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# Scottish Sanitary Survey Project



## Restricted Sanitary Survey Report Eriska Shoal AB 490 February 2010



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## Report Distribution – Eriska Shoal

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# 1. Area Overview

Eriska Shoal is a small bay located along the Lynn of Lorn on the west coast of Scotland, east of the Isle of Lismore and a short distance south of the mouth of Loch Creran (see Figure 1.1). The entrance to the bay is 0.48km wide. It is 1.6km at its widest point and 0.6km in length. The entire bay is intertidal and is connected to Loch Creran during higher tides, creating the Island of Eriska to the north of the bay. A restricted sanitary survey at Eriska Shoal was conducted in response to receipt of an application to classify the area for commercial harvest of common cockles.



Figure 1.1 Location of Eriska Shoal

## 1.1 Land Cover

Land Cover 2000 data (see Figure 1.2) indicates that the land cover on the surrounding coastline of the production area is predominantly open heath with some areas of natural and improved grassland. Improved grassland is found at the southern and northeastern ends of the bay. The Isle of Eriska has a mixture of broad leaf and coniferous woodland on the east side and a mixture of acid grassland, neutral grassland and open heath land.

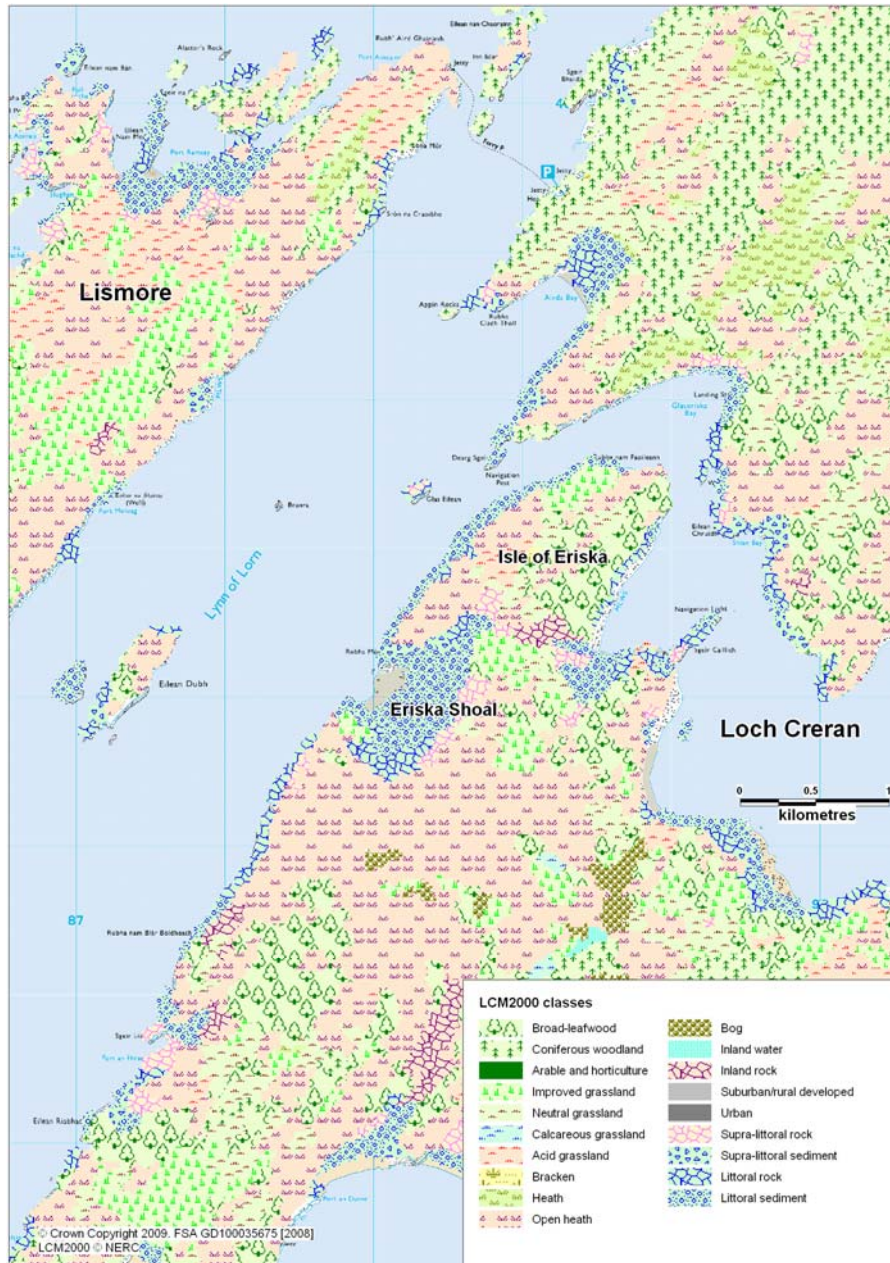


Figure 1.2 Landcover 2000 data for area surrounding Eriska Shoal

Faecal coliform contributions from improved grassland have been shown to be approximately  $8.3 \times 10^8$  cfu km<sup>-2</sup> hr<sup>-1</sup> (Kay et al. 2008). The contributions to the contamination if shellfish from all land cover types would be expected to increase significantly after marked rainfall events. This increase would be highest, at more than 100-fold, for improved grassland. Areas of improved grassland near the fishery would be expected to contribute the most to

contamination levels carried in surface runoff to the western end of the common cockle bed.

## 1.2 Human Population

Figure 1.3 shows the census output areas that are directly adjacent to Eriska Shoal. The land surrounding the Eriska Shoal is sparsely populated with a total of 94 residents (2001 census) spread over the census output area directly adjacent to the production area. The settlement of Port Appin is 2.5km north of the Eriska Shoal production area and has a human population of 184. Additional contamination from human sources could potentially arise from within Loch Creran itself.

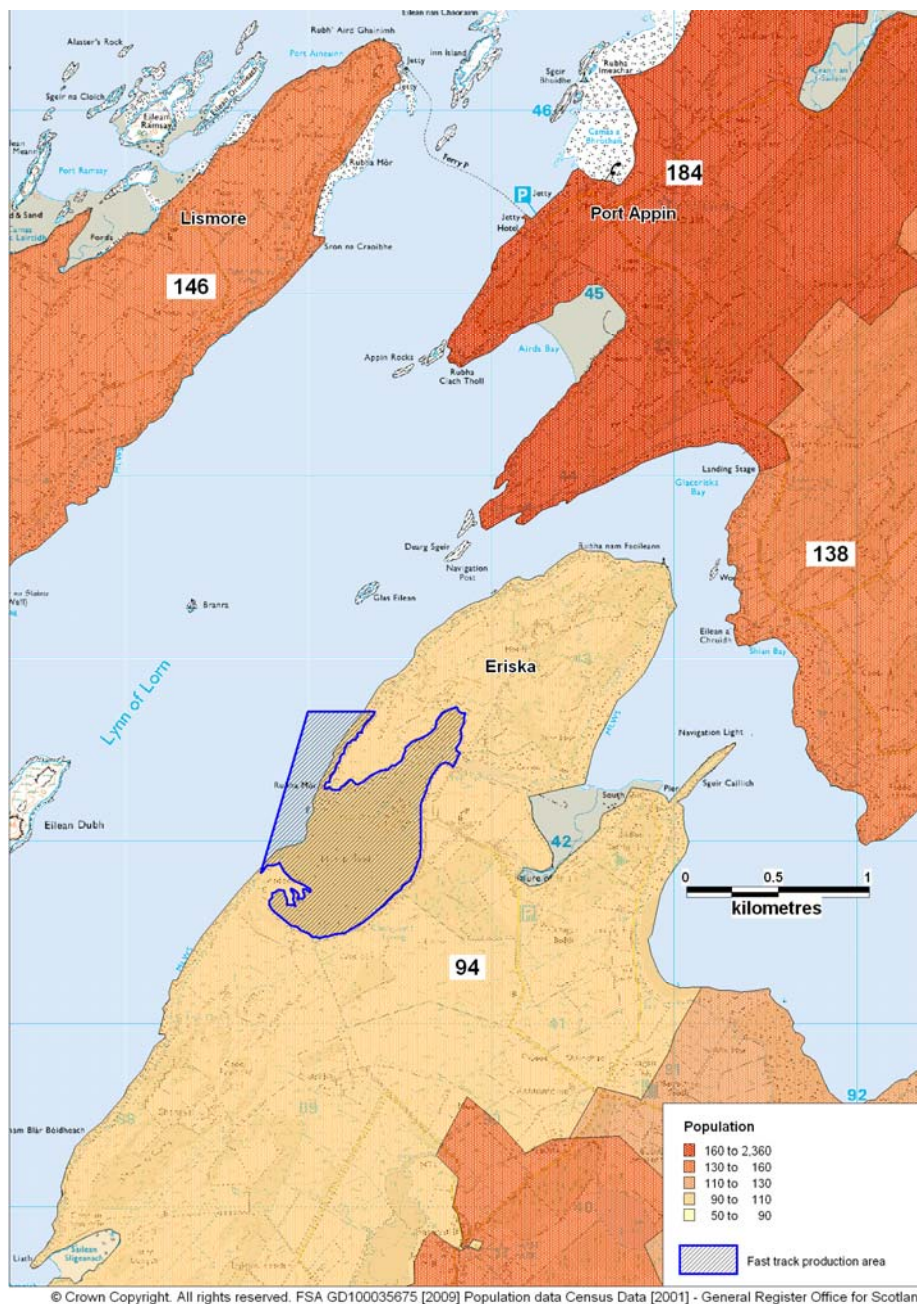


Figure 1.3 Human population surrounding Eriska Shoal

A ferry service operates between Port Appin and the Isle of Lismore and sails several times daily. There is a large hotel on Eriska and the area is popular with tourists, so it is expected to experience an increase in population in the summer months.

## 2. Fishery

The fishery at Eriska Shoal is comprised of a wild common cockle (*Cerastoderma edule*) bed within the Eriska Shoal (SIN AB 490 907 04) production area.

The fast track classification production area boundaries as identified by the Food Standards Agency on 3<sup>rd</sup> April 2009 are given as the area bounded by lines drawn between NM 8930 4270 to NM 8900 4270 and from NM 8900 4270 to NM 8870 4170 and from NM 8970 4240 to NM 8980 4250 extending to MHWS.

There is currently no representative monitoring point (RMP) assigned to this area. The common cockle bed at Eriska Shoal does not lie within designated shellfish waters.

The cockle bed lies within the production area, although the exact boundaries are not known. The production area boundaries established for the fast track application were based on where the harvester indicated the cockle bed was located. The cockles are hand raked which will therefore limit the cockle bed to MLWS. Harvesting of cockles is planned to take place throughout the year.



Figure 2.1 Eriska Shoal fishery



### 3. Sewage Discharges

A number of discharge consents were granted by SEPA for the area adjacent to Eriska Shoal. These are listed in Table 3.1 and mapped in Figure 3.1.

Table 3.1 Discharge consents granted by SEPA

Ref No.	NGR of discharge	Discharge type	Discharges to	PE	Discharge Vol m <sup>3</sup> per day
CAR/R/1019378	NM 9106 4591	Continuous	Land via soakaway	5	-
CAR/R/1018247	NM 9107 4584	Continuous	Land via soakaway	16	-
CAR/R/1017964	NM 9122 4589	Continuous	Land via soakaway	5	--
CAR/R/1012088	NM 9051 4558	Continuous	Lynn of Lorn	5	-
CAR/R/1019134	NM 9074 4548	Continuous	Land via soakaway	5	-
CAR/R/1015596	NM 9111 4571	Continuous	Land	5	-
CAR/S/1009904	NM 9079 4541	Continuous	Land	17	3.4
CAR/L/1000420	NM 907 456	Continuous	Lynn of Lorn	-	-
CAR/R/1010729	NM 9060 4330	Continuous	Land	5	-
CAR/R/1017596	NM 8921 4072	Continuous	Land via soakaway	6	-

A community septic tank and sewage discharge was identified by Scottish Water for the area adjacent to Eriska Shoal. This is detailed in Table 3.2 and mapped in Figure 3.1. The majority of these were located around Port Appin.

Table 3.2 Discharge identified by Scottish Water

Discharge Name	NGR of discharge	Discharge Type	Level of Treatment	Consented flow m <sup>3</sup> /day	Consented/design PE
Port Appin	NM 9070 4560	Continuous	Septic tank	-	30

No sanitary or microbiological data were available for these discharges.

A septic tank and an inspection chamber were also observed during the shoreline survey and these are listed in Table 3.3. Their locations have been included in the mapped discharges in Figure 3.1. Further details can be found in the shoreline survey report in the appendix.

Table 3.3 Observations of potential sewage discharges

No.	Date	NGR	Description of potential sewage discharge
1	04/06/2009	NM 88768 41707	Inspection chamber – empty
2	04/06/2009	NM 88780 41688	Balmoral private septic tank, serves one dwelling, no outlet pipe observed

Further observations on the sewage discharges at Port Appin are given in the Loch Creran sanitary survey report. These observations relate to the date of the shoreline survey conducted there. They observed a number of septic tanks discharging directly onto the beach between MHWS and MLWS. Some of the septic tanks were deemed to be malfunctioning at the time of the survey, as assessed by the presence of sanitary debris or faecal solids.

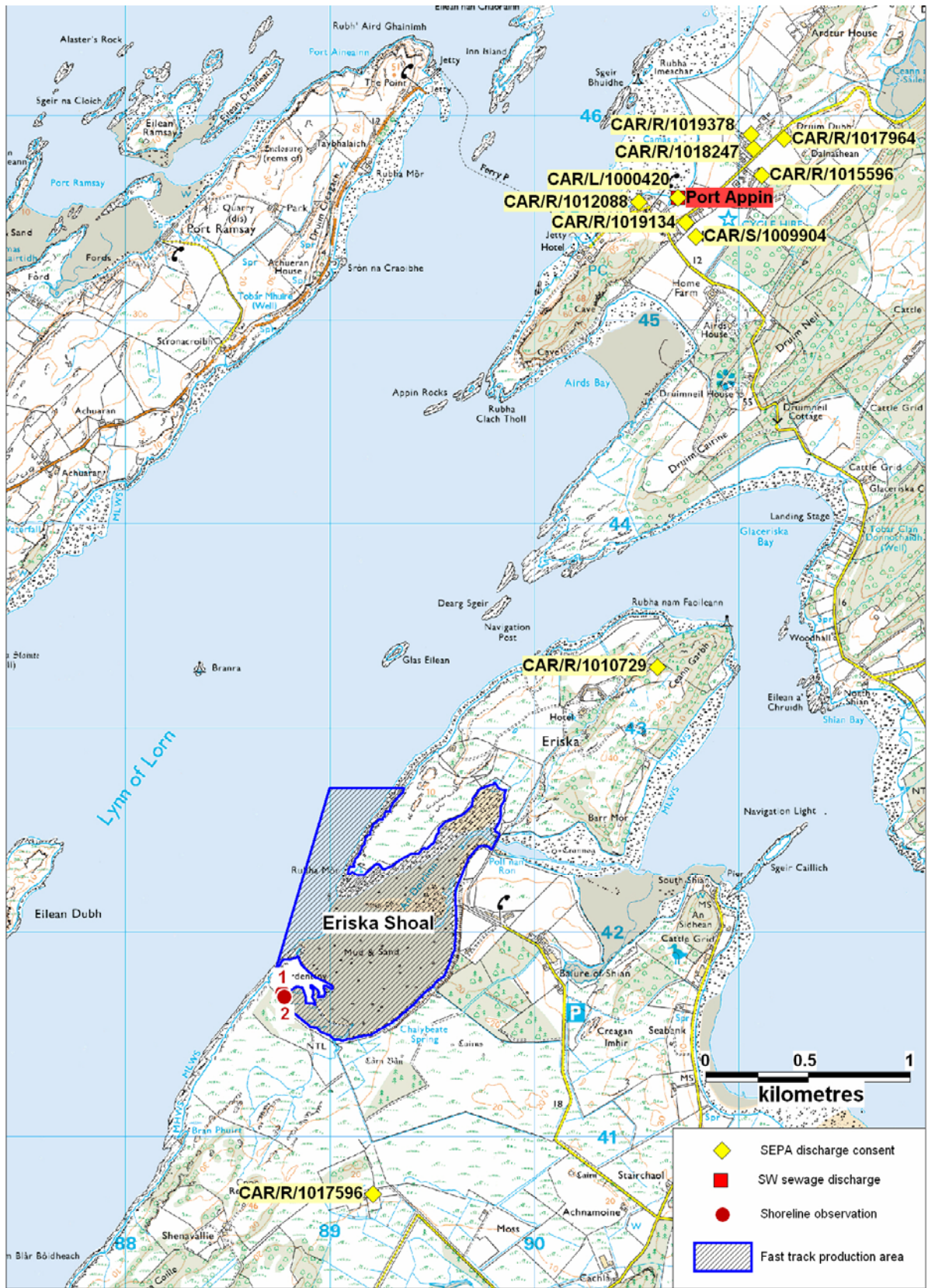


Figure 3.1 Sewage discharges at Eriska Shoal

## **4. Animals**

### **4.1 Livestock**

The only significant source of information concerning livestock numbers in the area surrounding Eriska Shoal was available from the shoreline survey. The shoreline survey only relates to the time of the site visit on the 4<sup>th</sup> June 2009.

During the shoreline survey, ten cattle were observed close to the shoreline at the southern end of the Eriska Shoal production area (see Figure 4.1). Thirty sheep were also observed in the same location as the cattle. A larger flock of forty sheep were observed close to the shoreline at the south west end of the shellfish bed and another flock of twelve sheep (and some cattle hoof prints) were observed at the south east end. No livestock were observed anywhere along the shoreline north of Chalybeate Spring or on the Isle of Eriska.

### **4.2 Wildlife**

Seabirds such as gulls and oyster catchers will always be present on and around Eriska Shoal but in the absence of distinct nesting or roosting areas, their distribution is likely to be even over time and as such would not materially affect the spatial assessment of microbiological quality. During the shoreline survey gulls, oyster catchers, geese and ducks were observed on and around the shellfish bed area.

No other wildlife was observed at the time of the shoreline survey, although deer hoof prints were observed in the sand on the eastern side of the shellfish bed, indicating their presence. Although no animals were seen at the time of the survey, it is likely that other animals including seals and otters may be present in the area. However, the distribution and numbers of these species is unknown.

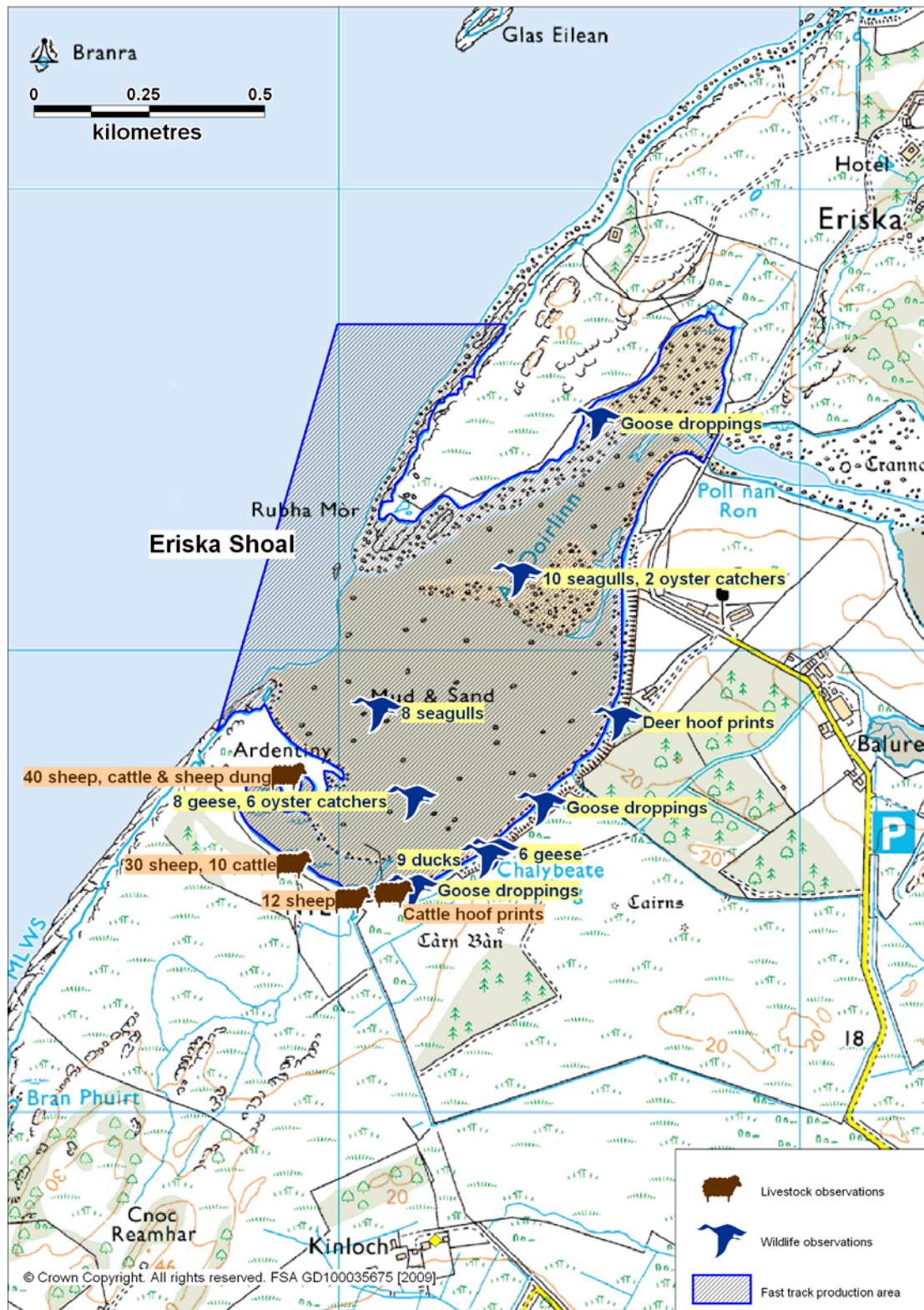


Figure 4.1 Livestock and wildlife present in Eriska Shoal

## 5. Rainfall

The nearest weather station is located at Strath of Appin, approximately 6.5 km north east of Eriska Shoal. Daily rainfall values were purchased from the Meteorological Office for the period 1/1/2003 to 31/12/2008 inclusive, although there were no records for 241 days during this period. Due to the very close proximity of the weather station to Castle Stalker, rainfall recorded here is likely to be very similar to that experienced on Eriska Shoal and the surrounding land.

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 Strath of Appin

Due to the missing data it is not appropriate to present total rainfall at Strath of Appin by year or month. Instead, Figures 5.1 and 5.2 summarise the pattern of rainfall recorded at Strath of Appin. 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 at the midline. The whiskers extend to the largest or smallest observations up to 1.5 times the box height above or below the box. As the bottom of the box sits at or near zero, there are no whiskers below the box. Individual observations falling beyond the whiskers are represented by the symbol \*.

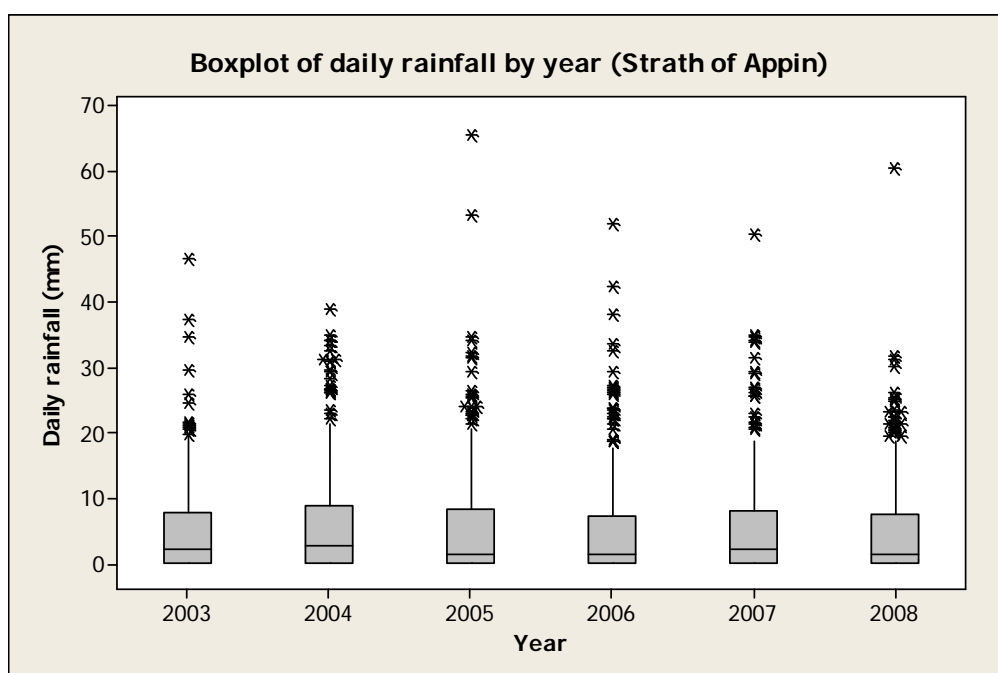


Figure 5.1 Boxplot of daily rainfall at Strath of Appin by year

While little variation was observed in median daily rainfall, there was considerable year-on-year variation in peak rainfall amounts.

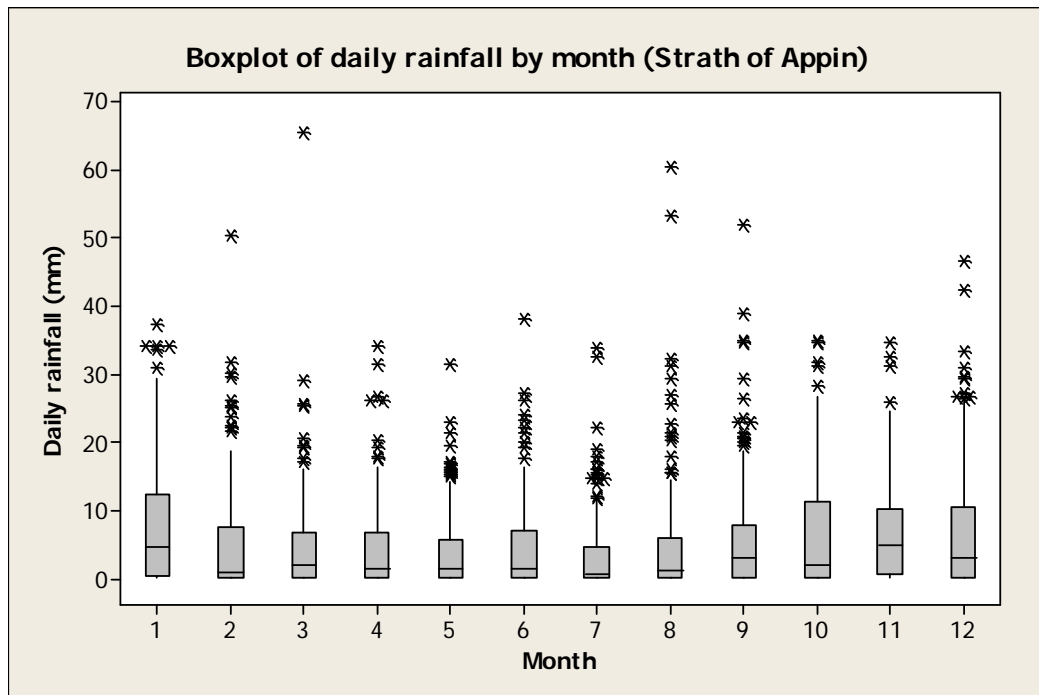


Figure 5.2 Boxplot of daily rainfall values at Strath of Appin by month

The wettest months were September to January inclusive. However, four of the six highest peak rainfall events occurred in months outside this period. For the period considered here (2003 – 2006), 30% of days for which records were available experienced no rainfall while 43% of days experienced rainfall of 1mm or less.

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.

Faecal contaminants from other sources may be independent of rainfall and so episodes of contamination may occur outside identified periods of higher rainfall, for example when livestock are present on the shoreline.

## 6. River Flow

There is no river gauging station in the vicinity of Eriska Shoal. A total of ten fresh water inputs were observed discharging into Eriska Shoal. In total, only six were of sufficient size to obtain a water sample. Only two of these were of a measurable size. The details of these streams are listed in Table 6.1 and mapped in Figure 6.1.

Table 6.1 River flow and loadings – Eriska Shoal

No	Grid Ref	Description	Width (m)	Depth (m)	Measured Flow (m/s)	Flow in m <sup>3</sup> /day	<i>E. coli</i> (CFU/100 ml)
1	NM 89769 42703	Stream**	-	-	-	-	“
2	NM 89832 42709	Stream*	-	-	-	-	<100
3	NM 89875 42688	Stream*	-	-	-	-	<100
4	NM 89959 42485	Stream**	-	-	-	-	“
5	NM 89492 41702	Stream	0.11	0.02	0.16	30.41	<100
6	NM 89470 41674	Stream*	-	-	-	-	<100
7	NM 89338 41557	Stream	0.10	0.02	0.363	3.0	<100
8	NM 89320 41545	Stream*	-	-	-	-	<100
9	NM 89147 41463	Stream**	-	-	-	-	“
10	NM 89028 41457	Stream*	-	-	-	-	500

\* Insufficient flow to measure

“ Insufficient water to sample

The only stream that yielded a measurable *E. coli* result (i.e. one at or above the limit of detection of the test) was too small for the flow to be measured. The other streams all gave results below the limit of detection of the test (100 *E. coli* / 100 ml) as performed on these samples. No *E. coli* loadings could therefore be calculated. The predominant freshwater inputs to the Shoal in terms of size were to the south-east of the embayment. However, these would not have necessarily been the predominant freshwater sources of contamination in terms of *E. coli*.

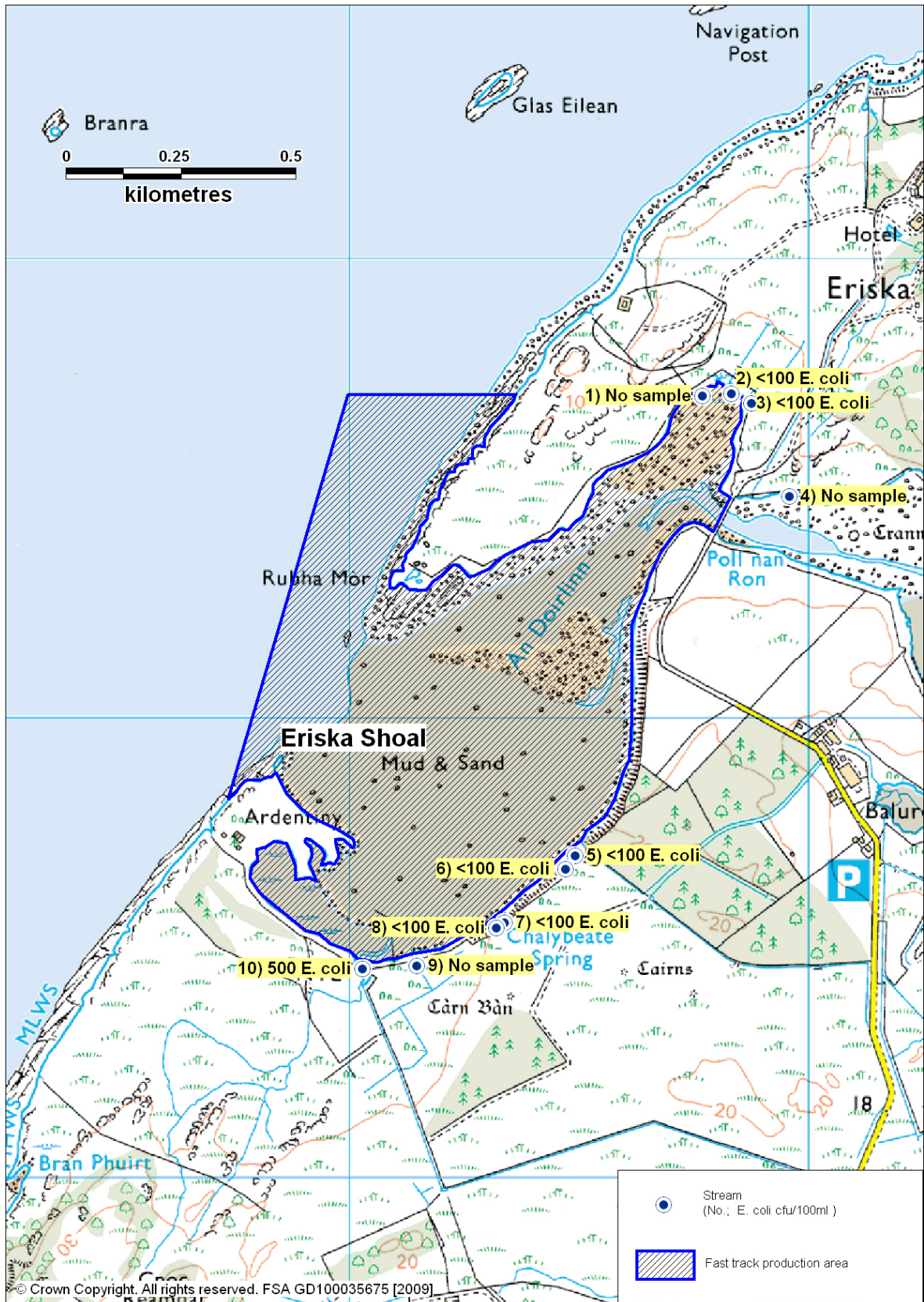


Figure 6.1. Location of river flows and loadings at Eriska Shoal



## 7. Historical *E. coli* Monitoring Data

There is limited historical *E. coli* monitoring data available for Eriska Shoal, all of it gathered since April 2009. No samples appear to have been submitted in support of the fast track classification application which was dated 26/03/2009. The *E. coli* results for samples submitted in 2009 are listed in Table 7.1 below and are represented spatially on the map in Figure 7.1 overleaf. For reference, the results and locations of shellfish sampled during the shoreline survey are also represented on this map. All but one of the samples collected in support of the monitoring program came from within a 20 meters of one another. Results varied from a low of 50 MPN/100g to a high of 700 MPN/100g. Of these, 4 out of 7 (57%) exceeded 230 *E. coli*/100g.

There was insufficient monitoring history to undertake a more detailed analysis of seasonal variation in results. However, as the shoreline survey samples were collected within 1 day of a monitoring sample it may be useful to consider spatial variation amongst these 4 samples. The monitoring sample collected on 03/06/2009 was taken from within the 20m cluster of results located near to the shoreline at the northern end of the bay and had result of 130 MPN/100 g. This appears to lie adjacent to a seawater channel running between Eriska Shoal and Loch Creran. Samples taken as part of the shoreline survey on 04/06/2009 came from 140m west and up to 600m southwest of the monitoring sample. All of these samples returned results of 20 or below MPN/100g, indicating that the area of the bay further from shore may be cleaner.

Table 7.1 Shellfish classification monitoring results

Site ID	Grid Reference	Eastings	Northings	Collection Date	<i>E. coli</i> (MPN/100g)
AB-490-907-04	NM 89595 42319	189595	742319	22/04/2009	70
AB-490-907-04	NM 89530 42154	189530	742154	29/04/2009	330
AB-490-907-04	NM 89529 42153	189529	742153	03/06/2009	130
AB-490-907-04	NM 89523 42149	189523	742149	08/07/2009	330
AB-490-907-04	NM 89517 42146	189517	742146	06/08/2009	490
AB-490-907-04	NM 89531 42156	189531	742156	02/09/2009	700
AB-490-907-04	NM 89541 42138	189541	742138	21/10/2009	50

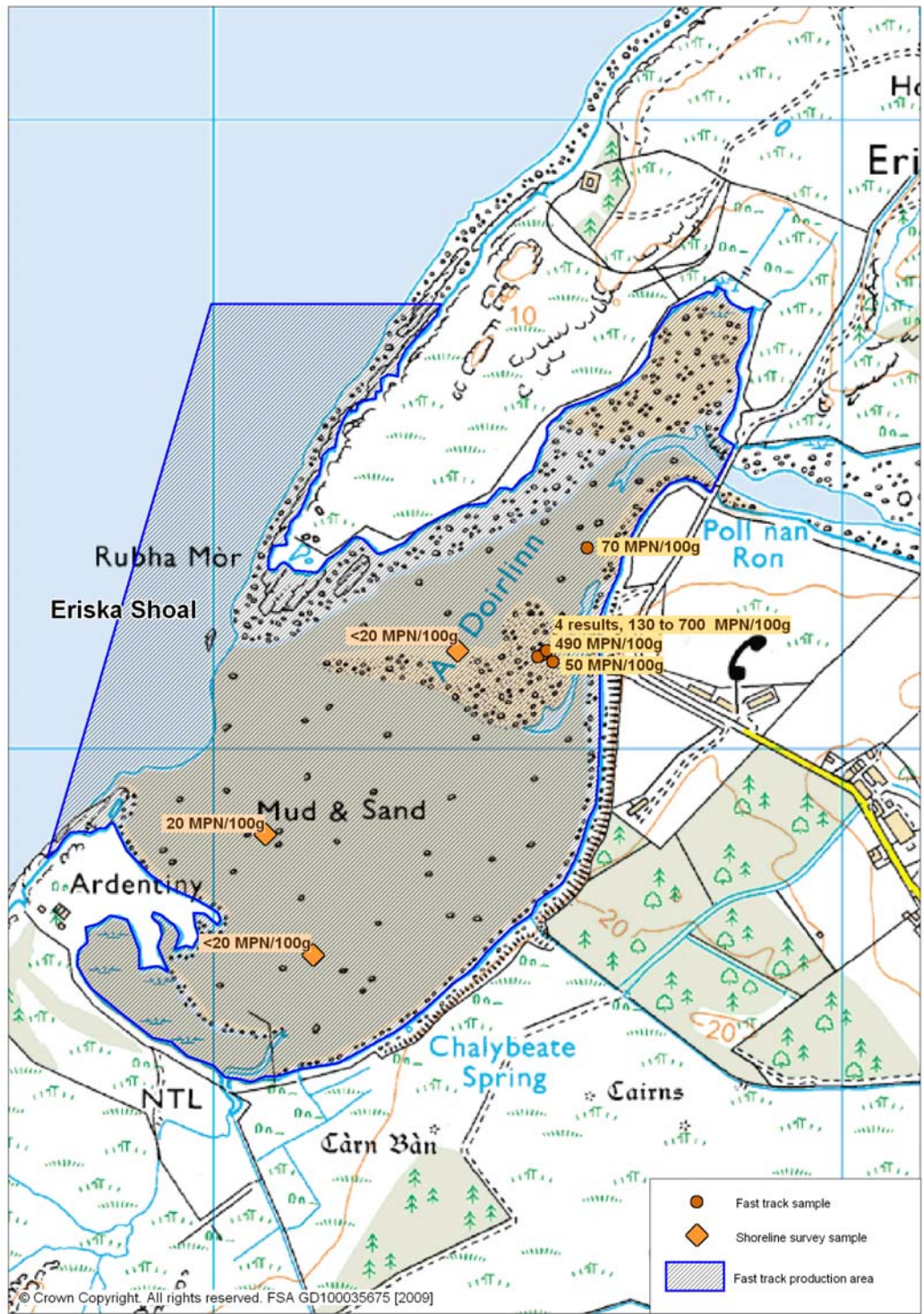


Figure 7.1 Results of shellfish sampling at Eriska Shoal

## 8. Bathymetry and Hydrodynamics



Figure 8.1 Eriska Shoal

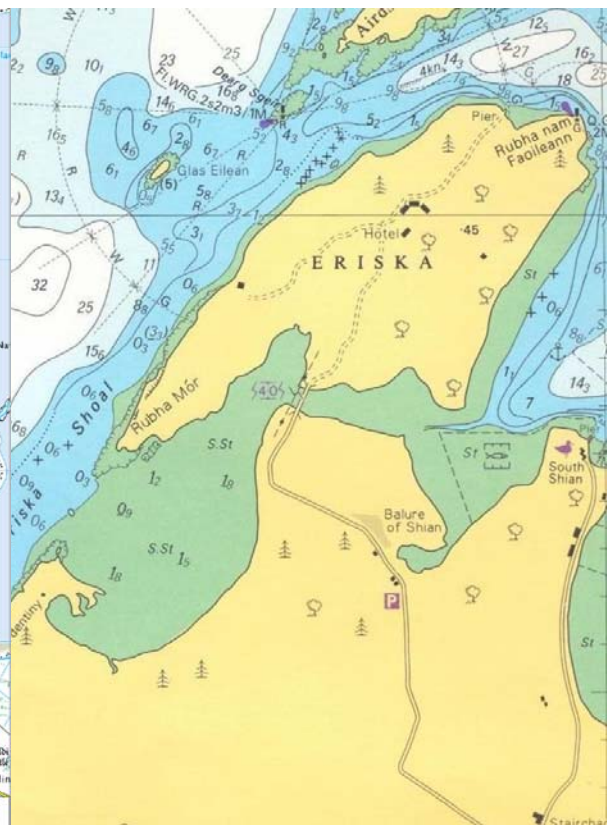


Figure 8.2 Eriska Shoal bathymetry

The bathymetry chart above (Figure 8.2) shows that the Eriska Shoal production area is a shallow intertidal area lying southwest of Eriska. The northwestern edge of the production area lies in extremely shallow subtidal waters.

### 8.1 Tidal curve and description

The two tidal curves below are for the port of Port Appin, the nearest secondary port– they have been output from UKHO TotalTide. The first is for seven days beginning 00.00 GMT on 2<sup>nd</sup> June 2009. The second is for seven days beginning 00.00 GMT on 9<sup>th</sup> June 2009. Together they show the predicted tidal heights over high/low water for a full neap/spring tidal cycle.

The following is the UKHO summary description for Port Appin:

The tide type is Semi-Diurnal.

MHWS	4.2 m
MHWN	3.1 m
MLWN	1.9 m
MLWS	0.8 m

Predicted heights are in metres above chart datum. The tidal range at spring tide is therefore approximately 3.4 m and at neap tide 1.2 m.

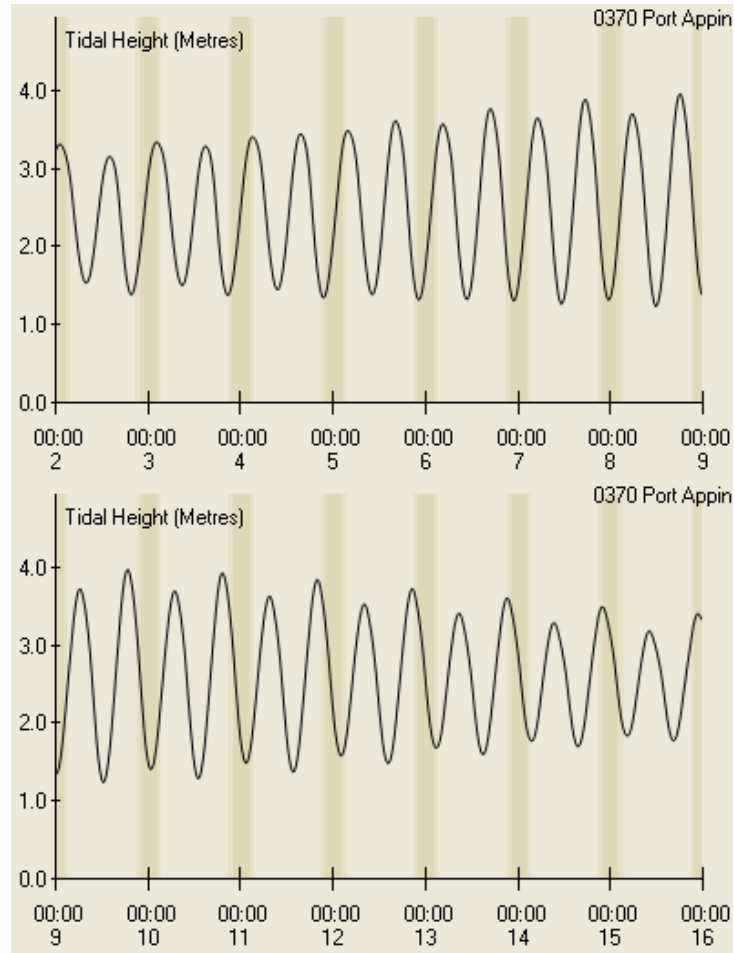


Figure 8.3 Tidal curves for Port Appin

## 8.2 Currents

The only information available on tidal streams in the area was for the entrance to Loch Creran – this was identified that the streams are 4 knots (2 m/s) at spring tide and 2.75 knots (1.4 m/s) at neap tide. It would be expected that the currents outside the entrance would be less than this. Tidal streams passing Eriska Shoal will generally flow south on an ebbing tide and north on a rising tide.

## 8.3 Conclusions regarding effect on impacting sources

Contamination arising with the area between Eriska and the mainland will be carried over the shellfishery on the ebbing tide. During part of that period, the ebbing tide may also include contamination arising within Loch Creran.

Any impact of the sources at Loch Appin will be limited by the fact that transport from that area will occur on the ebbing tide, where the main part of the production area will be emptying of water. However, the part of the production area outside that embayment will potentially be subject to impact from those sources. There could also be some impact within the embayment on the next rising tide.

## 9. Shoreline Survey Overview

A restricted shoreline survey of the Eriska Shoal shoreline was undertaken by staff from Argyll and Bute Council on the 4<sup>th</sup> June 2009.

Sub surface sea water samples were taken at several points along the Eriska Shoal coastline and also from within the shellfish bed area. Results ranged from 2 to 10 *E. coli* cfu/100 ml. Two results of 10 *E. coli* cfu/100 ml were recorded one from Pol nan Ron at the north of the production area and the second from An Doirlinn towards the centre of the shellfish bed.

In total, seven fresh water samples were taken along the coastline of the Eriska Shoal shellfish bed area from any streams flowing at the time of the shoreline survey. There were six results of <100 *E. coli* cfu/100ml and one result of 500 *E. coli* cfu/100ml. The sample with the result of 500 *E. coli* cfu/100 ml was taken from a stream discharging into the far south end of the shellfish bed. This stream was too small to measure.

During the shoreline survey a private septic tank serving one house was observed near Ardentiny at the far south west corner of the production area. There is one SEPA discharge consent on the Isle of Eriska, north of the shellfish bed and a second inland and south of the production area. There are an additional eight SEPA discharge consents and one SW septic tank in the town of Port Appin, 2.5km north of Eriska Shoal.

Approximately 10 cattle were present on the southern shoreline of the production area. Three flocks of sheep were also observed at the very southern end of the production area. All livestock had access to the shoreline. No livestock was observed north of Chalybeate Spring.

Common cockle samples were collected from three points within the production area. The first sample was collected from the north end of the shellfish bed at An Doirlinn and returned a result of <20 *E. coli* MPN/100 g. The second sample was collected from centre of the production area and returned a result of 20 *E. coli* MPN/100 g and the third sample was taken from the southern end and returned a sample of <20 *E. coli* MPN/100 g.

A map is provided in Figure 9.1 that shows the relative locations of the most significant findings of the shoreline survey. Where the bacterial concentration is labelled, the scientific notation is written in digital format, as this is the only format recognised by the mapping software. So, where normal scientific notation for 1000 is  $1 \times 10^3$ , in this case it would be written as 1E+3.

In summary, identified sources of potentially significant contamination are:

- Contaminated freshwater streams in the area
- Livestock grazing on the southern shoreline
- Balmoral private septic tank

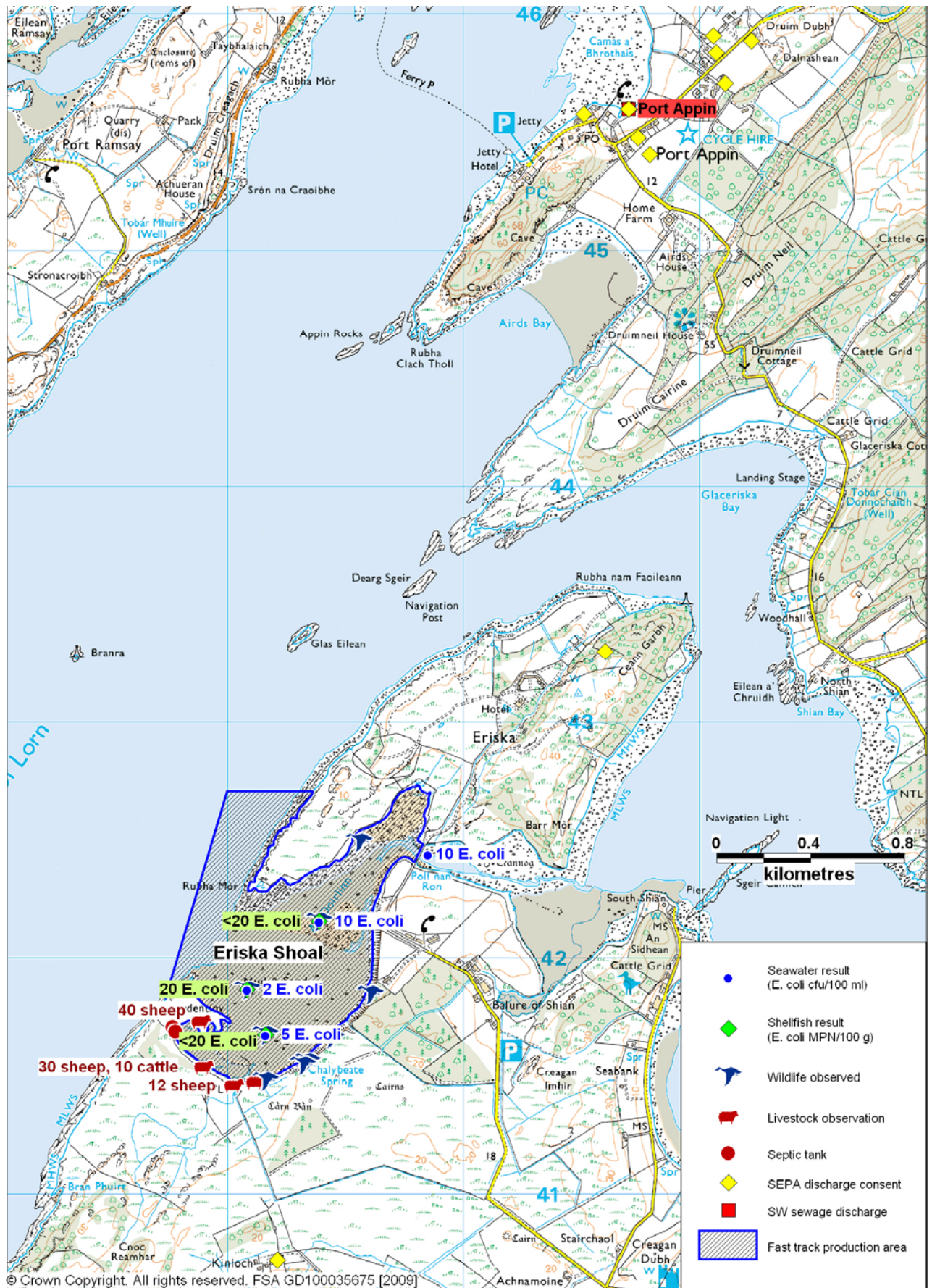


Figure 9.1 Summary of shoreline observations

## **10. Overall Assessment**

### **Fishery**

The shellfish bed is located in a bay connected to Loch Creran, within the Eriska Shoal production area. The exact boundaries of the shellfish bed are unknown.

### **Human sewage inputs**

There population of the census area surrounding Eriska Shoal was 94, with much of it widely scattered. The only significant settlement is Port Appin, located north of the production area, with a population of 184. Port Appin had eight consented discharges (as reported by SEPA) and one Scottish Water community septic tank. In addition to the above discharges, there is a further consented discharge on the Isle of Eriska and further one south of the production area and further inland. During the shoreline survey a septic tank serving a single dwelling and an inspection chamber were observed on the southern shore of the bay, though no discharge pipe was found.

### **Agricultural inputs**

During the shoreline survey, ten cattle were observed close to the shoreline at the southern end of the Eriska Shoal production area. In the same location as the cattle, thirty sheep were also observed. A larger flock of forty sheep were observed close to the shoreline at the south west end of the shellfish bed and another flock of twelve sheep (and some cattle hoof prints) were observed at the south east end. No livestock were observed anywhere along the shoreline north of Chalybeate Spring or on the Isle of Eriska. Due to the close proximity of the livestock to the shellfish bed at the southern end of the production area, it is likely that this will have an affect on the bacteriological contamination of the shellfish.

### **Wildlife inputs**

During the shoreline survey gulls, geese, oyster catchers and ducks were observed on and around the Eriska Shoal production area. Seabirds including gulls will always be present along the coastline but their distribution is likely to be even over time and as such not materially affect placement of an RMP.

### **Seasonal variation**

There were no historical monitoring results available to establish a pattern of seasonal variation.

Livestock numbers in the area as a whole are likely to be at their highest during the summer months when calves and 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.

Port Appin and the Isle of Eriska are popular with tourists and there is likely to be an increase in human presence in the surrounding area during the summer months.

### **Rivers and streams**

A total of ten streams were discharging into the Eriska Shoal shellfish bed area at the time of the shoreline survey. Four of these streams were located in the north eastern corner of the shellfish bed and the remaining six streams were located on the south-eastern side of the shellfish bed. It was not possible to calculate *E. coli* loadings for any of the sampled streams, either because they were too small to measure, or because the *E. coli* result was less than the limit of detection of the test.

### **Rainfall**

Rainfall patterns at Strath of Appin (the nearest rainfall station) show rainfall levels are higher between September and January than during the remainder of the year. An increase in rainfall, especially early in this period and after the dry summer months, may be expected to wash a flush of bacteria from the surrounding land into the production area. The impact of this is likely to be most acute nearest where the streams enter the bay and sea.

### **Analysis of results**

Seven cockle samples from the area had been submitted for *E. coli* testing from April to October 2009. The results ranged from 50 to 700 *E. coli* per 100 g. All but one of the samples were recorded as having been taken from an area on the east side of the embayment marked as sand and shingle on the OS map. The other sample was taken a little to the north of there.

During the shoreline survey, seawater samples were taken at several points from inside the production area. Results were low overall ranging from 2 to 10 *E. coli* (cfu/100 ml). The two results of 10 *E. coli* cfu/100 ml were taken from the northern end of the shellfish bed.

Cockle samples were collected from three points within the production area. All three samples returned results of 20 or <20 *E. coli* (MPN/100 g). The samples were taken from the north end, centre and south end of the shellfish bed.

The results of the samples taken during the shoreline survey were thus markedly lower than those taken during the routine monitoring. It must be noted that they differed from the others in sample date, as well as location. However, one routine monitoring sample had been taken the day before the shoreline survey, just to the east of one of the shoreline survey samples, and yielded a result of 130 *E. coli* per 100g. It is possible that this level of *E. coli* could have depurated in the time between the sampling occasions and thus the difference may not simply be due to difference in sampling location.



## **Movement of contaminants**

Contamination arising within the bay will impact on the shellfish during the ebbing tide. This may also include contamination arising from within Loch Creran as well. Any impact from the sources at Port Appin will tend to be on the part of the production area outside the bay. However, this may affect the shellfishery to the same extent on the following rising tide.

## **Overall Conclusions**

Although a number of potential sources of contamination have been identified, there are no major sources. There is therefore likely to be a general background of contamination due to the combined effects of all these sources with potentially higher levels in the immediate vicinity of local inputs (e.g. livestock).

## 11. Recommendations

In the absence of specific information on the location of the fishery, and considering possible sources of human faecal contamination from the north at Port Appin, it is recommended that the production area boundaries be slightly amended to eliminate the area outside the bay. The grid references of the boundary at the bridge have been amended to more accurately reflect the area as shown in Figure 11.1. The production area is therefore described as the area bounded by lines drawn between NM 8886 7194 to NM 8912 4229 and from NM 8979 4241 to NM 8983 4248 extending to MHWS.

The highest seawater results obtained during the shoreline survey were seen in the north-east side of the bay. This is also the area from where routine sampling has yielded results up to 700 *E. coli* per 100 g. Given that no specific sources of faecal contamination were identified, it is proposed that the RMP be located in this area at NM 8947 4213. The recommended tolerance is 100 m. This will allow some flexibility to allow for variation in stock density while still targeting the intended location. The recommended tolerance also takes into account the relatively small size of the production area.

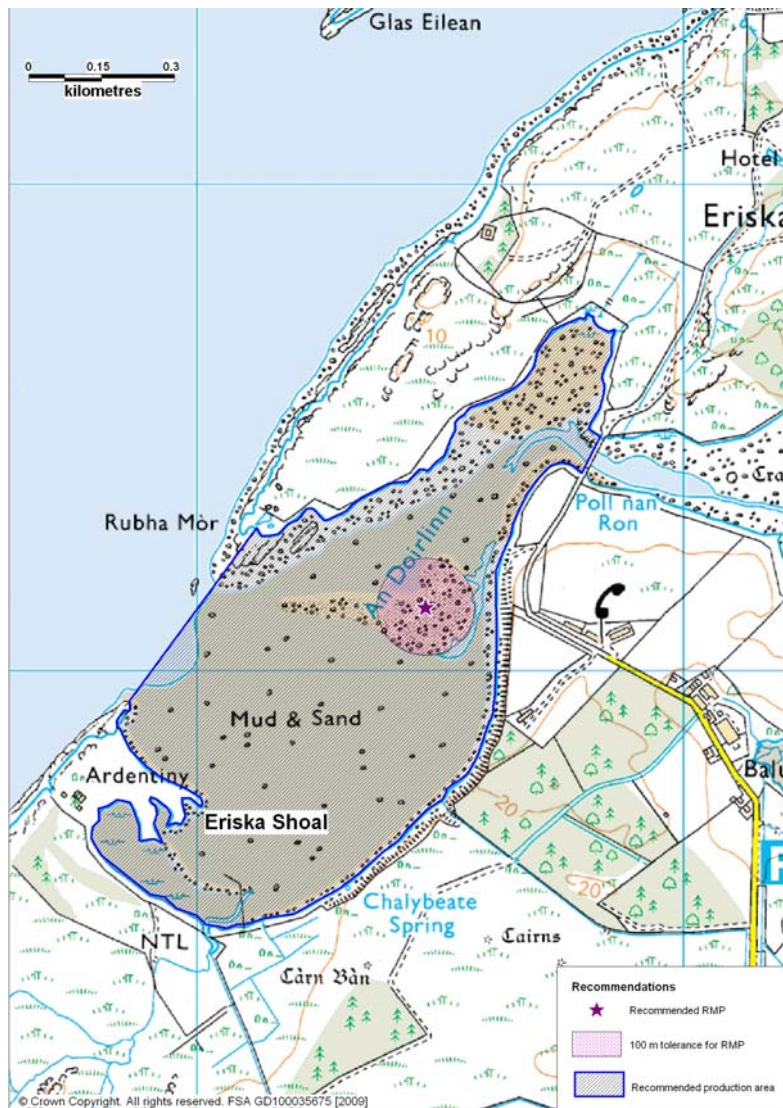


Figure 11.1 Recommendations for Eriska Shoal

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# Appendices

1. **Summary Sampling Plan**
2. **Comparative Table of Boundaries and RMPs**
3. **Shoreline Survey Report**

### Sampling Plan for Eriska Shoal

PRODUCTION AREA	SITE NAME	SIN	SPECIES	TYPE OF FISHERY	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
Eriska Shoal	Eriska Shoal Cockles	AB 490	Common cockles	Wild harvest	NM 8947 4213	189470	742130	100	NA	Hand raked	Monthly	Argyll and Bute Council	Christine McLachlan, Ewan McDougall, William MacQuarrie, Donald Campbell	Christine McLachlan

## Comparative Table of Boundaries and RMPs – Eriska Shoal

Production Area	Species	SIN	Existing Boundary (Fast Track)	Existing RMP	New Boundary	New RMP	Comments
Eriska Shoal	Common cockles	AB 490 907 04	Area bounded by lines drawn between NM 8930 4270 to NM 8900 4270 and from NM 8900 4270 to NM 8870 4170 and from NM 8970 4240 to NM 8980 4170 extending to MHWS	None	Area bounded by lines drawn between NM 8886 7194 to NM 8912 4229 and from NM 8979 4241 to NM 8983 4248 extending to MHWS.	NM 8947 4213	Production area amended to exclude area outside bay and with grid references adjusted to match GIS shapefile. New RMP.

# Shoreline Survey Report



Eriska Shoal  
AB 490

Restricted Scottish Sanitary Survey  
Project





## Shoreline Survey Report

Production area: Eriska Shoal  
 Site name: Eriska Shoal Cockles  
 Species: Common cockles (*Cerastoderma edule*)  
 Harvester: Iain McIntyre  
 Local Authority: Argyll & Bute Council  
 Status: New site  
  
 Date Surveyed: Thursday 4<sup>th</sup> June 2009  
 Surveyed by: Christine McLachlan, Ewan McDougall, Donald Campbell,  
 William MacQuarrie  
 Existing RMP: NM 8953 4215 (used for Fast Track Classification)  
 Area Surveyed: See Figure 1.

### Weather observations

Thursday 4<sup>th</sup> June: Dry and sunny, no previous rain for past 7 days. Wind NE, Force 3.

### Site Observations

#### **Fishery**

The Eriska Shoal site is harvested for Common cockles (*Cerastoderma edule*). The cockles are hand raked within the boundaries of the Eriska Shoal production area identified in Figure 1. The harvester plans to harvest the cockles all year round.

#### **Sewage/Faecal Sources**

The area surveyed had the small village called Balure of Shian 0.5 km inland on the western shoreline of the Eriska Shoal production area and the small settlement of Kinloch 0.7 km inland on the southern shoreline of the production area. There is one SEPA discharge consent for the northern end of the Isle of Eriska and a second SEPA discharge consent in Kinloch. There are eight SEPA discharges and one Scottish Water discharge in Port Appin and a further single SEPA and Scottish Water discharge in Appin. During the shoreline survey, a single septic tank (Balmoral septic tank) located at the southern end of the Eriska Shoal production area, in a small inlet just south of Ardentiny was observed.

#### **Seasonal Population**

No caravans or campsites were observed during the shoreline survey in the surrounding area of Eriska Shoal. There is a large hotel/spa located on the Isle of Eriska 0.5 km north for the Eriska Shoal production area.

#### **Boats/Shipping**

During the shoreline survey no boats were observed in the area.

#### **Land Use**

There is a mixed patch of deciduous and coniferous woodland north of the Chalybeate Spring. South of this area the land is composed primarily of open

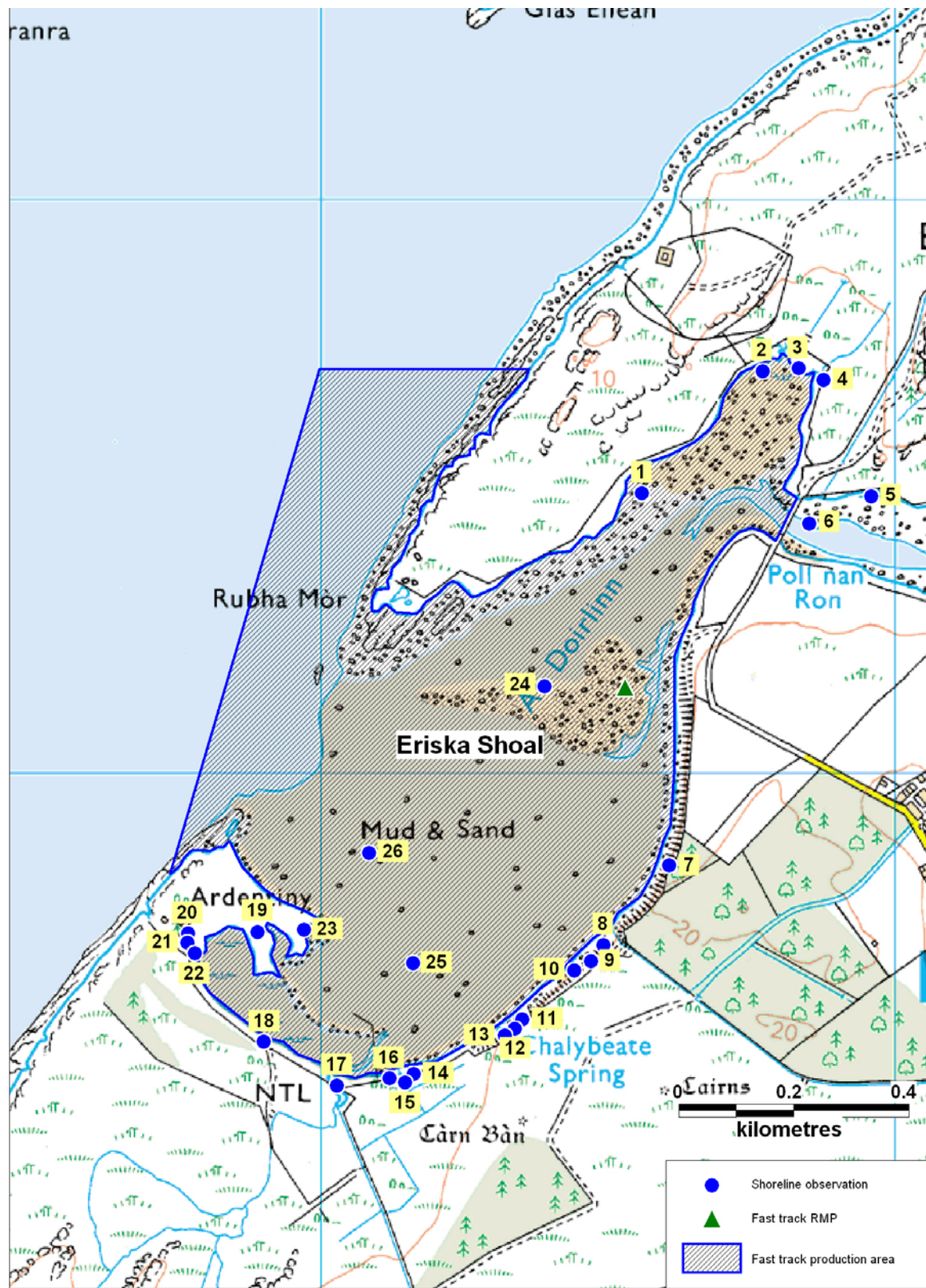
heath land. The area north of the Chalybeate Spring is improved grassland. The Isle of Eriska is composed of patches of heath land, acid grassland and broadleaf woodland.

### **Wildlife/Birds**

During the shoreline survey thirty gulls, ten geese and eight oyster catchers were observed on the central mud and sand area of Eriska Shoal. Close to the shoreline near the Chalybeate Spring a further six geese, geese dropping and deer hoof prints were also observed.

Observations can be found in Table 1.

Figure 1. Shoreline Observations



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Table 1. Shoreline Observations

No.	Date	Time	NGR	East	North	Associated photograph	Description
1	04/06/2009	08:50	NM 89559 42491	189559	742491		Survey start point. Geese droppings.
2	04/06/2009	08:56	NM 89769 42703	189769	742703		Small stream, not flowing.
3	04/06/2009	08:58	NM 89832 42709	189832	742709	Figure 4	Small stream, flowing but not enough to measure. Eriska fresh water sample 1.
4	04/06/2009	09:04	NM 89875 42688	189875	742688	Figure 5	Small stream, barely flowing, not measurable. Eriska fresh water sample 2.
5	04/06/2009	09:15	NM 89959 42485	189959	742485	Figure 6	Small stream, drainage pipe under road, not flowing.
6	04/06/2009	09:21	NM 89850 42438	189850	742438	Figure 7	Tidal channel at bridge approx 40 m wide at time of survey. Flows both East and West on ebb. Salinity = 35 ppt. Eriska sea water sample 3. Cockles shells and small clam shells.
7	04/06/2009	09:50	NM 89607 41842	189607	741842		Ground water running from bank. Deer hoof prints in sand.
8	04/06/2009	09:54	NM 89492 41702	189492	741702		Small stream, flowing, 11 cm x 2 cm x 0.16. Eriska fresh water sample 4.
9	04/06/2009	10:01	NM 89470 41674	189470	741674		Small stream, barely flowing, not measurable. Eriska fresh water sample 5.
10	04/06/2009	10:02	NM 89441 41658	189441	741658		Geese droppings.
11	04/06/2009	10:05	NM 89351 41573	189351	741573		Ground water running from bank.
12	04/06/2009	10:06	NM 89338 41557	189338	741557		Small stream, flowing, 10 cm x 2 cm x 0.363. Eriska fresh water sample 6. 6 geese observed.
13	04/06/2009	10:11	NM 89320 41545	189320	741545	Figure 8	Spring, Eriska fresh water sample 7. 9 ducks.
14	04/06/2009	10:16	NM 89162 41478	189162	741478		Geese droppings.
15	04/06/2009	10:17	NM 89147 41463	189147	741463		Very small stream, barely flowing, not measurable.
16	04/06/2009	10:18	NM 89120 41470	189120	741470		Cattle hoof prints.
17	04/06/2009	10:21	NM 89028 41457	189028	741457	Figure 9	Stream, barely flowing, not measurable. Eriska fresh water sample 8. Cattle and deer prints. 12 sheep in fenced field behind.
18	04/06/2009	10:26	NM 88900 41534	188900	741534		Cattle hoof prints. 30 sheep in fenced field. 10 cattle in fenced field.
19	04/06/2009	10:33	NM 88889 41725	188889	741725		40 sheep in field. Significant cattle and sheep dung in field.
20	04/06/2009	10:35	NM 88769 41723	188769	741723	Figure 10	House, no permanent occupants.
21	04/06/2009	10:38	NM 88768 41707	188768	741707		Inspection chamber – empty.
22	04/06/2009	10:39	NM 88780 41688	188780	741688	Figure 10	Balmoral septic tank, no outlet pipe observed.

No.	Date	Time	NGR	East	North	Associated photograph	Description
23	04/06/2009	10:44	NM 88970 41730	188970	741730	Figure 11	Empty shells (small clams, razors, cockles, mussels, whelks, scallops). End of shoreline walk.
24	04/06/2009	09:50	NM 89389 42154	189389	742154		Eriska cockle sample 1 (30 cockles found fairly easily). Eriska cockle seawater 1. Salinity = 36 ppt Significant empty shells (native oysters & cockles). 10 seagulls, 2 oysters catchers
25	04/06/2009	10:20	NM 89160 41671	189160	741671		Eriska Cockles Sample 2 (17 cockles).Cockles harder to find here than samples 1 and 3. Eriska Cockle Seawater 2. Salinity = 36 ppt. 20 seagulls, 8 geese, 6 oyster catchers.
26	04/06/2009	10:40	NM 89084 41863	189084	741863		Eriska Cockle Sample 3. (30 Cockles found fairly easily). Eriska Cockle Seawater 3. Salinity = 34 ppt. 8 Seagulls.

Photos 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	<i>E. coli</i> (cfu/100 ml)	Salinity (g/L)
1	04/06/2009	Cockles SW1	NM 89389 42154	Seawater	10	34.3
2	04/06/2009	Cockles SW2	NM 89160 41671	Seawater	5	33.1
3	04/06/2009	Cockles SW3	NM 89084 41863	Seawater	2	33.4
4	04/06/2009	Cockles FW1	NM 89832 42709	Fresh water	<100	-
5	04/06/2009	Cockles FW2	NM 89875 42688	Fresh water	<100	-
6	04/06/2009	SW3	NM 89850 42438	Seawater	10	34.0
7	04/06/2009	FW4	NM 89492 41702	Fresh water	<100	-
8	04/06/2009	FW5	NM 89470 41674	Fresh water	<100	-
9	04/06/2009	FW6	NM 89338 41557	Fresh water	<100	-
10	04/06/2009	FW7	NM 89320 41545	Fresh water	<100	-
11	04/06/2009	FW8	NM 89028 41457	Fresh water	500	-

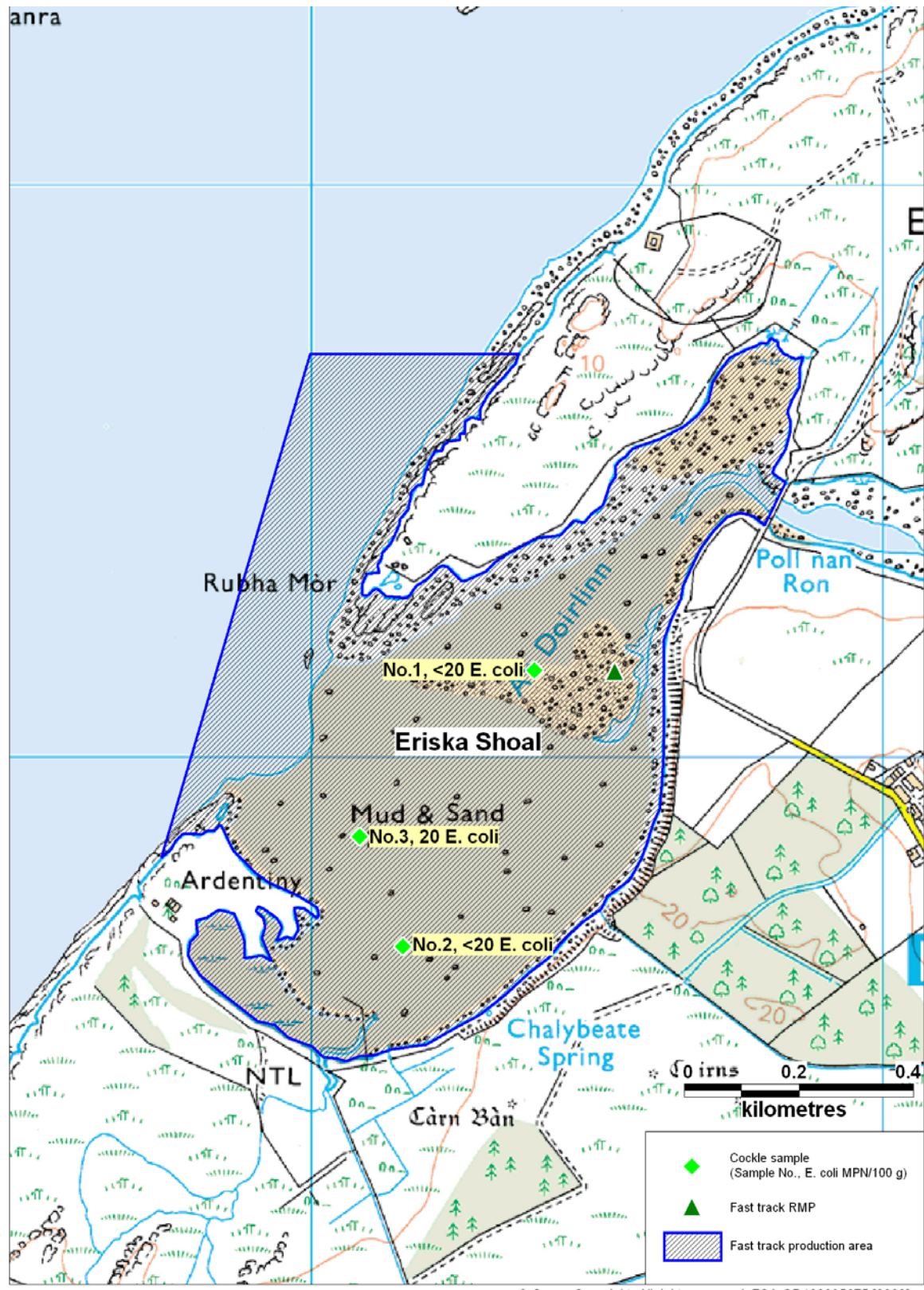
Table 3. Shellfish Sample Results

No.	Date	Sample	Grid Ref	Type	<i>E. coli</i> (cfu/100g)
1	04/06/09	Cockles 1	NM 89389 42154	Common cockle	<20
2	04/06/09	Cockles 2	NM 89160 41671	Common cockle	<20
3	04/06/09	Cockles 3	NM 89084 41863	Common cockle	20

Figure 3. Water sample results



Figure 4. Shellfish sample results



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## Photographs



Figure 4. Small stream, water sample 4



Figure 5. Small stream, water sample 5



Figure 6. Drainage pipe under road, not flowing



Figure 7. Tidal channel at bridge, water sample 6



Figure 8. Spring, water sample 10



Figure 9. Stream, water sample 11



Figure 10. House and Balmoral septic tank



Figure 11. Empty shells on the shoreline