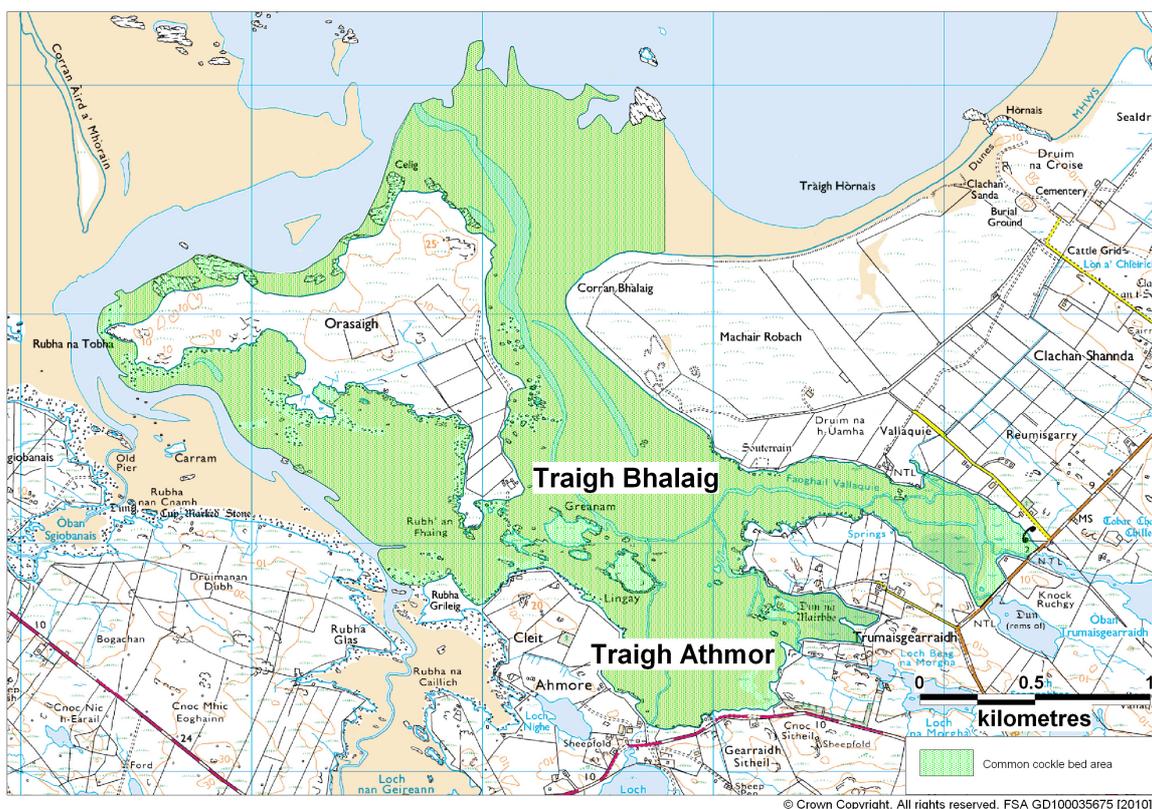


Figure 2.1 Orasaigh East fishery

3. Sewage Discharges

A large number of discharge consents were provided by SEPA for the area surrounding the Orasaigh East cockle bed. The majority of these discharge consents were identified as sewage (private) primary or sewage (public) primary discharges (i.e. septic tanks) discharging to soakaway. In Figure 3.1 the discharge consents have been thematically mapped to identify those discharging to watercourses or the sea, soakaways within 400 m of MHWS and soakaways >400 m from MHWS. Details of those not going to soakaway are listed in Table 3.1. Details of those going to soakaway are listed in Appendix 4. Only details of septic tanks have been provided below as these are considered of greater significance to the pollution of shellfish than soakaways. At the time of writing this report, SEPA had not provided data concerning the consented/design population equivalent (PE) or the consented flow in m³/day for any of the discharge consents. Discharge consents provided previously by SEPA for other areas had generally assigned a PE of 5 to all septic tank discharges associated with individual dwellings.

Table 3.1 SEPA discharge consents – septic tank discharges

Consent No.	NGR of discharge	Discharge Type	Discharges to
CAR/L/1002336	NF 81358 74999	Sewage (Public) Primary	Unnamed watercourse, Solas
CAR/R/1057583	NF 85679 74207	Sewage (Private) Primary	Coastal waters, Athmor
CAR/R/1057589	NF 85649 74142	Sewage (Private) Primary	Unnamed watercourse, Loch Maddy
CAR/R/1057036	NF 85513 74048	Sewage (Private) Primary	Loch Aonghais, Athmor
CAR/R/1056991	NF 85630 74087	Sewage (Private) Primary	Unnamed burn, Athmor
CAR/R/1049868	NF 86760 75390	Sewage (Private) Primary	Faoghail Vallaquie, Clachan Sands
CAR/R/1059779	NF 87170 75190	Sewage (Private) Primary	Traigh Bhalaigh
CAR/R/1062181	NF 89325 77246	Sewage (Private) Primary	Unnamed tributary of Loch An Sticir, Loch Maddy
CAR/R/1020406	NF 89397 77635	Sewage (Private) Primary	Unnamed tributary of Loch An Sticir, Loch Maddy
CAR/R/1066492	NF 89609 78275	Sewage (Private) Primary	Port nan Long
CAR/R/1056629	NF 89590 78350	Sewage (Private) Primary	Port nan Long

No community septic tank discharges were identified by Scottish Water for the area. No septic tanks or sewage outfall pipes were observed during the shoreline survey of the area.

Despite the relatively low population density as a whole, there are quite a large number of sewage discharges in the area, although most serve individual dwellings. A number of those that discharge into, or near, the coastline, may cause localised deterioration in water quality. There is a cluster of septic tank discharges at the south eastern end of the cockle bed and these would be expected to provide a significant potential source of contamination of the shellfishery.

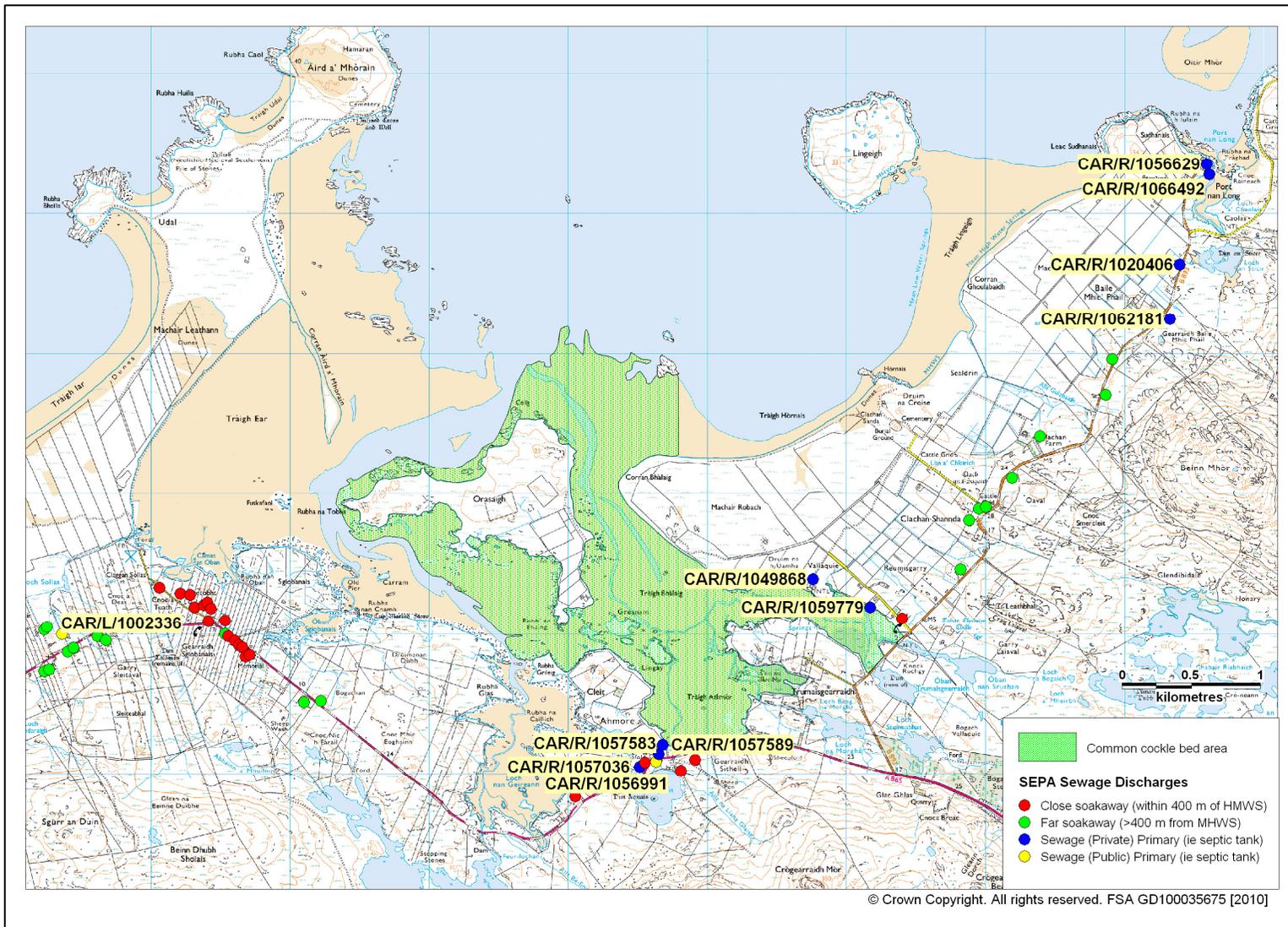


Figure 3.1 Sewage discharges at Orasaigh East

4. Animals

4.1 Livestock

Both sheep and cattle are raised through crofting on North Uist (Encyclopaedia Britannica online). Livestock are raised on communal grazing areas, including on Machair Robach (sandy grassland to the east of Orasaigh). An agricultural show, including livestock, is held on the island in late July/early August each year.

The only significant source of information concerning livestock numbers in the vicinity of the fishery was available from the shoreline survey. The shoreline survey relates to the time of the site visits on the 13th April 2010, and so these counts may not represent all livestock in the area as they depend on the point of view of the observer and some animals may have been obscured by the terrain. The area surveyed was a selected stretch of the south east coastline. This was to concentrate on the area with the majority of any relevant discharges and fresh water inputs. It is therefore possible that livestock were present in areas that were not surveyed. As a result the observations made on the day of the shoreline survey will not represent the true variation in distribution of livestock in the area.

At the southeast corner of the shellfish bed on the shoreline surrounding Traigh Athmor, approximately 52 sheep and 4 cattle were observed grazing. The observation of 12 sheep and 4 cattle was observed from the sands but the livestock were located on the western adjacent shoreline. There were an additional 35 sheep grazing on the shoreline further to the east. The shoreline surrounding the fishery was fenced off so livestock did not have direct access to the shoreline. No other livestock was observed at the time of the shoreline survey.

On the basis of these observations, the risk of contamination of the shellfishery from livestock sources will be greatest around Traigh Athmor.

Livestock numbers in the area as a whole are likely to be at their highest during the summer months when lambs are present. During the warmer months livestock may access streams to drink and cool off more frequently, leading to higher levels of faecal contamination in freshwater streams and the shellfish bed itself.

4.2 Wildlife

During the shoreline survey gulls, oyster catchers, geese and other seabirds were observed on and around the Orasaigh East production area (see Figure 4.1). These seabirds were mainly observed towards the southeast, Traigh Athmor section of the shellfish bed. No other wildlife was observed at the time of the shoreline survey. However, it is likely that other seabirds may be present in the area. The distribution and numbers of additional species was not investigated. On the basis of the shoreline survey observations, the risk of contamination of the shellfishery from wild birds will be greatest around the southeast, Traigh Athmor end of the shellfish bed. However, this does not provide information as to whether this difference in bird density applies more generally than just at the time of the survey.

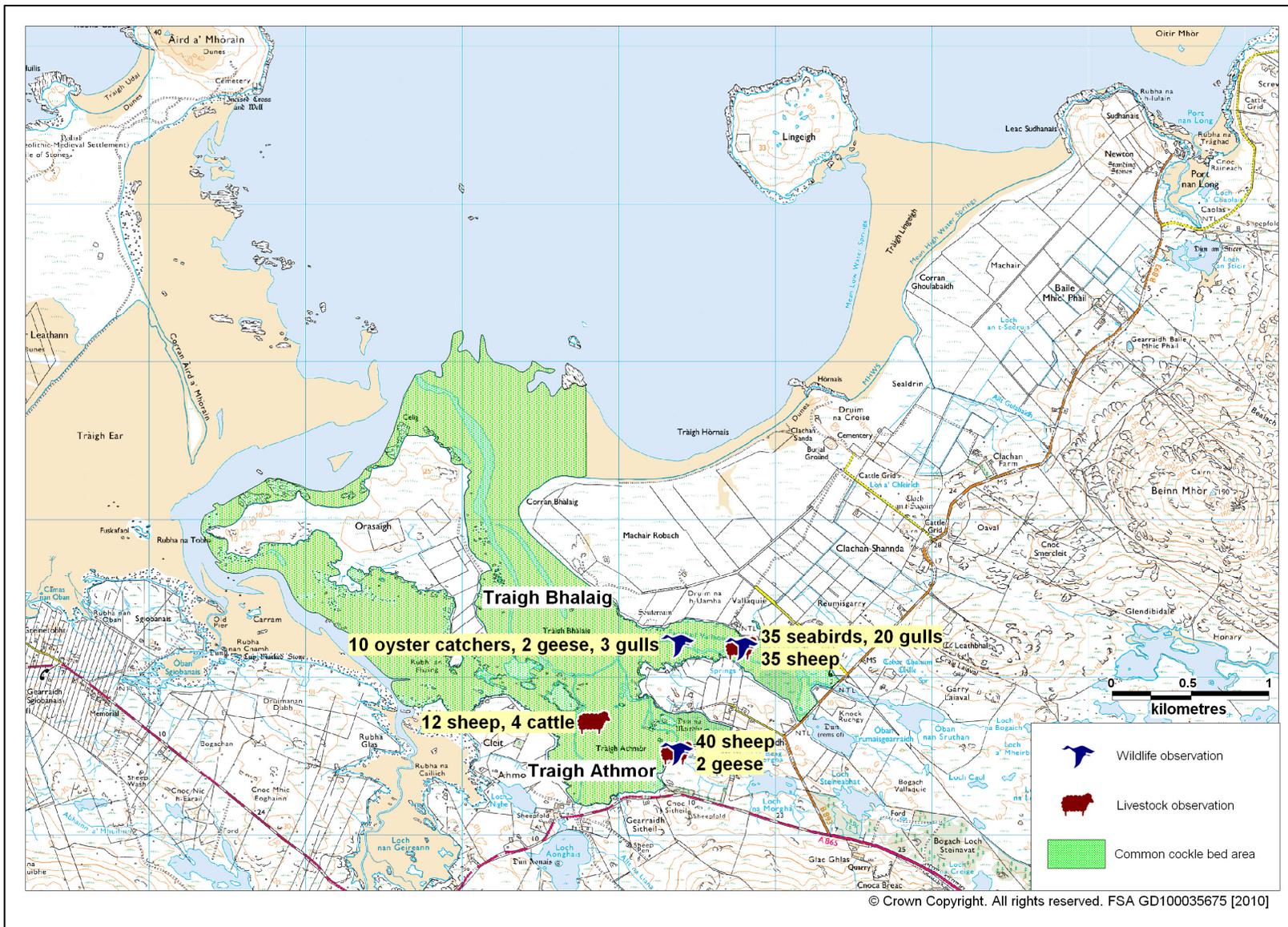


Figure 4.1 Livestock and wildlife present at Orsaigh East during the shoreline survey

5. Rainfall

The nearest weather station is located at North Uist: Clachan na Luib which is approximately 10 km south west of Orasaigh East. Daily rainfall values were purchased from the Meteorological Office for the period 01/01/2003 to 30/09/2007 inclusive for the North Uist: Clachan na Luib weather station. For this period of 1664 days, total daily rainfall was not recorded for 260 days, including the entire months of July 2003, June 2004, October and December 2005, March and April 2006, and February 2007.

Rainfall data were supplied to Cefas/FSAS by the Meteorological Office under licence. Unless otherwise identified, the content of this section (e.g. graphs) is based on further analysis of this data undertaken by Cefas.

High rainfall and storm events are commonly associated with increased faecal contamination of coastal waters through surface water run-off from land where livestock or other animals are present, and through sewer and wastewater treatment plant overflows (Mallin et al. 2001, Lee and Morgan 2003).

The influence of rainfall on microbiological quality will depend on factors such as local geology, topography, land use and sewerage infrastructure.

5.1 Rainfall at North Uist

Due to the missing data it is not appropriate to present total rainfall at North Uist by year or month. Instead, Figures 5.1 and 5.2 summarise the pattern of rainfall recorded at North Uist. The box and whisker plots present the distribution of individual daily rainfall values (observations) by year (Figure 5.1) or by month (Figure 5.2). The grey box represents the middle 50% of the observations, with the median noted by a line within the box. The whiskers extend to the largest or smallest observations up to 1.5 times the box height above or below the box. Individual observations falling outside the box and whiskers are represented by the symbol '*'.

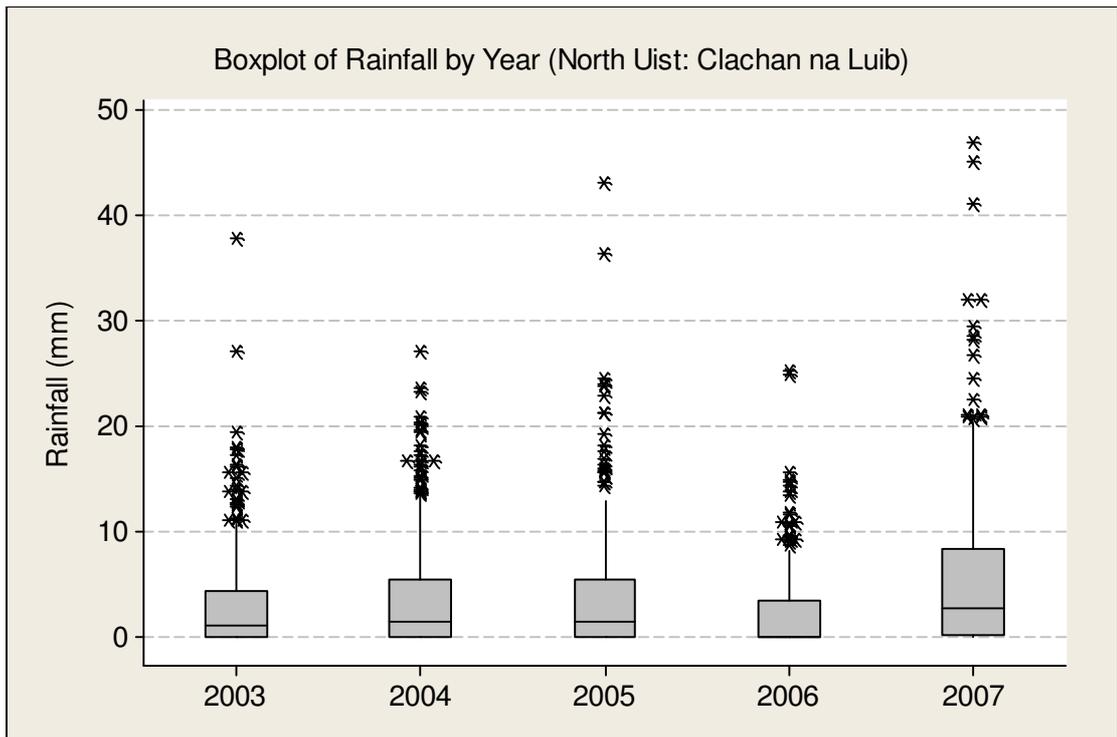


Figure 5.1 Boxplot of daily rainfall at North Uist by year

Figure 5.1 shows that there was considerable variation in the median daily rainfall from year to year. Overall, 2006 saw the lowest median rainfall, of 0mm. The highest individual rainfall events occurred in 2005 and 2007, with 2007 being wetter overall.

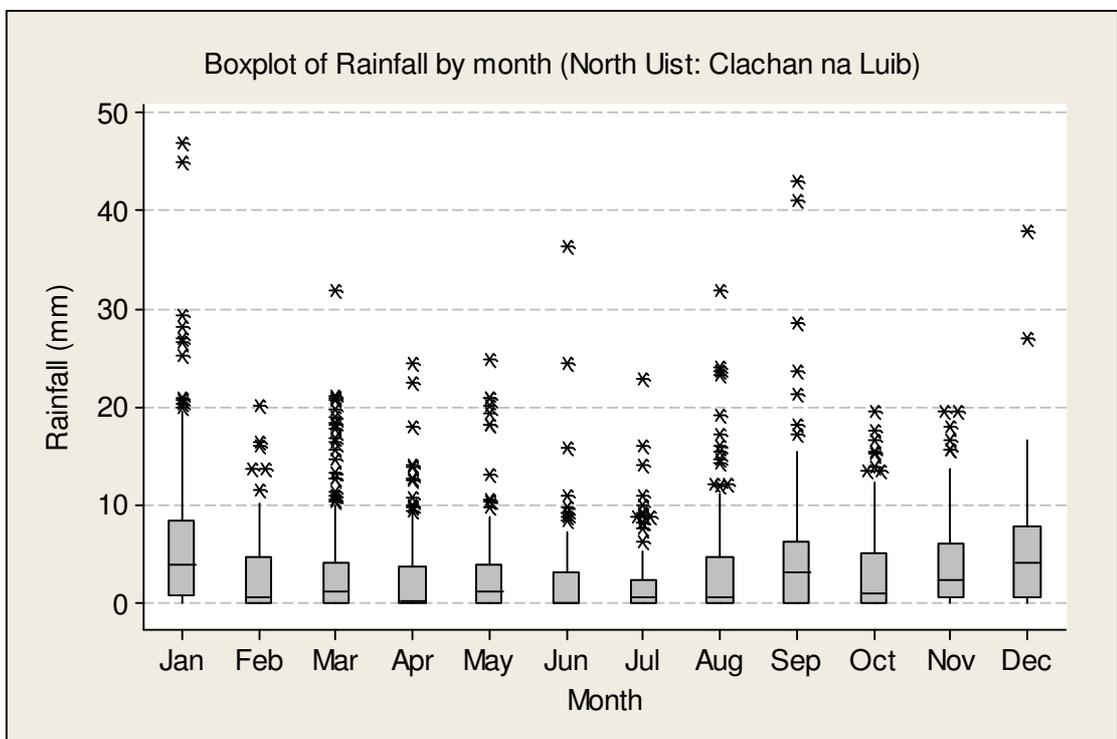


Figure 5.2 Boxplot of daily rainfall values at North Uist by month

The wettest months were January, September and December but the high individual rainfall events occurred throughout the year, although not in all individual months. For the period considered here (2003 – 2007), 36% of days for which records were available experienced no rainfall while 47% of days experienced rainfall of 1mm or less. Although the mean rainfall was 4 mm per day, there were 8 occasions where daily rainfall exceeded 30mm. The highest daily rainfall recorded (47mm) fell in January 2007.

Periods of increased rainfall are generally associated with higher levels of contaminated surface water runoff. Marked changes in the level of rainfall may also cause significant wash off of accumulated material, especially after preceding dry periods.

6. River Flow

There is no river gauging station in the vicinity of Orasaigh. During the shoreline survey walk, four fresh water streams were observed discharging into the selected area shellfish bed. The Ordnance Survey map indicates that there are potentially 9-10 fresh water streams in total discharging into the bay in which the fishery is located. Only one of the streams observed had measurable flow at the time of the shoreline survey. The streams sampled are listed in Table 6.1 and mapped in Figure 6.1. There was no rain on the day of the shoreline survey or in the previous week.

Table 6.1 Stream flow and *E. coli* concentrations – Orasaigh East

No	Grid Ref	Description	Width (m)	Depth (m)	Measured Flow (m/s)	Flow in m ³ /day	<i>E. coli</i> (CFU/100 ml)
1	NF 84377 73576	Stream	5.20	0.46	0.2	41333.8	<100
2	NF 85718 74180	Stream	0.98	0.14	NA	NA	200
3	NF 86374 74519	Stream	6.1	0.01 – 0.25	NA	NA	<100
4	NF 86788 75183	Stream	NA	NA	NA	NA	200

On the day of the shoreline survey, four of the fresh water streams entering the bay in which the fishery is located were sampled. One of the streams discharged outside of the cockle bed area, directly south of the Isle of Orasaigh and the remainder discharged into the south east corner of the fishery. Two of the streams gave a result of <100 *E. coli* cfu/100 ml, including the stream discharging outside of the cockle bed area and the other two streams sampled gave results of 200 *E. coli* cfu/100 ml. These results indicate that *E. coli* contamination of these watercourses was therefore relatively low on the day of the survey. It would be expected that levels of faecal contamination in the streams would increase significantly after periods of rainfall. However, these samples represented conditions at one point in time only and contamination levels present in the identified watercourses could vary considerably from these values.

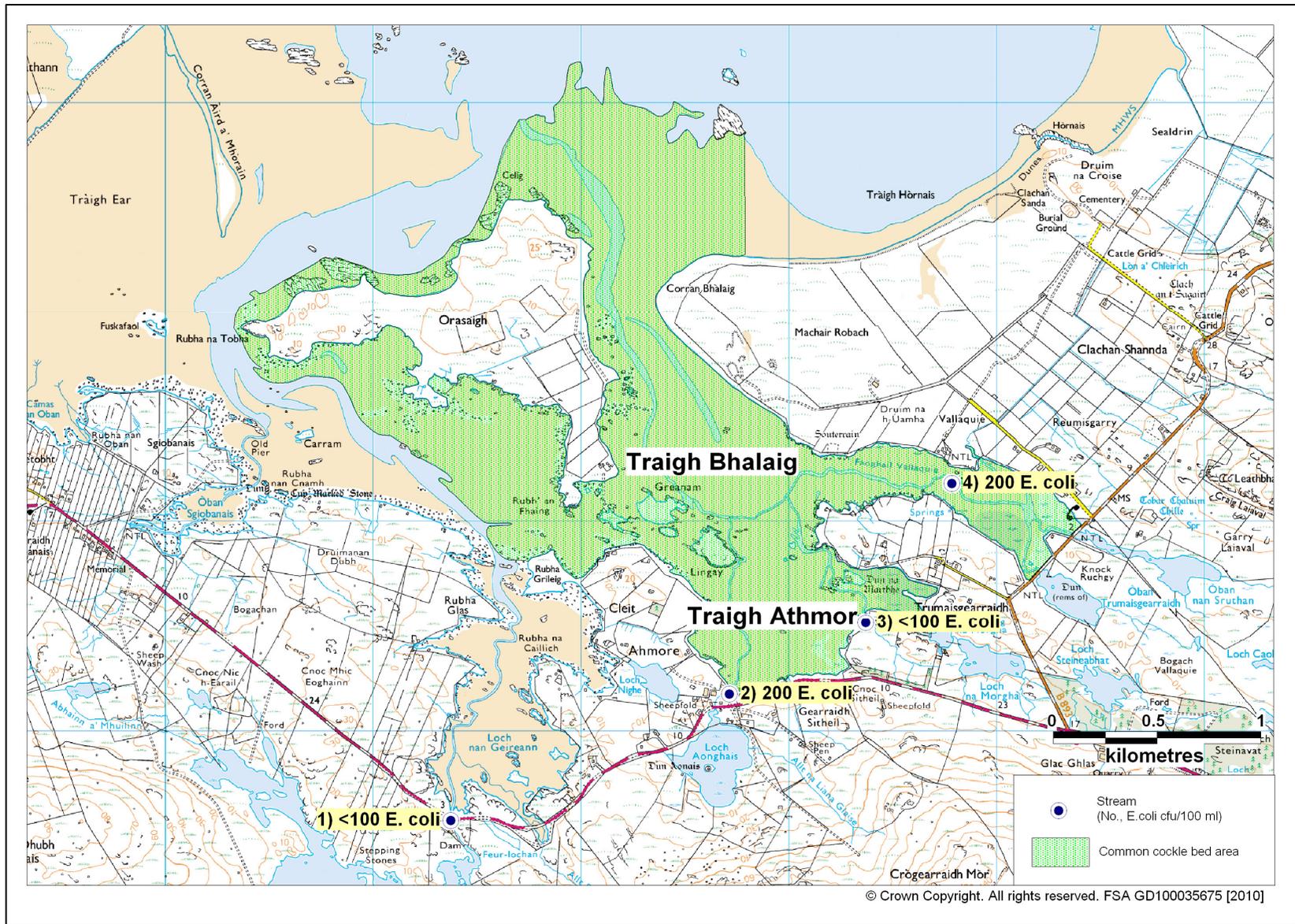


Figure 6.1. Location of streams and fresh water samples at Orasaigh East

7. Historical *E. coli* Monitoring Data

There is no historical *E. coli* monitoring data available for Orasaigh East.

8. Bathymetry and Hydrodynamics

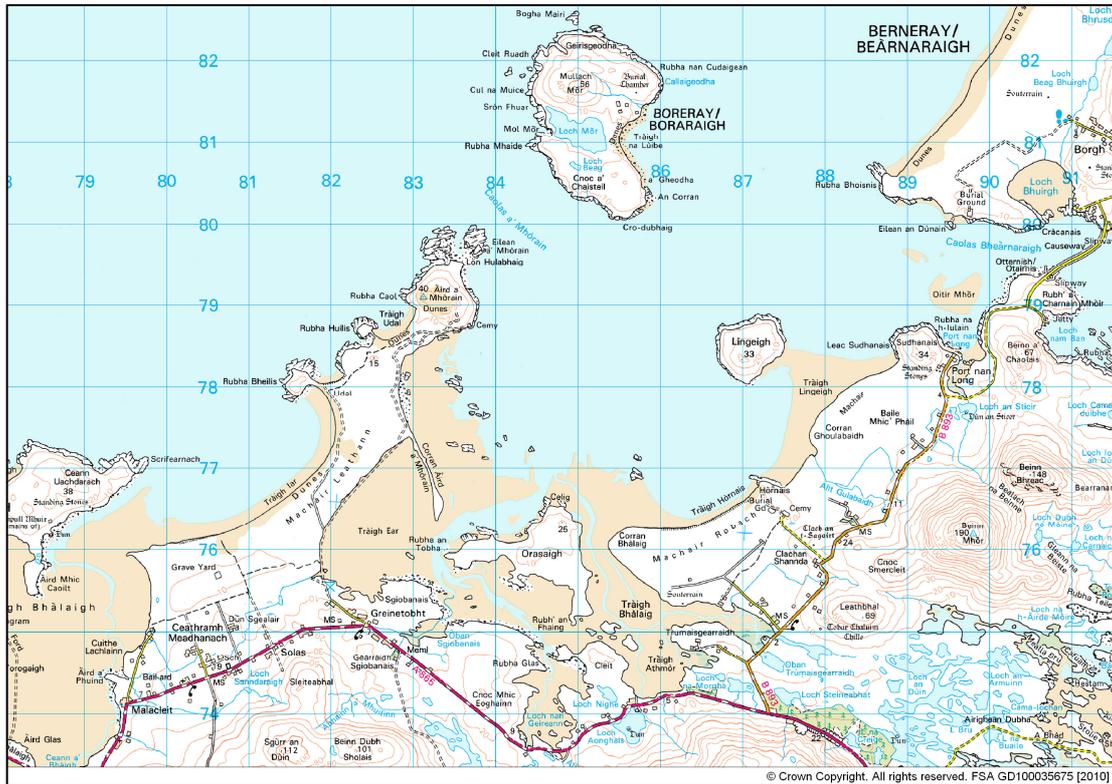


Figure 8.1 Isle of Orasaigh and the surrounding area

The Ordnance Survey map shows that much of the area is intertidal with shallow subtidal channels that interweave around the Isle of Orasaigh (see Figure 8.1). This area is shown as a drying area on Admiralty charts. Depths do not exceed 2 m in the intertidal area. Beyond the island of Lingeigh, depths increase to up to 10 m. In the channel between Boreray and North Uist depths increase to 20 m and beyond here is the Atlantic Ocean. The Orasaigh East area is partially sheltered by the islands of Boreray and Berneray but is open to the north. Due to the bay being open to the north, strong winds from this direction would tend to drive tides higher than normal, resulting in resuspension and shifting of sediments.

8.1 Tidal curve and description

The two tidal curves below are for the port of Scolpaig, the nearest secondary port. Scolpaig is located approximately 11 km west along the coastline of the fishery at Scolpaig. The tidal curves were output from UKHO TotalTide. The first is for seven days beginning 00.00 GMT on 7th April 2010. The second is for seven days beginning 00.00 GMT on 14th April 2010. Together they show the predicted tidal heights over high/low water for a full neap/spring tidal cycle.

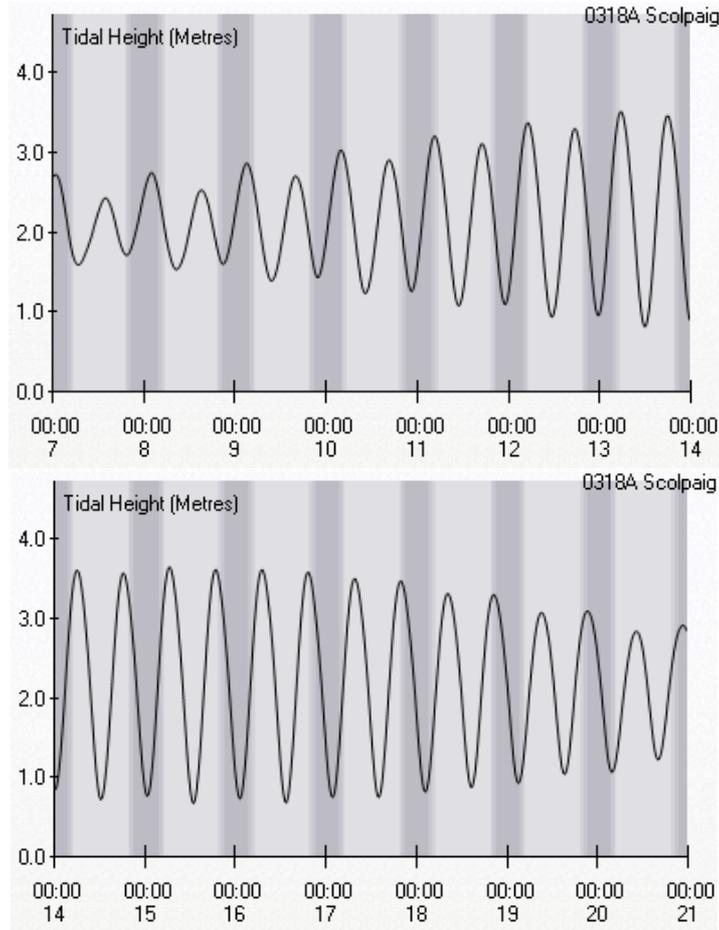


Figure 8.2 Tidal curves for Scolpaig

The following is the UKHO summary description for Scolpaig:

The tide type is Semi-Diurnal.

MHWS	3.8 m
MHWN	2.8 m
MLWN	1.5 m
MLWS	0.7 m

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Predicted heights are in metres above chart datum. The tidal range at spring tide is therefore approximately 2.3 m and at neap tide 2.1 m.

8.2 Currents

On the flood tide, water will enter through the main channels located on either side of Orasaigh and flood over the intertidal areas from the shallow channels. The reverse will occur on the ebb tide. The incoming tide will flow around Orasaigh, with a larger proportion of flow curving round the west side of the island via the Rubha na Tobha channel.

8.3 Conclusions

Contamination arising to the southeast of Orasaigh will impact on the local area at high tide and will flow northward across Traigh Athmor on the ebb tide and into the deeper water channels along the eastern side of Orasaigh. Further sources of contamination entering the far eastern extent of the fishery would also impact the local part of the bed particularly at high tide and then flow westwards across the bed and then northward past Orasaigh.

9. Shoreline Survey Overview

A restricted shoreline survey of the southeastern part of the shoreline was undertaken by staff from Comhairle nan Eilean Siar Council on the 13th April 2010.

No septic tanks or sewage outfall pipes were observed during the shoreline survey.

Sub-surface seawater samples were taken from two points in the south east corner of the cockle bed. The sample taken the furthest south returned a very high result of 700 *E. coli* cfu/100 ml and the other sample taken further north also returned a high result of 110 *E. coli* cfu/100 ml.

Freshwater samples were taken at any streams or burns observed to be flowing at the time. One of the streams discharged outside of the cockle bed, directly south of the Isle of Orasaigh and the remainder discharged into the south east corner of the fishery. Two of the streams gave a result of <100 *E. coli* cfu/100 ml, including the stream discharging southwest outside of the cockle bed area and the other two streams sampled gave results of 200 *E. coli* cfu/100 ml.

During the shoreline survey two common cockle samples were collected from the south east end of the Orasaigh East shellfish bed. The common cockle sample taken the furthest south returned a high result of 790 *E. coli* MPN/100 g and the second sample taken further north returned a very high result of 1700 *E. coli* MPN/100 g.

The shellfish and seawater sample results indicated higher levels of faecal contamination were entering the sea in this area than found in stream freshwater samples.

At the southeast corner of the shellfish bed on the shoreline surrounding Traigh Ahmore, approximately 52 sheep and 4 cattle were observed grazing. There were an additional 35 sheep grazing on the shoreline further to the east. The shoreline surrounding the fishery was fenced off so livestock did not have direct access to the shoreline. In addition to livestock certain wildlife including gulls, oyster catchers, geese and other seabirds were also observed.

A map is provided in Figure 9.1 that shows the relative locations of the most significant findings of the shoreline survey. These findings only represent the selected area surveyed on the day of the shoreline survey and not the entire shoreline surrounding the bay in which the fishery is located.

In summary, identified sources of potentially significant contamination were:

- Freshwater streams flowing into the south east end of the shellfish bed
- Livestock grazing on the shoreline

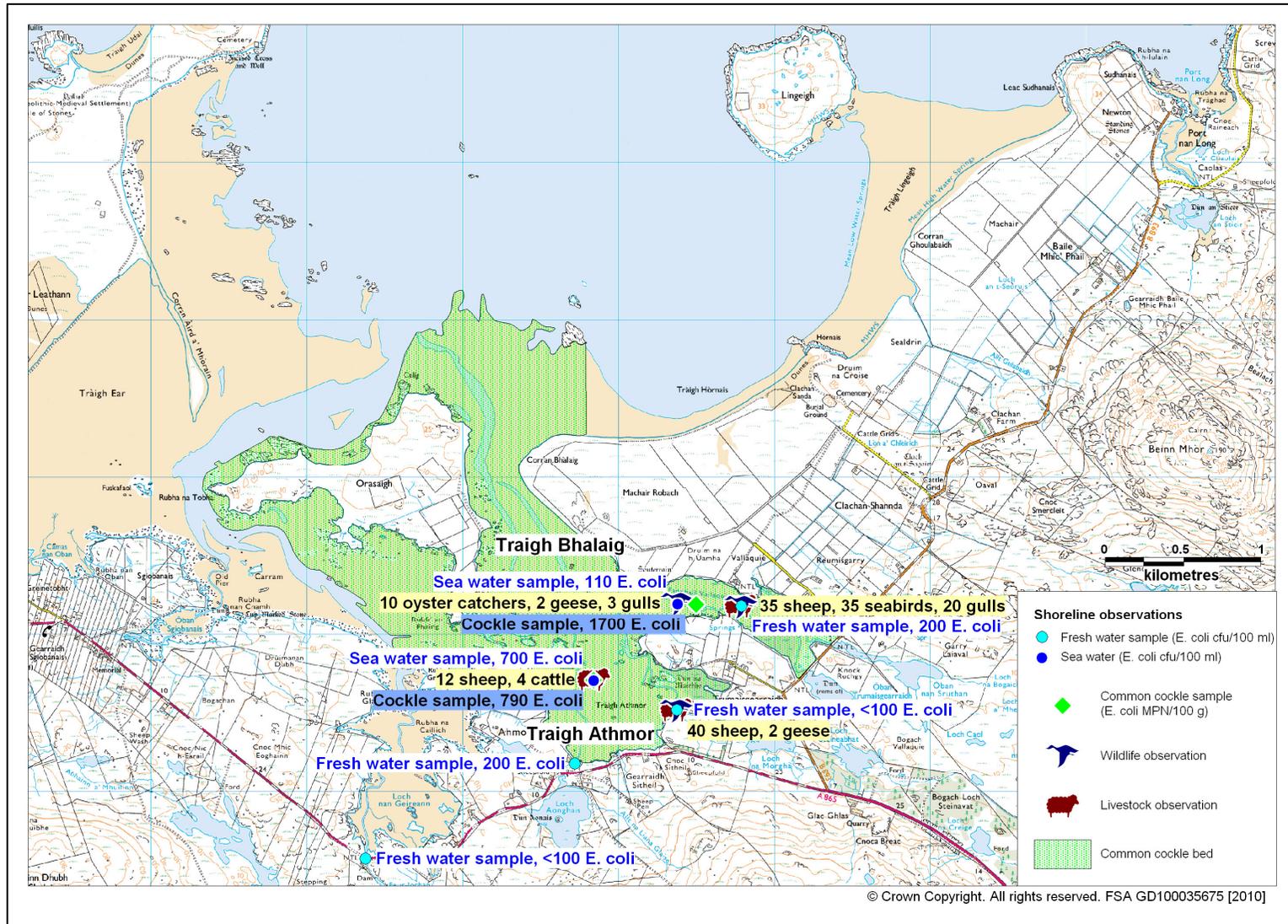


Figure 9.1 Summary of shoreline observations

10. Overall Assessment

Fishery

The cockle bed was identified by the harvester on the classification application form as the beaches surrounding Orasaigh at NF 845 760, east of Rubha an Tobha extending to the shore and north to Vallaquie. The cockles will be hand raked and harvesting is expected to take place throughout the year.

Human sewage inputs

A large number of consented discharges are present in the area surrounding Orasaigh East. The majority of these discharge consents are soakaways, over half of which are within 400 m of the shoreline and could therefore have the potential to impact the fishery. There are also 11 private septic tank discharges to the sea. Over half (6 out of 11) of the private and public primary sewage (septic tank) discharges are located at the extreme, south east end of the shellfish bed. None of these were confirmed during the shoreline survey. The location of the septic tanks and soakaways match the distribution of the population on the surrounding southern and eastern shorelines of Orasaigh.

Any impact from sewage inputs will be likely to be greatest at the south and south east end of the shellfish bed, as this is where a significant number of the private septic tank discharges are located. Discharges located to the north east side of the shellfish bed may also be a significant source of contamination.

Agricultural inputs

During the shoreline survey a number of sheep (approximately 87 in total) and several cattle were observed grazing along the shoreline of the south eastern side of the shellfish bed. No livestock were observed on the far eastern and western shorelines at the time of the shoreline survey. Often the sheep and cattle were close and/or had access to the shoreline and were close to fresh watercourses. Therefore, agricultural sources may be a significant source of contamination to the area. No conclusions can be drawn about the overall distribution of animals due to only a select area of the fishery being surveyed.

Wildlife inputs

During the shoreline survey approximately 23 gulls, 10 oyster catchers, 4 geese and 35 other seabirds were observed on and around the Orasaigh East site.

Rivers and streams

During the shoreline survey walk, four fresh water streams were observed discharging into the selected area shellfish bed. The Ordnance Survey map indicates that there are potentially 9-10 fresh water streams in total discharging into the bay in which the fishery is located. One of the streams sampled discharged outside of the cockle bed, directly south of the Isle of Orasaigh and the remainder discharged into the south east corner of the fishery. Two of the streams gave a result of <100 *E. coli* cfu/100 ml, including the stream discharging outside of the cockle bed and the other two streams sampled gave results of 200 *E. coli* cfu/100 ml. It would be expected that levels of faecal contamination in the streams would increase significantly after periods of rainfall. However, these samples represented conditions at one point in time only and contamination levels present in the identified watercourses could vary considerably from these values.

Rainfall

Rainfall patterns at North Uist: Clachan na Luib (the nearest rainfall station) show that seasonal variation in rainfall levels occurs and the wettest months were January, September and December. An increase in rainfall following a dry period may be expected to wash a flush of bacteria from the surrounding land into the production area. The highest risk of this type of event is during July and August, when lower average daily rainfall and extreme daily rainfall events are most likely to occur. The impact of rainfall events is likely to be most acute nearest where the streams enter the shellfish bed.

Analysis of results

There are no historical *E. coli* monitoring results for Orasaigh East.

During the shoreline survey two common cockle samples were collected from the south east end of the shellfish bed. Both samples had Class B results, one sample taken from the south end of the shellfish bed returned a result of 790 *E. coli* MPN/100 g and the second sample taken from the south east side of the shellfish bed returned a result of 1700 *E. coli* MPN/100 g.

Seawater samples were taken from two points within the shellfish bed. Both samples were taken from the south east corner of the shellfish bed. The sample taken the furthest south returned a very high result of 700 *E. coli* cfu/100 ml and the second sample taken slightly further north also returned a high result of 110 *E. coli* cfu/100 ml.

Movement of contaminants

Contamination arising to the southeast of Orasaigh will impact on the local area at high tide and will flow northward across Traigh Athmor on the ebb tide and into the deeper water channels along the eastern side of Orasaigh. Sources of contamination entering the far eastern extent of the fishery would also impact the local part of the bed particularly at high tide and then flow westwards across the bed.

Overall conclusions

The main identified potential sources of human and animal contamination lay on the southern shore of the area and in the eastern arm of the cockle bed and are likely to have their greatest impact on the fishery in the near vicinity. The highest sample result was obtained in the eastern arm of the sands, and there were both discharges and livestock to this area.

11. Recommendations

Production Area

The recommended production area boundaries are: the area bounded between NF 8465 7654 to NF 8565 7682 and NF 8565 7682 to NF 8563 7628, NF 8350 7578 to NF 8331 7533, NF 8716 7472 to NF 8727 7484 and NF 8735 7493 to NF 8741 7498 extending to MHWS.

RMP

It is recommended that the RMP be set at NF 8650 7520, which is located within the eastern arm of the cockle bed where the highest sample result was obtained. This is near to both human and animal sources of contamination

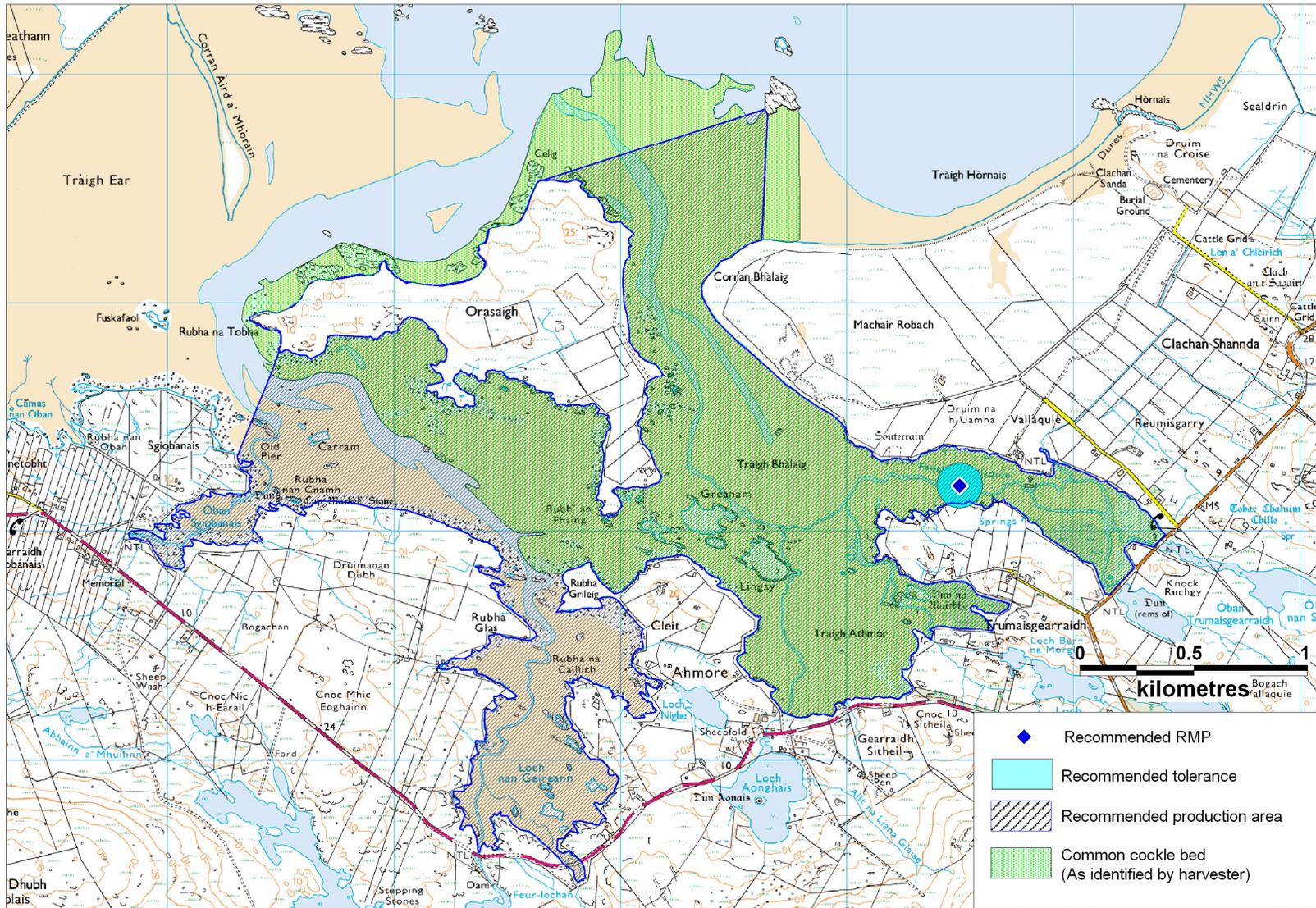
Tolerance

As there is likely to be variation in cockle density across the Orasaigh West area, it is recommended that a 100 m tolerance be allowed for sampling. This will allow for some variability in density while still ensuring that monitoring is undertaken reasonably close to the assigned RMP.

Frequency

As there is no historical monitoring data for the area and some seasonal variation in sources of contamination is expected, it is recommended that monthly monitoring be undertaken until sufficient data has been accumulated to permit a review.

The locations of the recommended production area boundaries, RMP and tolerance zone are illustrated in Figure 11.1.



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Figure 11. 1 Recommendations for Orasaigh East

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Mallin, M.A., Ensign, S.H., McIver, M.R., Shank, G.C., Fowler, P.K. (2001). Demographic, landscape, and meteorological factors controlling the microbial pollution of coastal waters. *Hydrobiologia* 460, 185-193.

OPSI (Office of Public Sector Information)
http://www.opsi.gov.uk/legislation/scotland/ssi2009/ssi_20090444_en_1 *The Inshore Fishing (Prohibition of Fishing for Cockles) (Western Isles) (Scotland) Order 2009* Accessed online 12/05/10

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Sampling Plan for Orasaigh East

PRODUCTION AREA	SITE NAME	SIN	SPECIES	TYPE OF FISH-ERY	NGR OF RMP	EAST	NORTH	TOLE R-ANCE (M)	DEPTH (M)	METHOD OF SAMPLING	FREQ OF SAMPLING	LOCAL AUTHORITY	AUTHORISED SAMPLER(S)	LOCAL AUTHORITY LIAISON OFFICER
Orasaigh East	Traigh Bhalaig	UB 488 844 04	Common cockles	Wild	NF 8650 7520	86500	875200	100	N/A	Hand raked	Monthly	CnES	Samantha Muir	Samantha Muir

Comparative Table of Boundaries and RMPs – Orasaigh East

Production Area	Species	SIN	Existing Boundary	Existing RMP	New Boundary	New RMP	Comments
Orasaigh East	Common cockles	UB 488 844 04	N/A	N/A	The area bounded between NF 8465 7654 to NF 8565 7682 and NF 8565 7682 to NF 8563 7628, NF 8350 7578 to NF 8331 7533, NF 8716 7472 to NF 8727 7484 and NF 8735 7493 to NF 8741 7498 extending to MHWS.	NF 8650 7520	New production area and RMP

Shoreline Survey Report



Orasaigh East UB 488

Restricted Scottish Sanitary Survey Project

Shoreline Survey Report

Production area: Orasaigh East
 Site name: Traigh Bhalaig
 Species: Common Cockles (*Cerostoderma edule*).
 Harvester: Duncan MacInnes
 Local Authority: CnES
 Status: New site

Date Surveyed: Tuesday 13th April 2010
 Surveyed by: Samantha Muir
 Existing RMP: NA
 Area Surveyed: See Figure 1.

Weather observations

Tuesday 13th April: Sunny and dry with no rainfall in previous weeks

Site Observations

Fishery

The Orasaigh East production area is harvested for common cockles (*Cerostoderma edule*). The common cockles are hand raked within the sands of Traigh Bhalaigh, shown in Figure 1. The harvesters plan to harvest the razors all year round.

Sewage/Faecal Sources

There are no large settlements surrounding Orasaigh East. Human population is spread through scattered dwellings around the production area. No sewage outfall pipes or septic tanks were observed during the shoreline survey.

Seasonal Population

There are no caravan parks or campsites in the area surrounding Orasaigh East. No hotels or B&BS were observed during the shoreline survey; however there was one holiday cottage let was observed.

Boats/Shipping

At the time of the shoreline survey no boats were observed in Orasaigh East.

Land Use

The land surrounding Orasaigh East is mainly croft land primarily used for grazing sheep and some cattle.

Livestock

During the shoreline survey at the southeast end of the cockle bed on the shoreline surrounding the Traigh Ahmore area, approximately 52 sheep and 4 cattle were observed grazing. There were an additional 35 sheep grazing on the shoreline surrounding the next water body east of Traigh Ahmore. No other livestock was observed at the time of the shoreline survey.

Wildlife/Birds

During the shoreline survey gulls, oyster catchers, geese and other seabirds were observed on and around the Orasaigh East area.

Observations can be found in Table 1.

Figure 1. Shoreline Observations

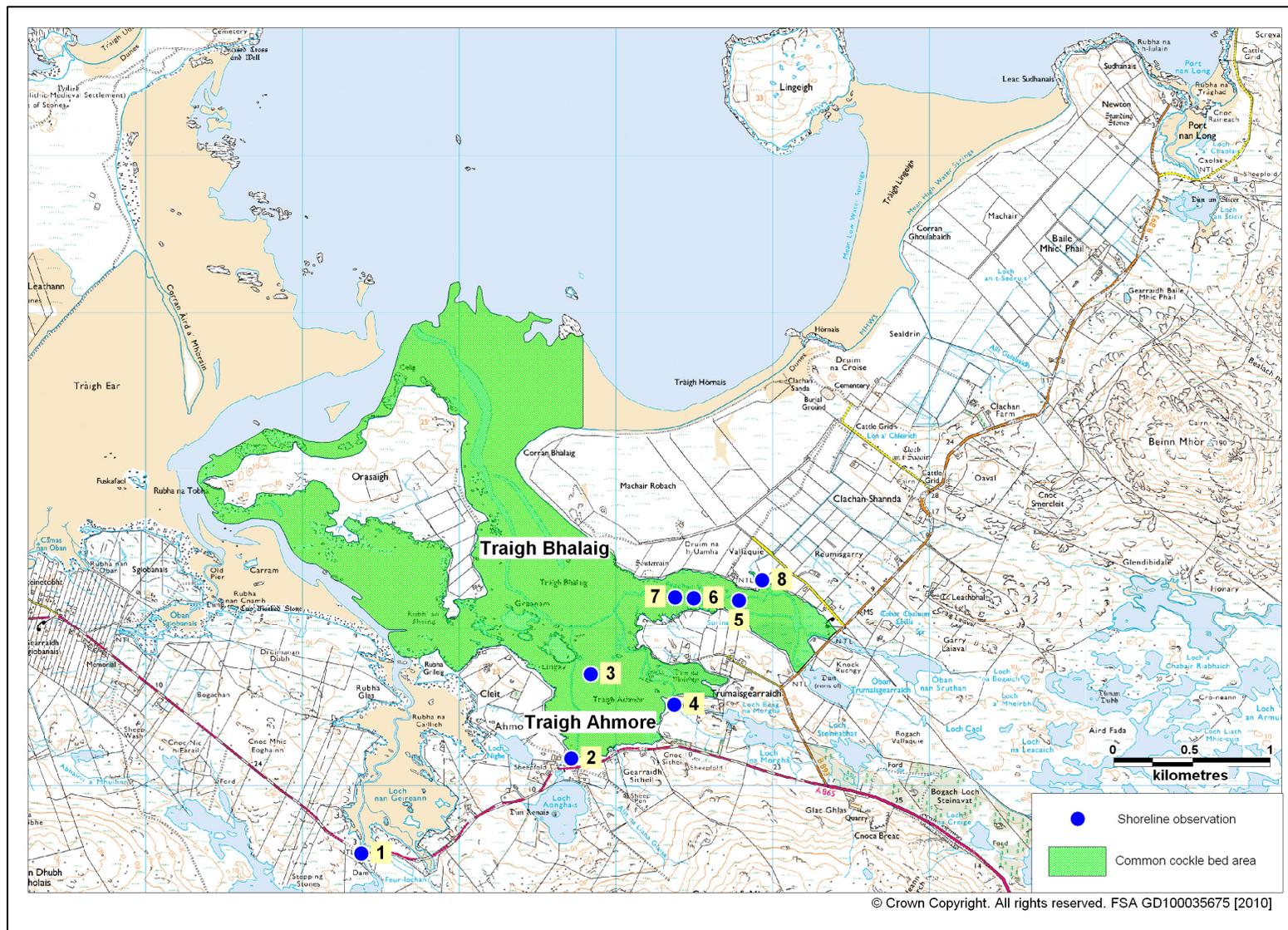


Table 1. Shoreline Observations

No.	Date	Time	NGR	East	North	Associated photograph	Description
1	13/04/2010	11:45	NF 84377 73576	84377	873576	Figures 4 & 5	Fresh water stream, W 5.2, D 0.46, Flow 0.2 m/sec. Fresh water sample OEFW1. Pipes under road, each approx 1 m wide. Derelict cottage.
2	13/04/2010	12:05	NF 85718 74180	85718	874180	Figure 6	Fresh water stream, W 0.98, D 0.14, unable to measure flow – boulder strewn. Fresh water sample OEFW2. Cluster of 3 houses with large building yard and machinery.
3	13/04/2010	12:40	NF 85841 74712	85841	874712	Figure 7	Sea water sample OESW1. Common cockle sample OEC1. 5 houses visible, 12 sheep & 4 cattle on the shoreline.
4	13/04/2010	13:00	NF 86374 74519	86374	874519	Figure 8	Fresh water stream, W 6.1, D 0.01 – 0.25, unable to measure flow – boulder strewn. Fresh water sample OEFW3. Approximately 40 sheep visible plus 2 geese.
5	13/04/2010	13:25	NF 86788 75183	86788	875183	Figure 9	Fresh water sample OEFW4. Area surrounded by croft land (mostly sheep grazing, some cattle), 35 sheep visible, 35 seabirds, 20 gulls. Broken cockle and mussel shells. 3 croft houses and one holiday cottage let.
6	13/04/2010	13:40	NF 86499 75197	86499	875197	Figure 10	Common cockle sample OEC2 (juvenile cockles here)
7	13/04/2010	13:45	NF 86380 75202	86380	875202	-	Sea water sample OESW2. 10 oyster catchers, 2 geese, 3 gulls.
8	13/04/2010		NF 86935 75310	86935	875310	Figure 11	Fresh water stream at Vallaquie, tributary of stream from observation No. 5.

Photographs referenced in the table can be found attached as Figures 4 – 11.

Sampling

Water and shellfish samples were collected at sites marked on the map. Bacteriology results follow in Tables 2 and 3.

Seawater samples were tested for salinity using a hand held refractometer. These readings are recorded in Table 1 as salinity in parts per thousand (ppt).

Samples were also tested for salinity by the laboratory using a salinity meter under more controlled conditions. These results are shown in Table 2, given in units of grams salt per litre of water. This is the same as ppt.

Table 2. Water Sample Results

No.	Date	Sample	Grid Ref	Type	E. coli (cfu/100ml)	Salinity (g/L)
1	13/04/2010	OEFW1	NF 84377 73576	Fresh water	<100	-
2	13/04/2010	OEFW2	NF 85718 74180	Fresh water	200	-
3	13/04/2010	OEFW3	NF 86374 74519	Fresh water	<100	-
4	13/04/2010	OEFW4	NF 86788 75183	Fresh water	200	-
5	13/04/2010	OESW1	NF 85841 74712	Sea water	700	31.6
6	13/04/2010	OESW2	NF 86380 75202	Sea water	110	23.3

Table 3. Shellfish Sample Results

No.	Date	Sample	Grid Ref	Type	E. coli (MPN/100g)
1	13/04/2010	OEC1	NF 85841 74712	Common cockles	790
2	13/04/2010	OEC2	NF 86499 75197	Common cockles	1700

Figure 2. Water sample results

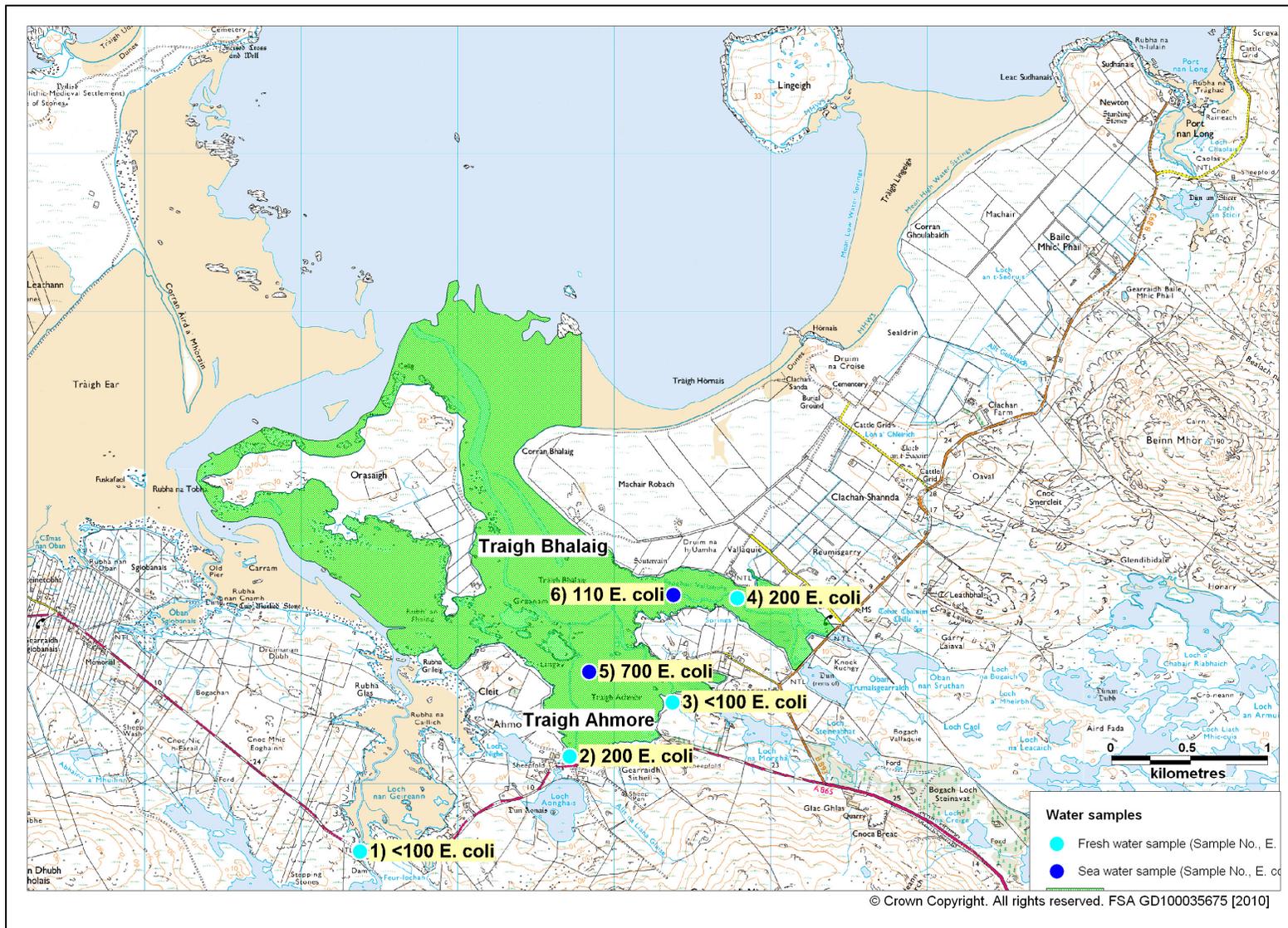
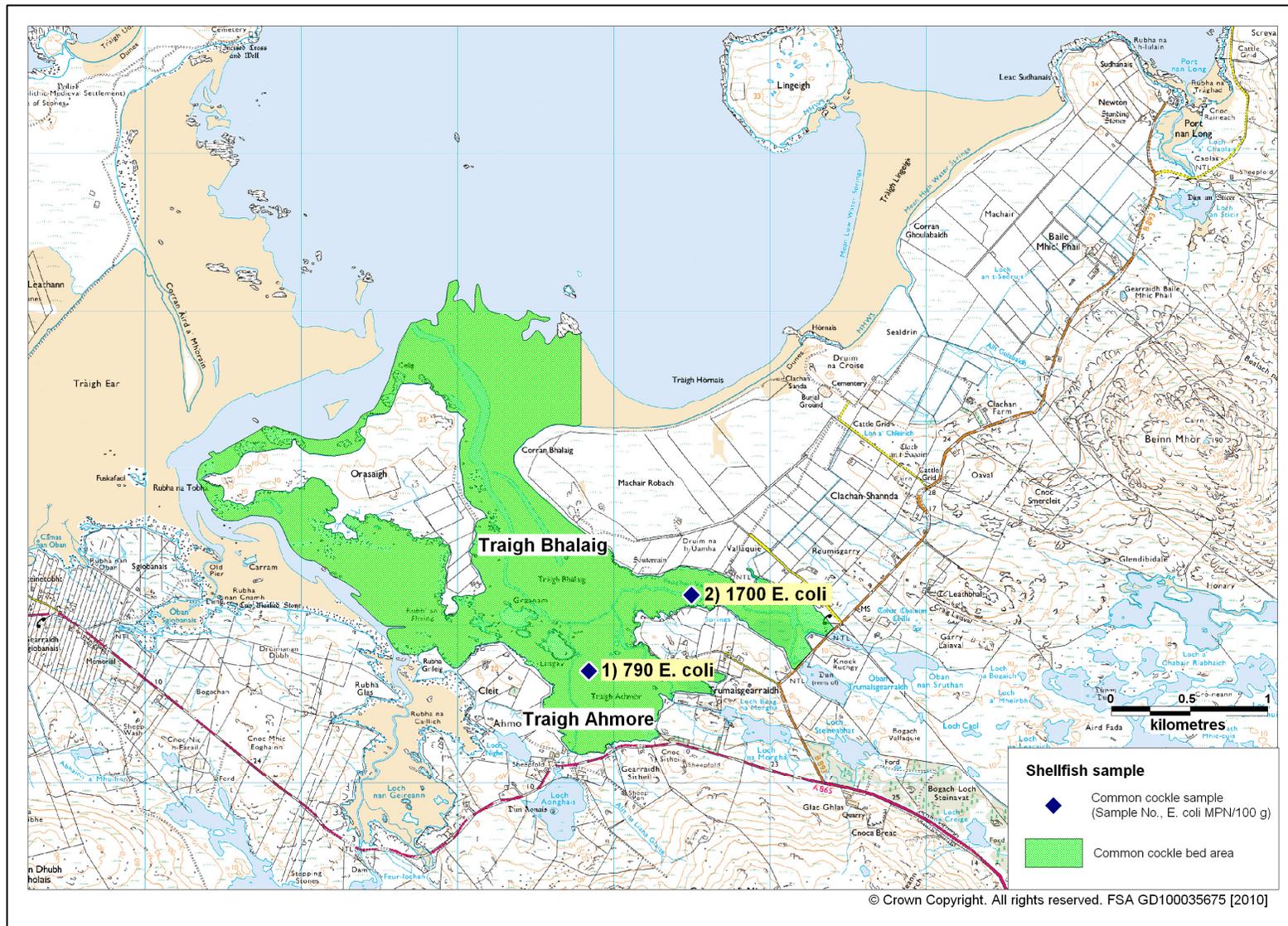


Figure 3. Shellfish sample results



Photographs



Figure 4. Pipes under road, each approx. 1 m wide



Figure 5. Fresh water stream, location of fresh water sample 1, OEFW1.



Figure 6. Fresh water stream, location of fresh water sample 2, OEFW2.



Figure 7. Common cockle sample, OEC1.



Figure 8. Fresh water stream, location of fresh water sample 3, OEFW3.



Figure 9. Sheep and lambs visible.



Figure 10. Location of cockle sample OEC2.



Figure 11. Fresh water stream at Vallaquie.

SEPA Discharge Consents - Soakaways

Consent No.	NGR of discharge	Discharge Type	Discharges to	Near or Far Soakaway
CAR/R/1076172	NF 81229 74730	Sewage (Private) Primary	Sheillaidh, STE to soakaway, 8 Sollas, Isle of North Uist	Far soakaway
CAR/R/1032229	NF 81230 75030	Sewage (Private) Primary	Havisgarry, STE to soakaway, Sollas, Isle of North Uist	Far soakaway
CAR/R/1020153	NF 81265 74745	Sewage (Private) Primary	8 Sollas, STE to land, Isle of North Uist	Far soakaway
CAR/R/1075900	NF 81250 75050	Sewage (Private) Primary	Arvillas Rock, STE to Soakaway, Sollas	Far soakaway
CAR/R/1075685	NF 81400 74870	Sewage (Private) Primary	Oceanview, STE to soakaway, Sollas	Far soakaway
CAR/R/1066699	NF 81440 74899	Sewage (Private) Primary	Primrose Cottage, STE to Soakaway, Sollas, Isle of North Uist	Far soakaway
CAR/R/1066568	NF 81613 74983	Sewage (Private) Primary	10 Sollas, STE to Soakaway, Isle of North Uist	Far soakaway
CAR/R/1049922	NF 81673 74953	Sewage (Private) Primary	11 Sollas, STE to soakaway, North Uist	Far soakaway
CAR/R/1073814	NF 82020 75070	Sewage (Private) Primary	Toloman View, STE to soakaway, Isle of North Uist	Close soakaway
CAR/R/1066828	NF 82060 75330	Sewage (Private) Primary	1 Grenitote, STE to soakaway, Isle of North Uist	Close soakaway
CAR/R/1056535	NF 82210 75290	Sewage (Private) Primary	3 Greintote, STE to soakaway, Isle Of Noth Uist	Close soakaway
CAR/R/1056410	NF 82280 75280	Sewage (Private) Primary	4 Grenitote, STE to soakaway, Lochmaddy, Isle Of North Uist	Close soakaway
CAR/R/1075836	NF 82310 75190	Sewage (Private) Primary	6 Grenitote, STE to soakaway, Isle Of North Uist	Close soakaway
CAR/R/1043308	NF 82378 75207	Sewage (Private) Primary	7 Grenitote, STE to soakaway, Lochmaddy, Isle Of North Uist	Close soakaway
CAR/R/1018412	NF 82410 75092	Sewage (Private) Primary	10 Grenitote, STE to land, Sollas, North Uist	Close soakaway
CAR/R/1045361	NF 82402 75224	Sewage (Private) Primary	8 Grenitote, STE to soakaway, North Uist	Close soakaway
CAR/R/1060028	NF 82430 75180	Sewage (Private) Primary	9 Grenitote, STE to Land, Isle of North Uist	Close soakaway
CAR/R/1056986	NF 82530 75000	Sewage (Private) Primary	14 Grenitoite, STE to soakaway, Isle of North Uist	Far soakaway
CAR/R/1064898	NF 82530 75094	Sewage (Private) Primary	13 Grenitote, STE to soakaway, Isle of North Uist	Close soakaway
CAR/R/1055778	NF 82553 74982	Sewage (Private) Primary	15 Grenitote, STE to soakaway, Isle of North Uist	Close soakaway
CAR/R/1047652	NF 82600 74950	Sewage (Private) Primary	17 Grenitote, STE to soakaway, Isle Of North Uist	Close soakaway
CAR/R/1046973	NF 82630 74920	Sewage (Private) Primary	18 Grenitote, STE to soakaway, Sollas, Isle Of North Uist	Close soakaway
CAR/R/1067559	NF 82654 74902	Sewage (Private) Primary	Shandon, STE to soakaway, Isle Of Lewis	Close soakaway
CAR/R/1043309	NF 82678 74835	Sewage (Private) Primary	20 Grenitote, STE to soakaway, Isle Of North Uist	Close soakaway
CAR/R/1043371	NF 82705 74849	Sewage (Private) Primary	21 Grenitote, STE to soakaway, Sollas, Isle Of North Uist	Close soakaway
CAR/R/1010069	NF 83100 74510	Sewage (Private)	Stonefield, 11 Genitote, Isle of North	Far soakaway

Consent No.	NGR of discharge	Discharge Type	Discharges to	Near or Far Soakaway
		Primary	Uist, STE to soakaway	
CAR/R/1061452	NF 83220 74520	Sewage (Private) Primary	Tynecastle, STE to soakaway, Grenitote, Isle of North Uist	Far soakaway
CAR/R/1044533	NF 85051 73836	Sewage (Private) Primary	4A Ahmor, STE to soakaway, Isle of North Uist	Close soakaway
CAR/R/1020136	NF 85332 73981	Sewage (Private) Primary	4 Ahmore, STE to Soakaway, Lochmaddy, Isle of North Uist	Close soakaway
CAR/R/1057574	NF 85550 74080	Sewage (Private) Primary	Newhouse, STE to soakaway, Lochmaddy, Isle of North Uist	Close soakaway
CAR/R/1017597	NF 85810 74020	Sewage (Private) Primary	2 Ahmor, STE to Land, Lochmaddy, Isle of North Uist	Close soakaway
CAR/R/1015995	NF 85910 74100	Sewage (Private) Primary	Orisaigh, 2 Ahmor, Isle of North Uist - STE to Land	Close soakaway
CAR/R/1049524	NF 87400 75110	Sewage (Private) Primary	8 Clachan Sands, STE to soakaway, Isle of North Uist	Close soakaway
CAR/R/1056584	NF 87820 75460	Sewage (Private) Primary	7 Clachan Sands, STE to Soakaway, Isle of North Uist	Far soakaway
CAR/R/1059542	NF 87880 75810	Sewage (Private) Primary	2 Clachan Sands, STE to Soakaway, Isle of North Uist	Far soakaway
CAR/R/1018968	NF 87950 75890	Sewage (Private) Primary	New dwelling, 2/3 Clachan Sands, STE to land, Isle of North Uist	Far soakaway
CAR/R/1059583	NF 88003 75903	Sewage (Private) Primary	Cnoc An Duin, STE to soakaway, Clachan Sands, Isle Of North Uist	Far soakaway
CAR/R/1015348	NF 88189 76108	Sewage (Private) Primary	Goulaby, Clachan Farm, Isle of North Uist, STE to land	Far soakaway
CAR/R/1050639	NF 88390 76410	Sewage (Private) Primary	Clachan Farm, STE to soakaway, Clachan Sands, Isle of North Uist	Far soakaway
CAR/R/1061450	NF 88864 76704	Sewage (Private) Primary	2A Newton, STE to soakaway, Lochmaddy, Isle of North Uist	Far soakaway
CAR/R/1060094	NF 88910 76960	Sewage (Private) Primary	2 Newton, STE to land, Isle of North Uist	Far soakaway