
Scottish Sanitary Survey Project



Restricted Sanitary Survey Report

West Jura

AB 482

September 2010



Report Distribution – West Jura

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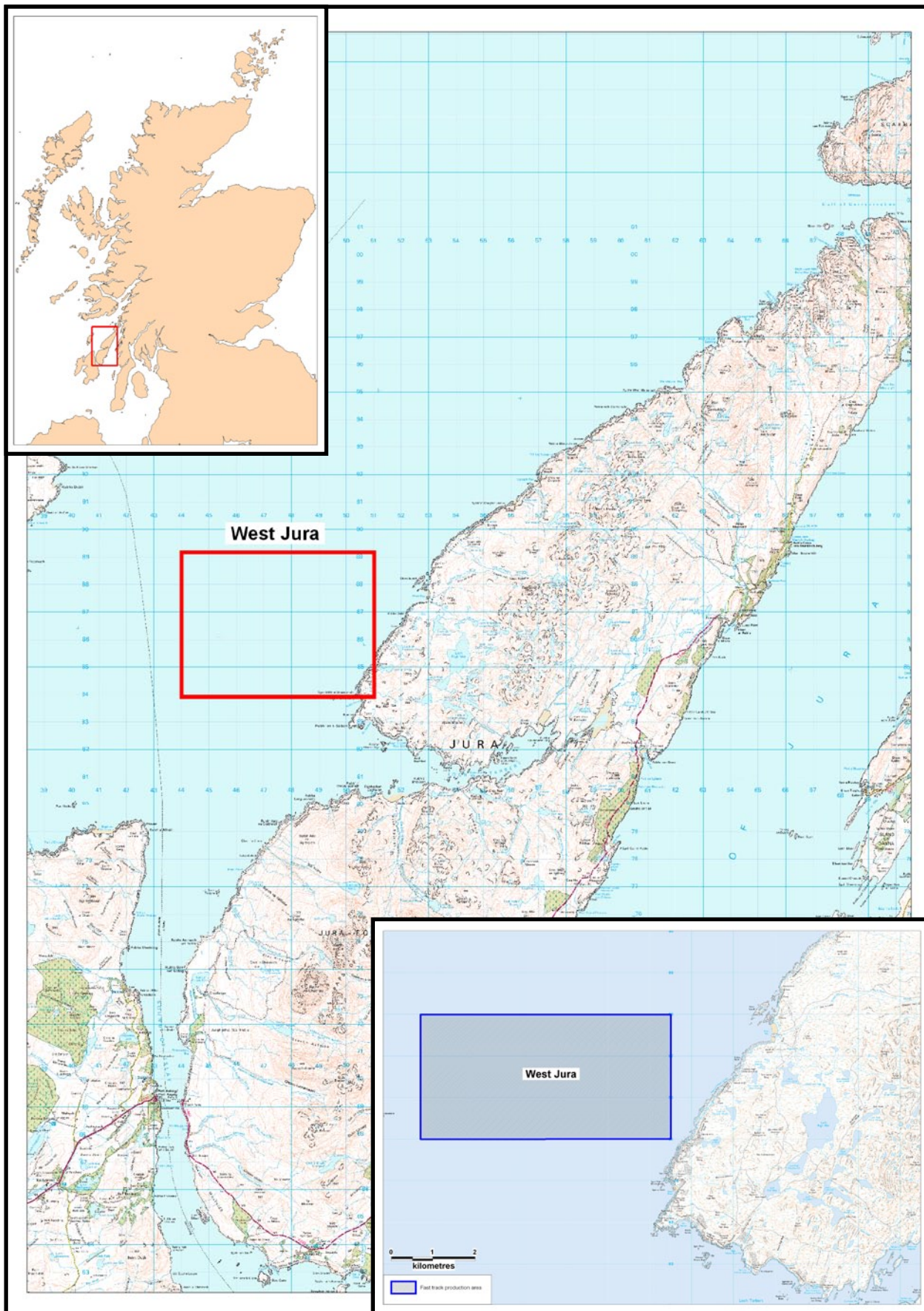
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1. Area Overview

The Isle of Jura is located in the southern inner Hebrides, off the western coast of Scotland. Jura is 0.7 km east of Islay across the Sound of Islay. To the north of Jura is the island of Scarba and to the west is the island of Colonsay, which is separated by the Atlantic Ocean (see Figure 1.1).

A shallow sand bank, called Tarbet Bank lies parallel to the West Jura coastline, stretching south to the island of Islay.

A restricted sanitary survey at West Jura was conducted in response to receipt of an application to classify an area west of the island for commercial harvest of razor clams (*Ensis* spp.).



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Figure 1.1 Location of West Jura

1.1 Land Use

Land Cover 2000 data indicates that the land adjacent to the West Jura production areas mainly acid grassland with areas of littoral rock and heath land, with some very small areas of improved grassland (see Figure 1.2).

Faecal coliform contributions from improved grassland have been shown to be approximately 8.3×10^8 cfu km⁻² hr⁻¹ (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. The areas of improved grassland adjacent to the shoreline east of the production area may be expected to contribute to contamination levels carried in surface runoff to this side of the razor clam bed, however the extent of these areas is very small compared to the other land cover types.

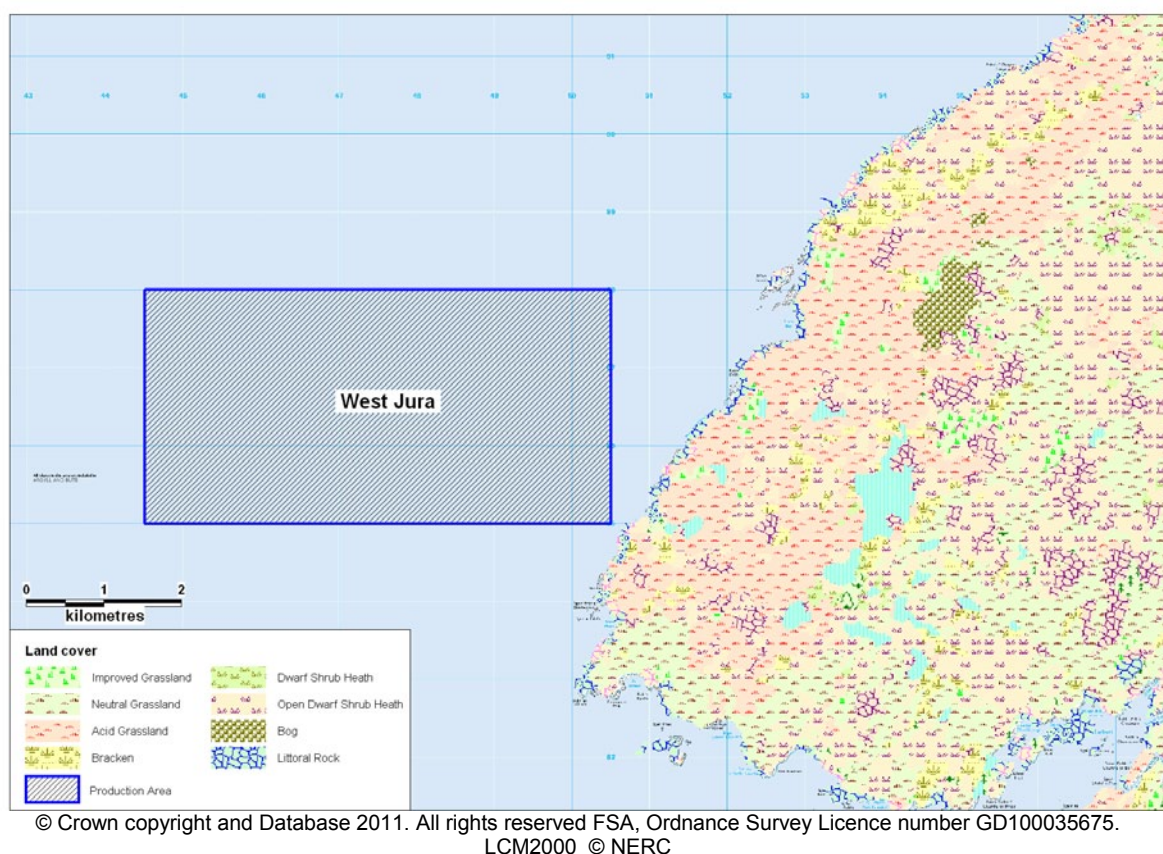


Figure 1.2 Land Cover 2000 data for West Jura

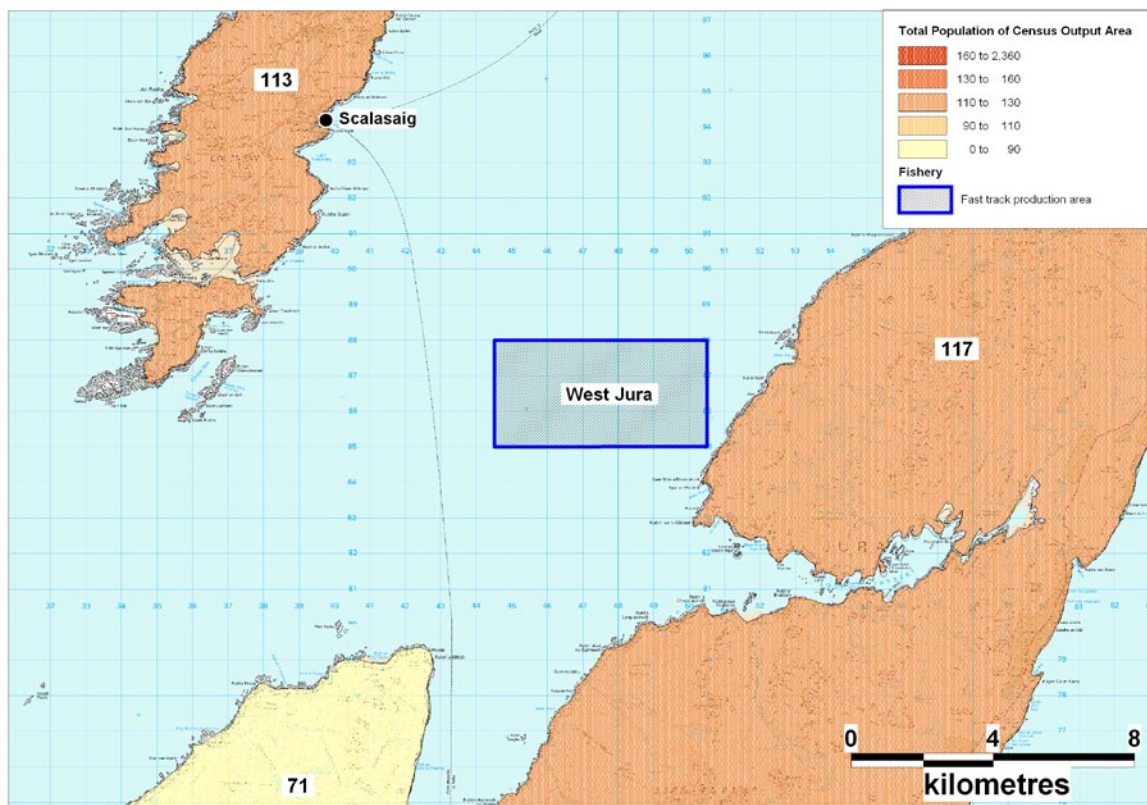
1.2 Human Population

Human population figures were obtained from the General Register Office for Scotland on the population within the census output areas in the vicinity of the West Jura production area. Figure 1.3 shows the census output areas that are adjacent to West Jura. There are three census output areas with total populations of 71, 113 and 117, within the catchment area of West Jura. Of these only one

(with a population of 117) is on Jura itself. The population within these census output areas is mainly spread throughout scattered dwellings and the nearest settlement is Scalasaig 7.9 km north west of the fishery on the Isle of Colonsay.

The Jura Hotel (18 bedrooms) is located on the east coast of Jura and Jura House (sleeps up to 15) is located on the south coast of the island, both outside the area shown in Figure 1.3. There are 12 additional self catering units scattered across the island. It is therefore expected that the population in the area will increase significantly during the summer holiday months.

A ferry service runs from Oban to Colonsay year-round. During the summer months this service does one return trip a day and during the winter months the ferry does one return trip every Monday, Wednesday and Friday. The ferries generally have on-board sewage treatment, discharging over board post-treatment. Other boats are likely to regularly pass through the body of water between Colonsay and Jura so occasional minor impacts to the razor bed are possible from overboard discharges.



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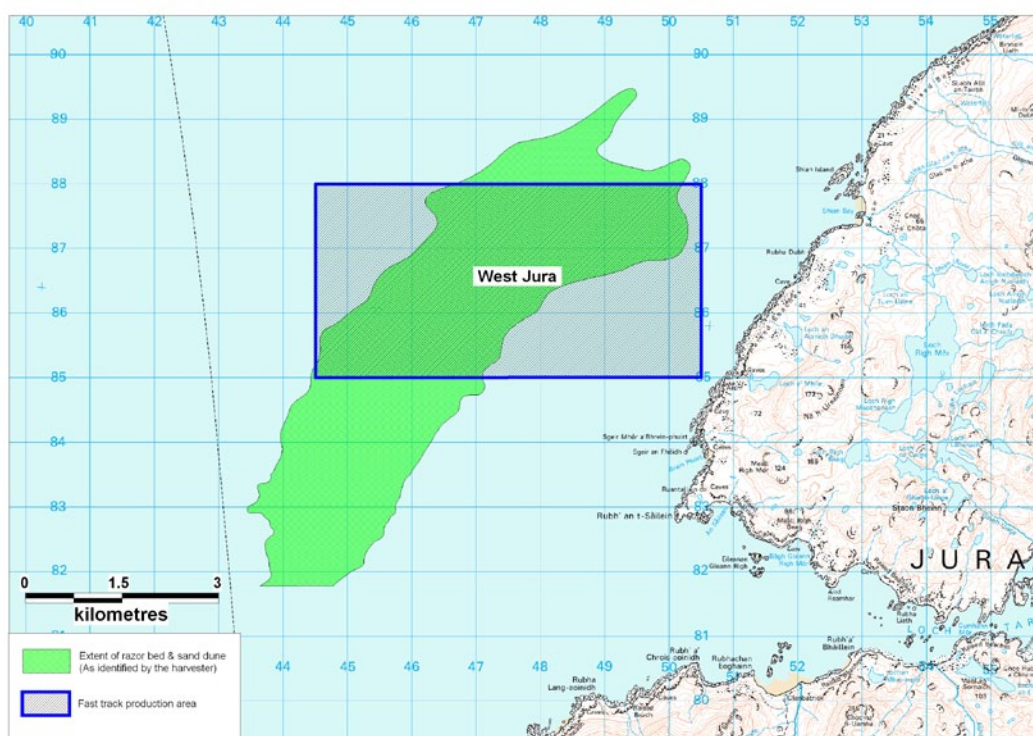
Figure 1.3 Human population adjacent to West Jura

2. Fishery

The fishery at West Jura (AB 482 805 16) is comprised of a wild razor clam (*Ensis* spp.) bed lying west of the island, to the north of Loch Tarbet.

The fast track classification production area boundaries were identified by the Food Standards Agency as the area bounded by lines drawn between points NR 4450 8800 and NR 4450 8500 and NR 5050 8800 and NR 5050 8500 (see Figure 2.1). There is currently no representative monitoring point (RMP) assigned to this area. No fast track samples had been collecting at the time of writing this report. The razor bed at West Jura does not lie within a designated shellfish water.

According to the harvester, the razors are located on a sand bank which lies parallel to the west coast of Jura. The harvestable extent of the bank is defined by the maximum dive able depth and the state of the tide. On the day of the shoreline survey and sampling the dive-master had limited diving to approximately 15 m; therefore samples were taken around the bank at this depth. By diving deeper (up to 20 m under appropriate conditions), and/or different states of tide, the harvestable extent of the fishery can be considerably larger. The sand bank extends out-with the defined production area to the south-west and is reported that harvestable stocks are also available in this area. The razors will be hand dived and harvesting is planned to take place throughout the year.



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Figure 2.1 West Jura fishery

3. Sewage Discharges

There are no known SEPA discharge consents or Scottish Water sewage discharges within a 7.5 km radius of the West Jura production area. The closest registered sewage discharges are located in Scalasaig on the east coast of Colonsay, approximately 7.9 km north west of the West Jura razor bed.

During the shoreline survey, no dwellings and/or associated septic tanks and outfall pipes were observed from the boat.

4. Animals

4.1 Livestock

Agricultural census data to parish level was provided by the Rural Environment, Research and Analysis Directorate (RERAD) for the parish of Jura, encompassing a land area of 383 km². Reported livestock populations for the parishes in 2008 and 2009 are listed in Table 7.1. RERAD withheld data for reasons of confidentiality where the small number of holdings reporting would have made it possible to discern individual farm data. Any entries which relate to less than five holdings, or where two or fewer holdings account for 85% or more of the information, are replaced with an asterisk.

Table 4.1 Livestock numbers in Jura parish - 2009

	Jura	
	2009	
	Holdings	Numbers
Pigs	*	*
Poultry	*	*
Cattle	12	585
Sheep	9	1189
Horses and ponies	*	*

* Data withheld for reasons of confidentiality

Although Table 4.1 indicates that there are cattle and sheep on the Isle of Jura, no livestock was observed from the boat on the day of the shoreline survey.

Livestock numbers on the island 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, such as those adjacent to the West Jura production area and the shellfish bed itself.

During the winter months, livestock, including dairy cattle are likely to be kept in barns with a likely increase in slurry production and a higher runoff from hard standing areas. Application of slurry to land may occur at any time but tends to be greatest in the spring. Seasonal variation in the presence of livestock is therefore expected to lead to higher rates of deposition on the land at these times.

4.2 Wildlife

At the time of the shoreline survey no wild animals or birds were observed. However, seabirds including gulls are likely to be present along the coastline. As most seabirds will roost and nest on land or at the coastline, any contamination is likely to be greater near to the coast. It is possible that other animals including

seals, otters and other seabirds may be present in the area. The distribution and numbers of these species was not investigated.

It is estimated that there are 6,000 red deer on the Isle of Jura (Jura Development, 2010), with a ratio of 30:1 (red deer to human). Although none were observed on the day of the shoreline survey, the boat crew reported that red deer can be frequently seen on the shore.

5. Rainfall

The nearest weather station is located at Colonsay: Homefield, approximately 11 km to the northeast of the West Jura production area. Daily rainfall values were purchased from the UK Meteorological Office for the period 1/1/2003 to 31/12/2008 inclusive for the Colonsay: Homefield weather station. Unless otherwise identified, the content of this section (e.g. graphs) is based on further analysis of this data undertaken by Cefas.

5.1 Rainfall at Colonsay: Homefield

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 waste water treatment plant overflows (e.g. Mallin et al, 2001; Lee & Morgan, 2003). The influence of rainfall on microbiological quality will depend on factors such as local geology, topography, land use and sewerage infrastructure. Figures 5.1 and 5.2 present box and whisker plots summarising the distribution of individual daily rainfall values by year and by month. The grey box represents the middle 50% of the observations, with the median marked as 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 '*'.

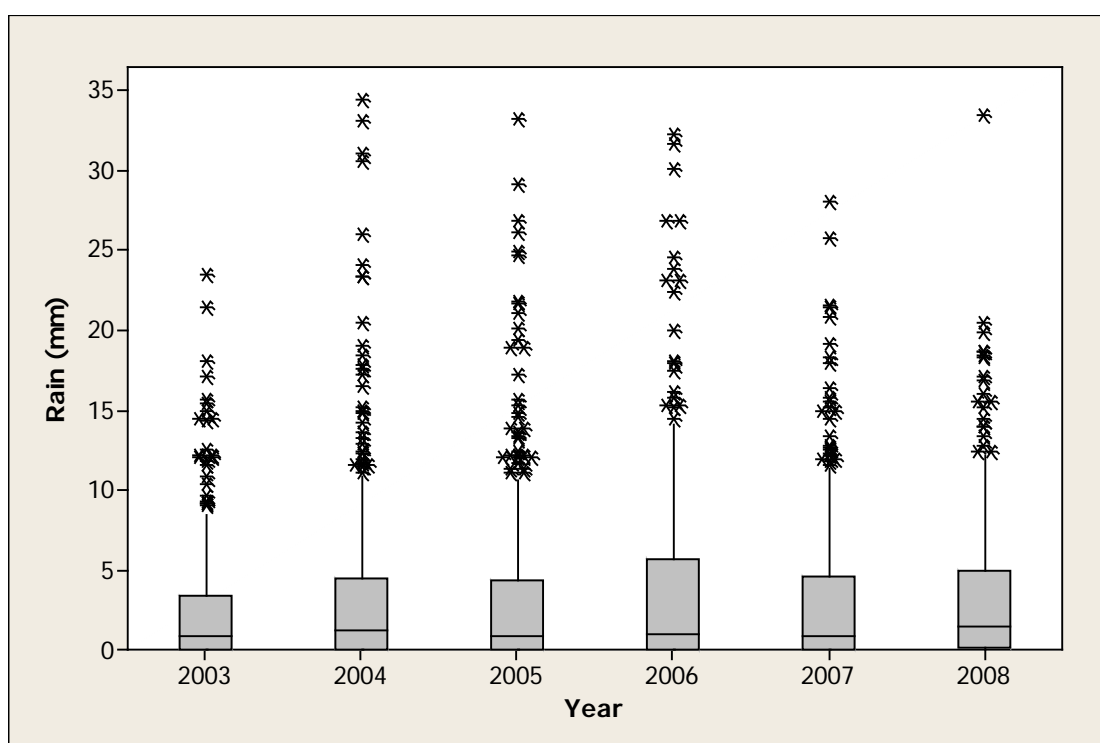


Figure 5.1 Box plot of daily rainfall values by year at Colonsay: Homefield, 2003-2008

Figure 5.1 shows that rainfall patterns were similar between the years presented here, with 2003 the driest and 2006 the wettest.

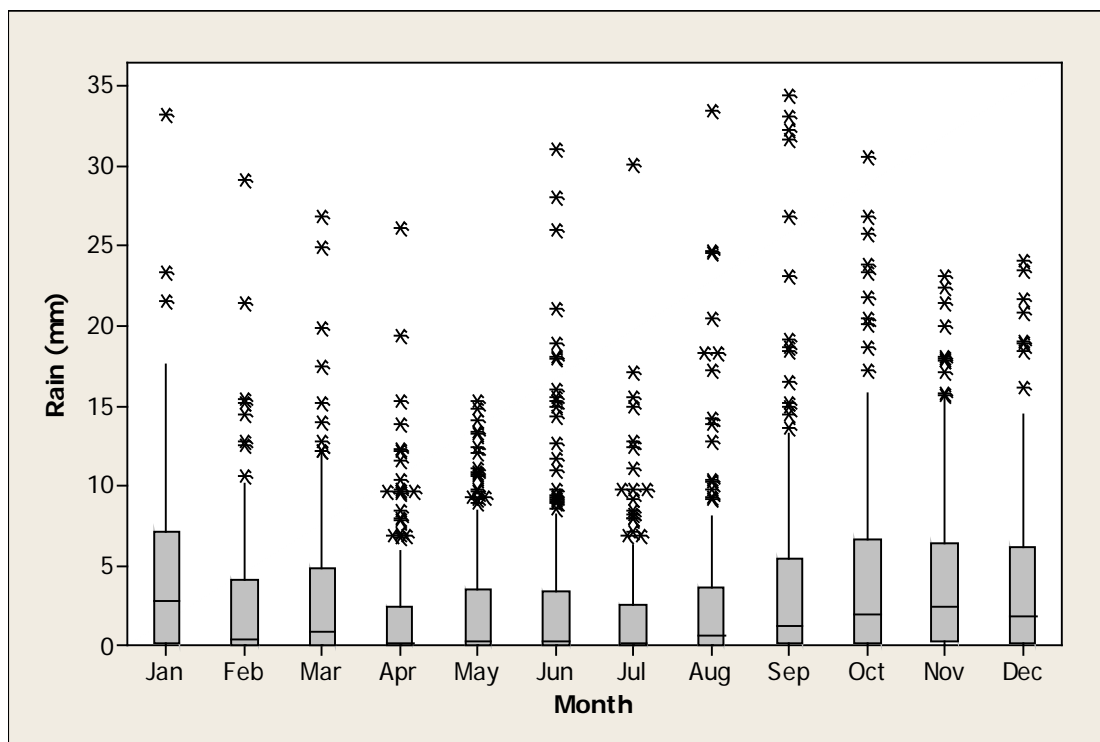


Figure 5.2 Box plot of daily rainfall values by month at Colonsay: Homefield, 2003-2008

The wettest months were September to March and April to July were the driest months. Days with high rainfall greater than 20 mm occurred during all months except May. For the period considered here (2003-2008), 49% of days experienced rainfall less than 1 mm, and 9% of days experienced rainfall of 10 mm or more.

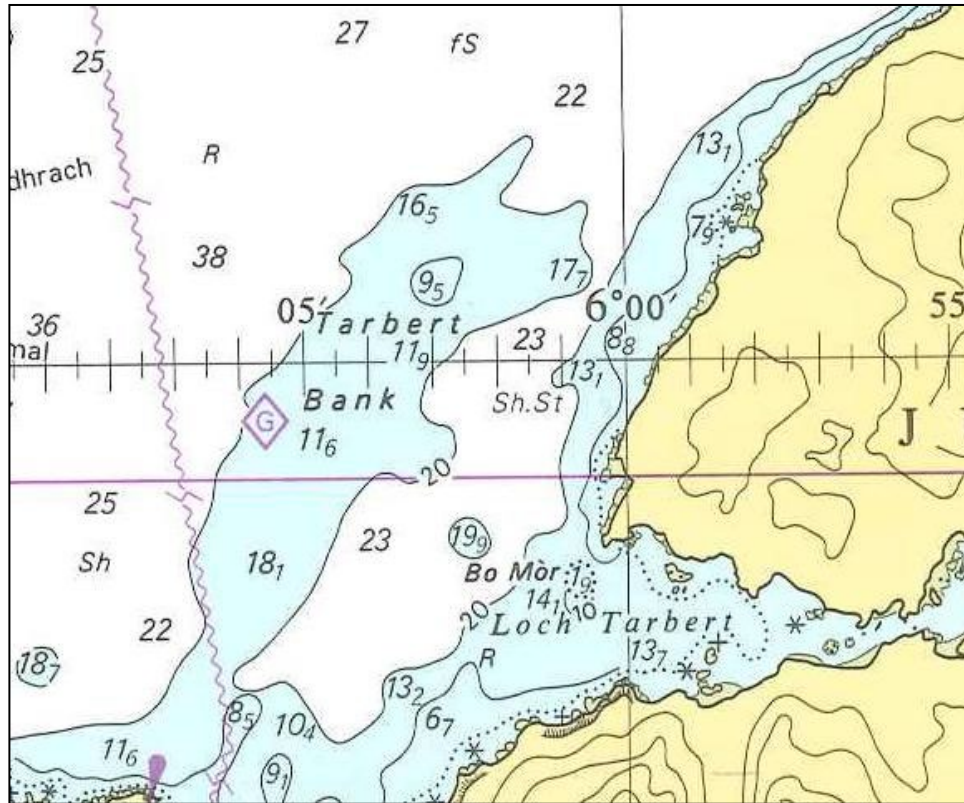
It is likely that amount of rainfall dependent faecal contamination entering the production area will be higher on average during the autumn and winter months.

High rainfall events can occur at any time of the year. However, after a dry period, these may result in a contaminated 'first flush' of pasture runoff which may be particularly acute during the summer when livestock numbers are likely to be highest and preceding dry periods may result in a build-up of faecal matter on pastures.

7. Historical *E. coli* Monitoring Data

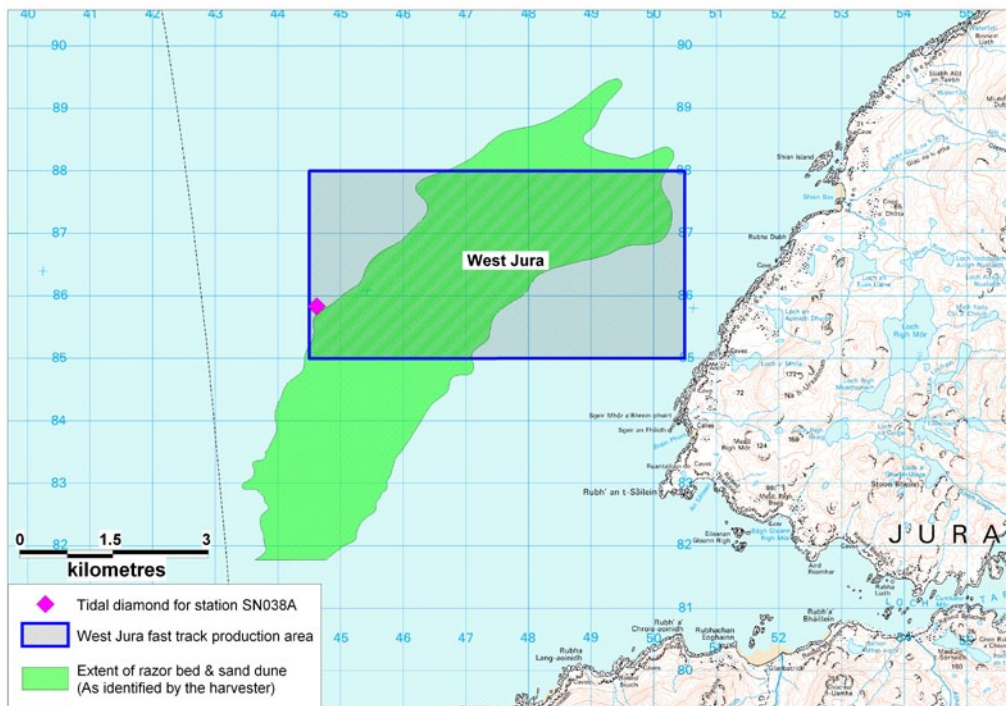
There was one *E. coli* result for West Jura on the FSAS classification database. This was taken on 01/09/2010, had a result of < 20 *E. coli* MPN/100 g and relates to entry 4 in Table 3, if the shoreline survey report.

8. Bathymetry and Hydrodynamics



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Figure 8.1 West Jura Admiralty chart



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Figure 8.2 West Jura OS map

The depth of the water on the west coast of Jura increases from <10 to 50 m within the boundaries of the fast track production area (see Figure 8.1). The area lies over a sand bank which lies parallel to the Jura coastline.

The two tidal curves below are for the port of Rubh' A' Mhail, the nearest secondary port (5.9 km southwest of West Jura). These have been output from UKHO TotalTide. The first is for seven days beginning 00.00 GMT on 20th September 2010. The second is for seven days beginning 00.00 GMT on 27th September 2010. Together they show the predicted tidal heights over high/low water for the full neap/spring tidal cycle during which the shoreline survey was undertaken.

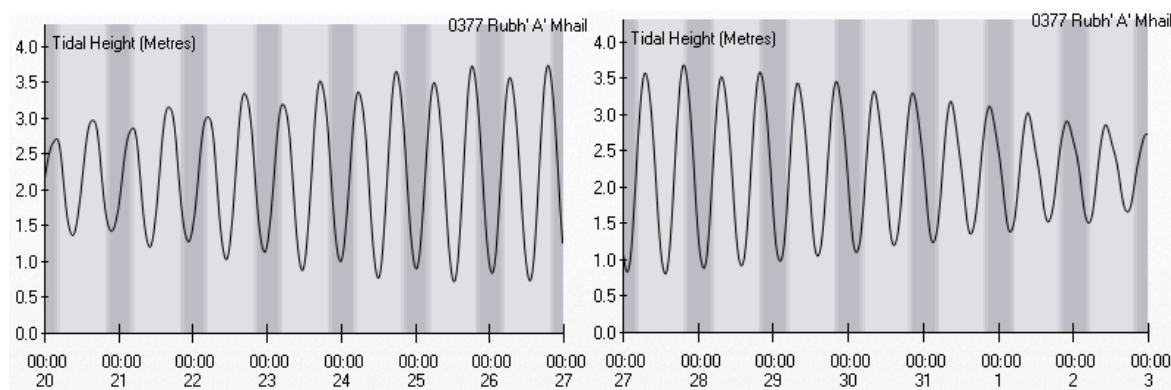


Figure 8.3 Tidal curves for Rubh' A' Mhail

The following is the UKHO summary description for Rubh' A' Mhail:

The tide type is Semi-Diurnal.

MHWS	3.7 m
MHWN	2.8 m
MLWN	1.5 m
MLWS	0.6 m

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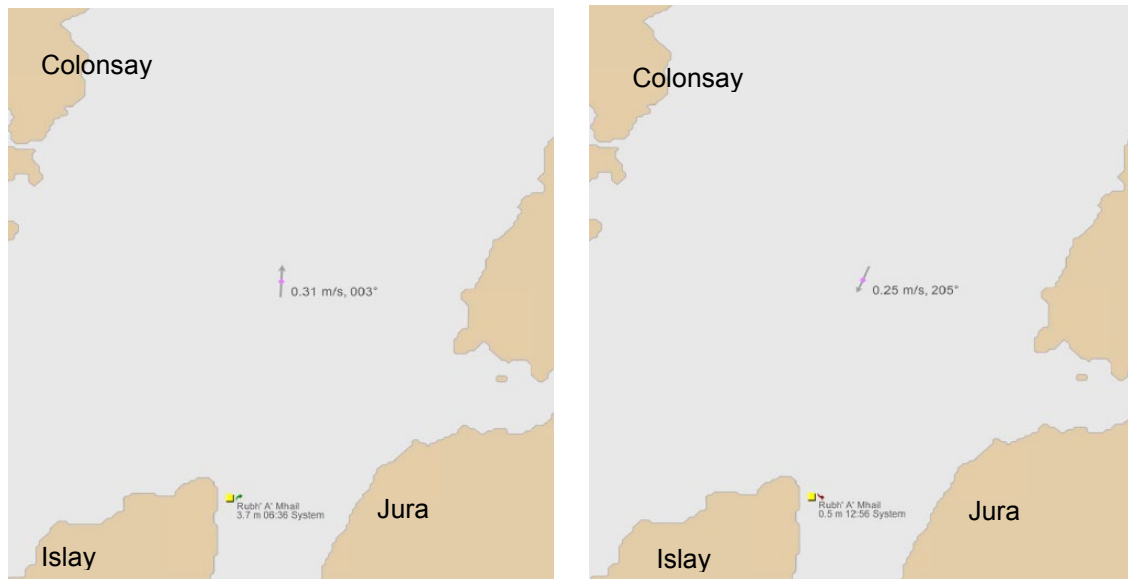
Predicted heights are in metres above chart datum. The tidal range at spring tide is therefore approximately 3.1 m and at neap tide 1.3 m.

8.1 Currents

Tidal stream information available was from TotalTide for a tidal diamond located in the south west corner of the West Jura production area (see Figure 8.2). The tidal diamond information is given below in Table 8.1. The associated spring tidal streams are shown in Figure 8.4 (flood tide) and Figure 8.5 (ebb tide).

Table 8.1 Tidal diamond for station SN038A (NR 44619 85831)

Time	Direction	Spring rate	Neap Rate
-06h	291°	0.21 m/s	0.10 m/s
-05h	330°	0.21 m/s	0.10 m/s
-04h	357°	0.31 m/s	0.10 m/s
-03h	012°	0.36 m/s	0.10 m/s
-02h	044°	0.21 m/s	0.10 m/s
-01h	092°	0.26 m/s	0.10 m/s
HW	114°	0.26 m/s	0.10 m/s
+01h	140°	0.26 m/s	0.10 m/s
+02h	167°	0.21 m/s	0.10 m/s
+03h	197°	0.26 m/s	0.10 m/s
+04h	220°	0.26 m/s	0.10 m/s
+05h	247°	0.26 m/s	0.10 m/s
+06h	278°	0.21 m/s	0.05 m/s



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Figure 8.4 Spring flood tide at **Station 038A** Figure 8.5 Spring ebb tide at **Station 038A**

Despite a moderate tidal range, the indicated tidal streams are relatively weak compared to those elsewhere in the general area, e.g. in the Sound of Jura and to the south and west of Islay. Based on the predicted flows at the tidal diamond, the particle transport distance at this station would be in the order of 5-6 km on spring tides and 2-3 km on neap tides.

The tidal stream information gives an indication of the currents that apply at the razor bed. It will be expected that currents will flow northwards along the coast during the flood tide and southwards along the coast during the ebb tide.

Salinities recorded during the shoreline ranged from 36.2 to 37.1 ppt, indicating no significant fresh water influence at the fishery.

8.2 Conclusions

The tidal current information indicates that the flow is generally parallel to the shore of Jura, flowing north on the flood tide and south on the ebb tide. The currents are relatively weak and this together with the dilution caused by the depth of the fishery, will limit the distance to which contamination travels from its source. Contaminants arising from sources on the west coast of Jura itself will tend to be taken along the shore in one or other direction and not towards the fishery. Likewise contamination arising on Colonsay will not tend to be carried across the straight towards the razor clam area.

9. Shoreline Survey Overview

A restricted shoreline survey of the West Jura shoreline was undertaken on a boat by staff from Argyll and Bute Council on the 1st September 2010.

Sub surface sea water samples were taken from several points along the West Jura coastline. Half of the samples were taken within the production area boundaries and the other half were taken along the coastline, as close as was safely possible to the watercourses entering the fishery. All the results were below the limit of detection, at <10 *E. coli* cfu/100 ml.

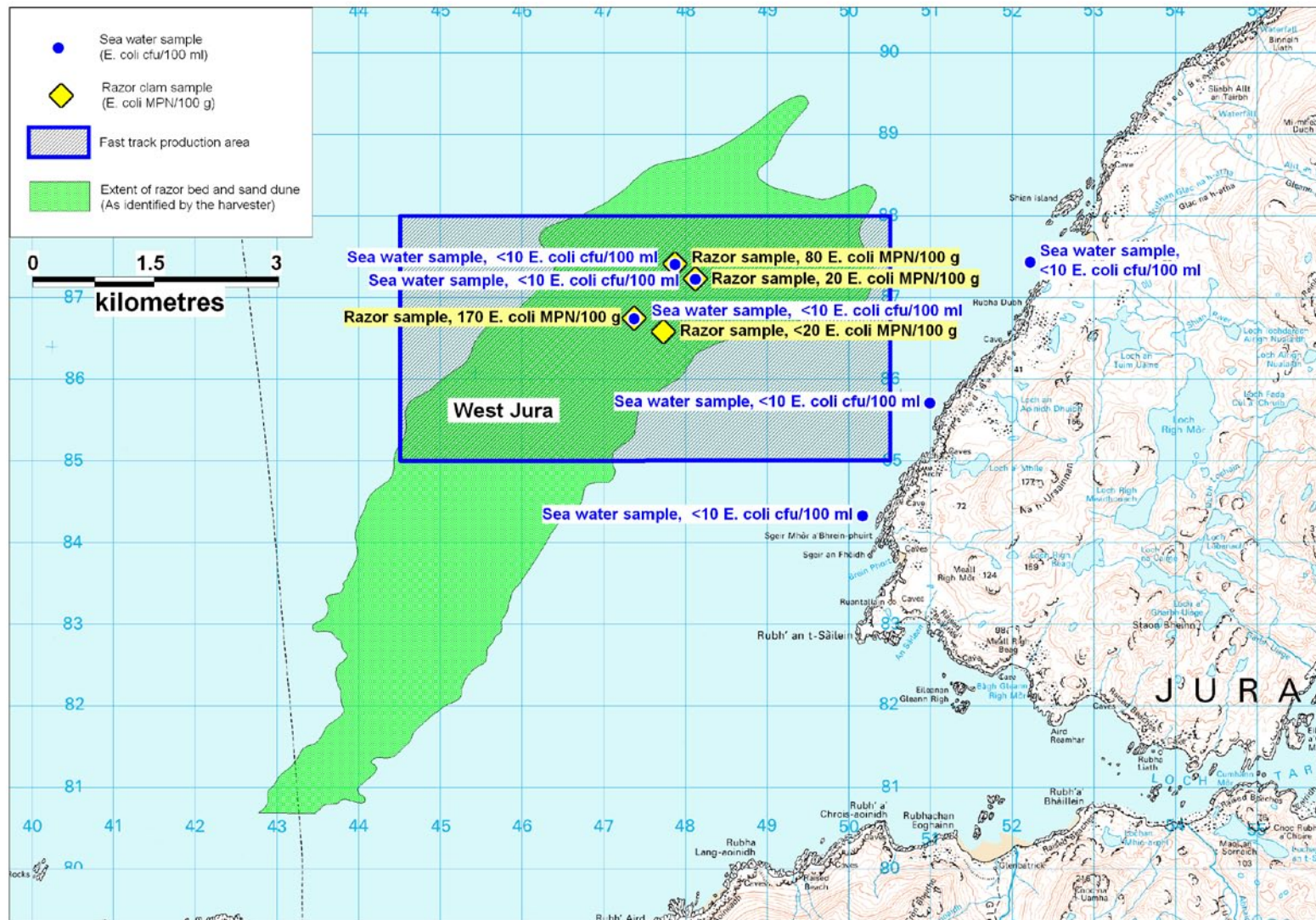
The shoreline at West Jura was inaccessible so it was not possible to sample any of the freshwater streams that enter the fishery. Salinities recorded during the shoreline survey ranged from 36.2 to 37.1 ppt.

Razor clam samples were collected from four points within the fast track production area. The samples taken closest to the shoreline had low results of 20 and <20 *E. coli* MPN/100 g. The other two samples taken further west had slightly higher results of 80 and 170 *E. coli* MPN/100 g.

No livestock or wildlife were observed during the shoreline survey.

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

A map is provided in Figure 9.1 that shows the relative locations of the most significant findings of the shoreline survey. Survey observations were made from a boat, as the shoreline adjacent to the fishery was inaccessible by foot.



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Figure 9.1 Summary of shoreline observations

10. Overall Assessment

Fishery

The razor bed has been described by the harvester as being located on a sand bank that lies parallel to the west coastline of Jura. The harvestable extent of the bank is defined by the maximum dive-able depth and the state of the tide. The sand bank extends out-with the defined production area to the south-west and it has been reported that harvestable stocks are also available in this area.

The razor clams will be hand dived and harvesting is planned to take place throughout the year.

Human sewage inputs

No direct impacts from human sewage are anticipated at West Jura as there are no identified discharges to water within a 7.5 km radius of the fast track production area. The nearest settlement is located approximately 7.9 km to the north west. Due to the large distance between the fishery and discharges and the depth of the water between Jura and Colonsay, it is unlikely that the discharges at Scalasaig will impact the fishery. Based on the predicted flows at the tidal diamond (SN038A), the particle transport distance at this station would be in the order of 5-6 km on spring tides and 2-3 km on neap tides. During the shoreline survey, no dwellings and/or associated septic tanks and outfall pipes were observed from the boat.

There is limited infrastructure on the island and the closest road/track is 10 km east of the fishery. Boats are likely to regularly pass through the body of water between Colonsay and Jura so occasional minor impacts to the razor bed are possible from overboard discharges. There is a ferry service that runs from Oban to the neighbouring island of Colonsay, with the ferry route passing 2 km west of the shellfish bed. However, any impact to the fishery is expected to be minimal and more likely in summer.

Agricultural inputs

No livestock were observed during the shoreline survey; however RERAD data indicated that cattle and sheep are present on the island. Livestock on the island may access streams to drink during the warmer months, and if so higher levels of faecal contamination could be carried via the streams to the sea. Any impact from this source would most likely impact the eastern side of the razor clam bed.

Wildlife inputs

No wildlife was observed, during the shoreline survey. However, seabirds including gulls are likely to be present along the coast. As most seabirds will roost and nest on land or at the coastline, any contamination is likely to be greater near to the coast. There is however a large red deer population (estimated 6,000) on the Isle

of Jura, with the ratio of 30:1 (red deer to human). Faecal contamination from deer and any other land animals is likely to be carried via stream runoff to the sea. However, these are not expected to markedly affect bacteriological water quality at the fishery.

Rivers and streams

No streams were sampled at the time of the shoreline survey, due to inaccessibility to the shoreline. However, referring to the ordnance survey map there are approximately a dozen fresh water streams in the area. Due to the distance between these possible fresh water streams and the fishery is not possible to say for certain whether they will have the potential to contaminate the shellfish. However, the salinities recorded during the shoreline ranged from 36.2 to 37.1 ppt, indicating no levels of fresh water influences to the area.

Rainfall

Rainfall patterns at Colonsay: Homefield (the nearest rainfall station) show that seasonal variation in rainfall levels occurs and the wettest months were between September and March. An increase in rainfall may be expected to wash a flush of bacteria from the surrounding land into the production area. The impact of rainfall events is likely to be most acute nearest where the streams on the western side Jura enter the shellfish bed.

Analysis of results

There were no historical *E. coli* monitoring results available for West Jura. It was therefore not possible to establish a pattern of seasonal variation in the microbiological quality of the shellfish.

During the shoreline survey razor clam samples were collected from four points within the bay. The samples taken closest to the shoreline had low results of 20 and <20 *E. coli* MPN/100 g. The other two samples taken further west had slightly higher results of 80 and 170 *E. coli* MPN/100 g.

Sea water samples were taken from six points within and around the shellfish bed area. Half of the samples were taken within the production area boundaries and the other half were taken along the western coastline of Jura, close to freshwater inputs. All the results were low at <10 *E. coli* cfu/100 ml.

Movement of contaminants

Due to the tidal currents, the part of the razor clam bed nearest shore would be subject to local sources of contamination if any were present. The part of the razor bed further from shore is less likely to be impacted by any potential sources on Jura's western coastline – the dilution will markedly increase away from shore given the depth in the area.

Overall conclusions

Overall, the three main possible sources of contamination to the fishery are the contamination of fresh water inputs by livestock and wildlife, the sewage discharges at Scalasaig and the possible overboard discharges from passing boats and the ferry. The level of contamination from all three sources is expected to be minimal due to the large distance from the fishery and the water depth between Colonsay and Jura. The *E. coli* results of the razor samples taken during the shoreline survey were higher on the western side of the shellfish bed, suggesting that the sewage discharges at Scalasaig and the possible overboard discharges have a greater influence on the fishery than the fresh water inputs.

11. Recommendations

Production area

The sources of information on the fishery include the description of razor bed given by the harvester, the fast track production area application and the location of razor samples taken during the shoreline survey. The latter all fell within the fast track production area. As no significant contaminating sources fell within the fishery or in the immediate area, it is recommended that the production area boundaries be increased to cover a larger area and reflect the shape of the razor bed. The south western boundary of the recommended production area has been permitted to allow a safe buffer between the ferry route and the possible harvesting area.

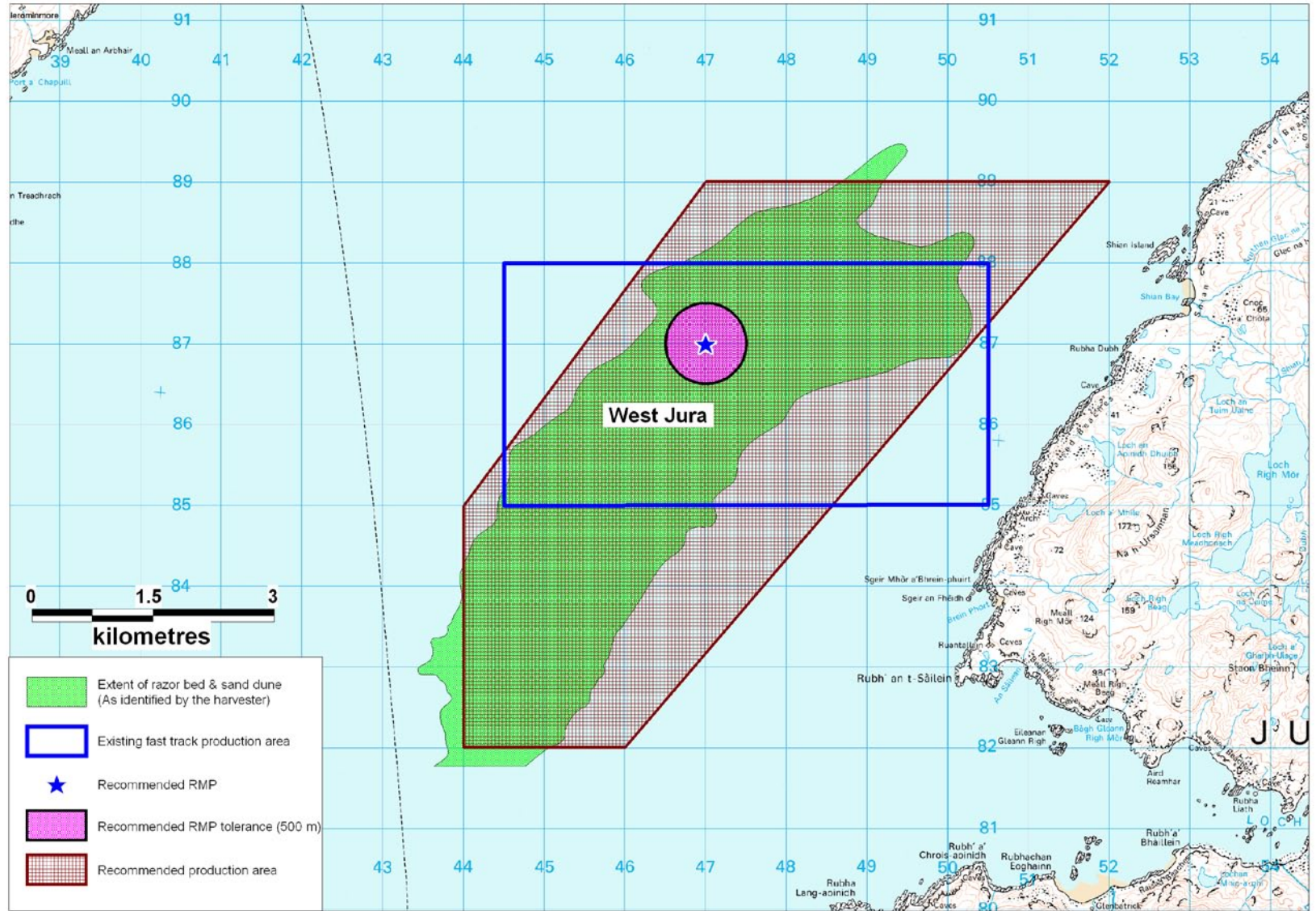
It is recommended that the new production area is bounded by lines drawn between NR 4700 8900 and NR 5200 8900 and NR 4600 8200 and NR 4400 8200 and NR 4400 8500 and NR 4700 8900.

RMP

As potential sources of contamination are on either side of the shellfish bed and the razor samples taken during the shoreline survey are the only indication that contamination may be greater on the western side of the razor bed, it is recommended that the RMP be established at NR 4700 8700.

The recommended tolerance is 500 m – this recognises the potential difficulty of gathering sufficient razors close to the identified point, allows for variation in stocking density and to allow sufficient area from which to reliably obtain samples.

Given that there is a very restricted data set available for this area, it is recommended that monthly sampling be undertaken for at least one year and then the variability reviewed to determine whether the frequency can be reduced.



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Figure 11.1 Recommendations for West Jura

12. References

Jura Development Trust Website (2010) www.juradevelopment.co.uk Accessed 21/09/2010

Kay, D, Crowther, J., Stapleton, C.M., Wyer, M.D., Fewtrell, L., Anthony, S.G., Bradford, M., Edwards, A., Francis, C.A., Hopkins, M. Kay, C., McDonald, A.T., Watkins, J., Wilkinson, J. (2008). Faecal indicator organism concentrations and catchment export coefficients in the UK. *Water Research* 42, 2649-2661.

Lee, R.J., Morgan, O.C. (2003). Environmental factors influencing the microbial contamination of commercially harvested shellfish. *Water Science and Technology* 47, 65-70.

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.

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Appendices

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Sampling Plan for West Jura

PRODUCTION AREA	West Jura
SITE NAME	Jura
SIN	AB 482 805 16
SPECIES	Razor clams
TYPE OF FISHERY	Wild
NGR OF RMP	NR 4700 8700
EAST	147000
NORTH	687000
TOLERANCE (M)	500
DEPTH (M)	Not applicable
METHOD OF SAMPLING	Hand dived
FREQUENCY OF SAMPLING	Monthly
LOCAL AUTHORITY	Argyll & Bute Council
AUTHORISED SAMPLER(S)	Christine McLachlan William MacQuarrie Ewan McDougall Donald Campbell
LOCAL AUTHORITY LIAISON OFFICER	Christine McLachlan

Comparative Table of Boundaries and RMPs – West Jura

PRODUCTION AREA	West Jura
SPECIES	Razor clams (<i>Ensis</i> spp)
SIN	AB 482 805 16
EXISTING BOUNDARY	The area bounded by lines drawn between points NR 4450 8800 and NR 4450 8500 and NR 5050 8800 and NR 5050 8500
EXISTING RMP	None
RECOMMENDED BOUNDARY	The area bounded by lines drawn between NR 4700 8900 and NR 5200 8900 and NR 4600 8200 and NR 4400 8200 and NR 4400 8500 and NR 4700 8900
RECOMMENDED RMP	NR 4700 8700
COMMENTS	New production area and RMP

Shoreline Survey Report



West Jura
AB 482

Scottish Sanitary Survey Project  **Cefas**

Shoreline Survey Report

Production area: West Jura
Site name: Jura (AB 482 805 16)
Species: Razors
Applicant: Kenneth Seath
Local Authority: Argyll & Bute Council
Status: New site

Date Surveyed: 1st September 2010
Surveyed by: Ewan McDougall Argyll & Bute Council
Existing RMP: To be established
Area Surveyed: See Figure 1, by boat only (shoreline inaccessible by foot).

Weather observations

01/09/2010 – Wind SE Force 2. Overcast. Dry. Sea water temperature: 15 C.

Site Observations

Fishery

According to the harvester, the razors are located on a sand bank which lies parallel to the Jura coastline. The harvestable extent of the bank is defined by the maximum dive-able depth and the state of the tide. On the day of sampling the dive-master had limited diving to approximately 15 m, therefore samples were taken around the bank at this depth. By diving deeper (up to 20 m under appropriate conditions), and/or different states of tide, the harvestable extent of the fishery can be considerably larger.

The sand bank extends out-with the defined production area to the south-west and is reported that harvestable stocks are also available in this area.

Sewage/Faecal Sources

During the shoreline survey no possible septic tanks or outfall pipes were observed.

Seasonal Population

There is a daily small car and passenger ferry from Port Askaig to the Isle of Jura. There is a tearoom and shop on the island. There are also 2 hotels and approximately 13 self catering units. Visitor numbers to the island are expected to be higher in the summer months.

Boats/Shipping

There is a daily small car and passenger ferry from Port Askaig to the Isle of Jura. During the shoreline survey, no other boats were observed in the vicinity of the fishery.

Land Cover and Topography

The land cover along the Jura coastline is mainly bedrock (quartzite) and heather. The coastline is extremely inaccessible and features cliffs, caves, sea arches and raised beaches.

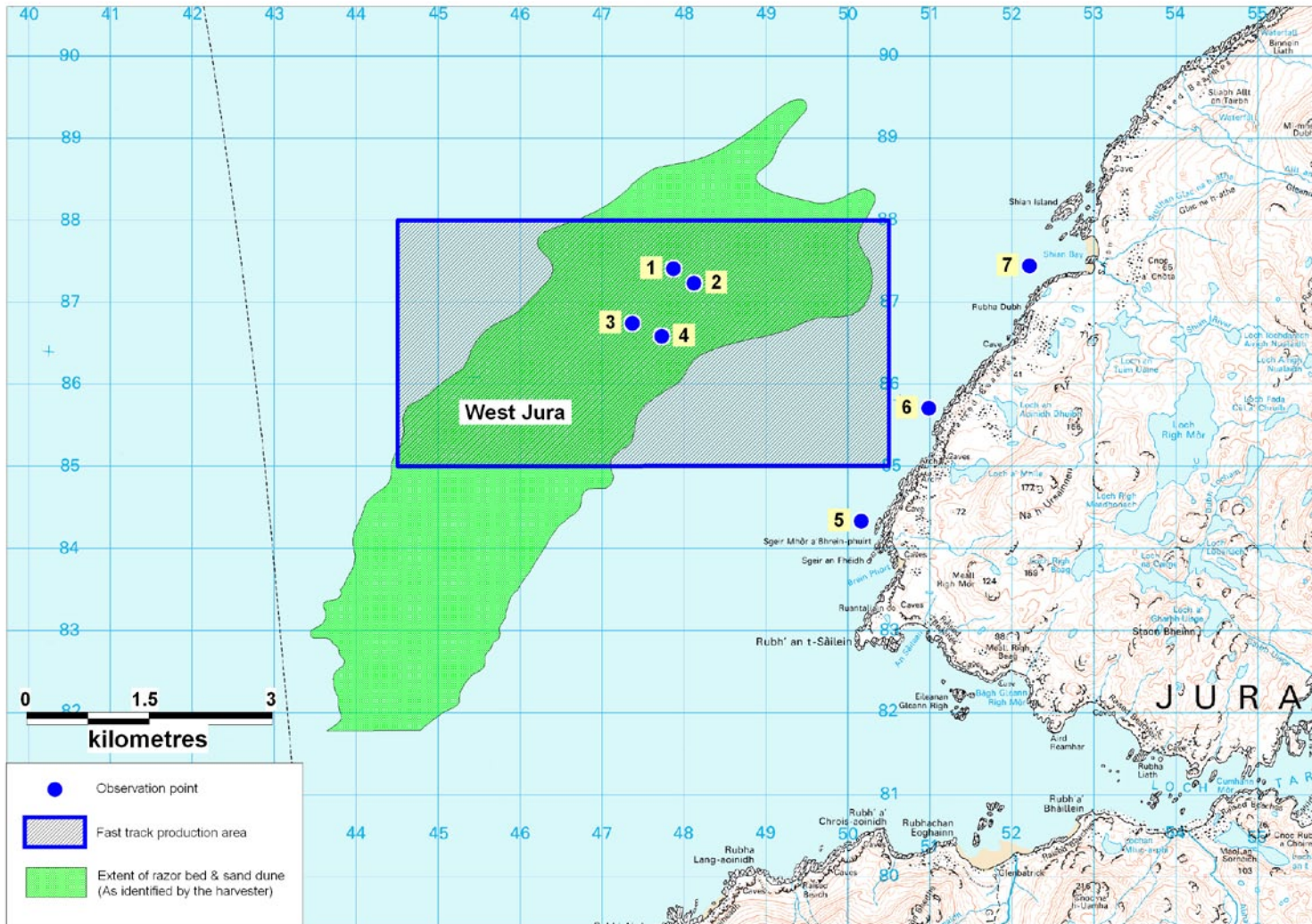
Wildlife/Birds

No wildlife was observed along the Jura coastline during the shoreline survey. However, the boat crew reported that red deer can be frequently seen on the shore.

Livestock

No livestock was observed along the Jura coastline during the shoreline survey.

Recorded observations apply to the date of survey only. Observations were recorded on the day from the observer's point of view. This does not necessarily equate to total numbers of, for example livestock and wildlife present as natural features may obscure individuals and groups of animals from view.



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Figure 1. Observations from boat at West Jura

Table 1. Shoreline Observations

No.	Date	Time	NGR	East	North	Associated photograph	Associated sample	Description
1	01/09/2010	13:33	NR 47868 87419	147868	687419	Figure 4	JURA SEAWATER1, JURA RAZOR1	Location of sea water sample 1 (JURA SEAWATER1) and shellfish sample 1 (JURA RAZOR 1). Depth 16 m. Western edge of bank.
2	01/09/2010	13:52	NR 48120 87239	148120	687239		JURA SEAWATER2, JURA RAZOR2	Location of sea water sample 2 (JURA SEAWATER2) and shellfish sample 2 (JURA RAZOR 2). Depth 15 m. Eastern edge of bank.
3	01/09/2010	14:09	NR 47366 86753	147366	686753		JURA SEAWATER3, JURA RAZOR3	Location of sea water sample 3 (JURA SEAWATER3) and shellfish sample 3 (JURA RAZOR 3). Depth 15 m. South-western edge of bank.
4	01/09/2010	14:24	NR 47727 86591	147727	686591		JURA CLASSIFICATION SAMPLE	Location of classification shellfish sample (JURA CLASSIFICATION SAMPLE). Depth 15 m. South-eastern edge of bank.
5	01/09/2010	15:01	NR 50161 84339	150161	684339	Figure 5	JURA SEAWATER4	Location of sea water sample 4 (JURA SEAWATER 4). Depth 15 m. As close to shore as safely possible. No razors to sample – ground unsuitable.
6	01/09/2010	15:15	NR 50988 85717	150988	685717	Figure 6	JURA SEAWATER5	Location of sea water sample 5 (JURA SEAWATER 5). Depth 8 m. As close to shore as safely possible. No razors to sample – ground unsuitable.
7	01/09/2010	15:30	NR 52213 87448	152213	687448	Figure 7	JURA SEAWATER6	Location of sea water sample 6 (JURA SEAWATER 6). Depth 7 m. As close to shore as safely possible. No razors to sample – ground unsuitable.

Photos referenced in the table can be found attached as Figures 4-7.

Sampling

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

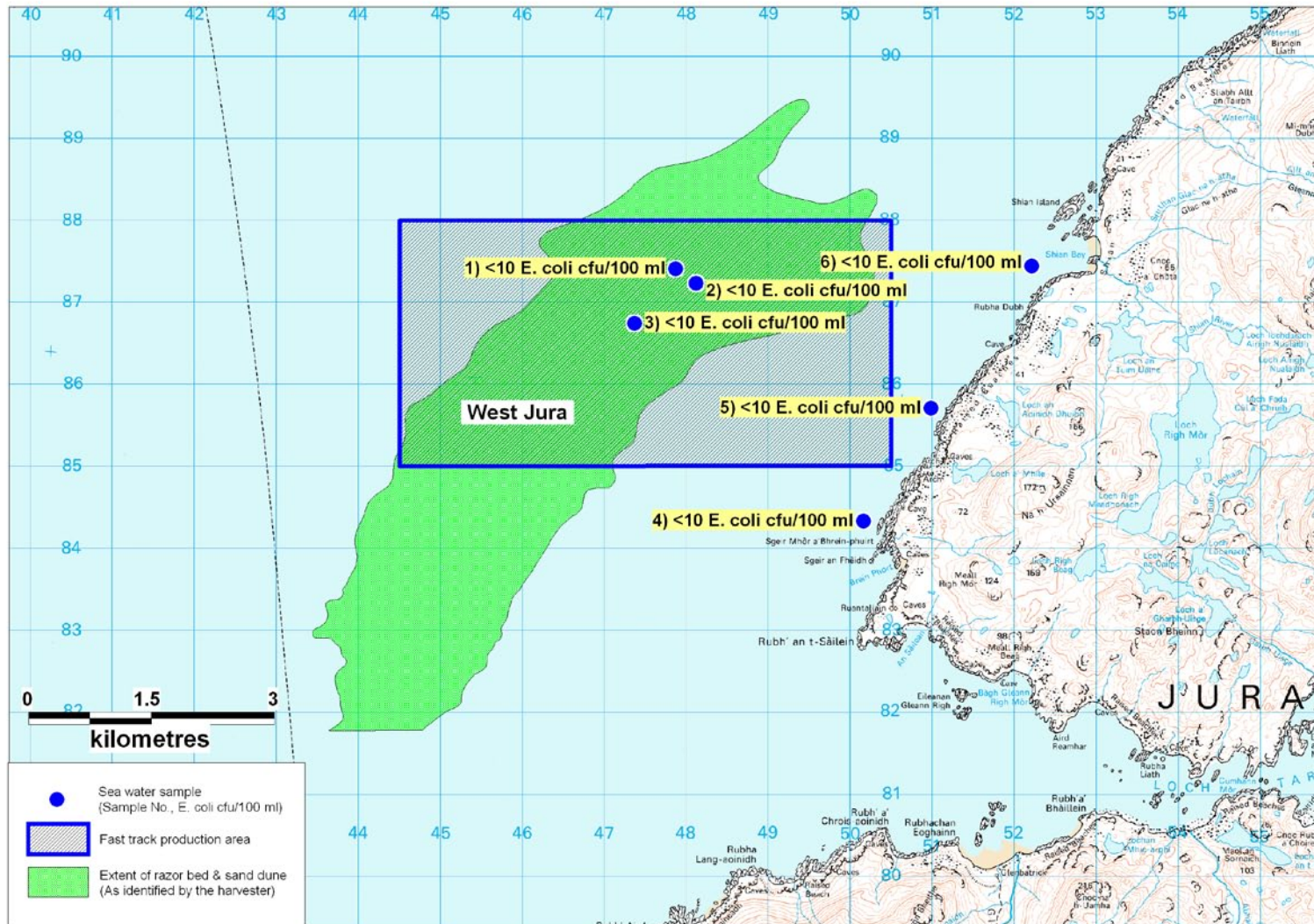
Samples of seawater were tested for salinity by the laboratory using a salinity meter under controlled conditions. These results are shown in Table 2, given in units of grams salt per litre of water. This is the same as ppt.

Table 2. Water Sample Results

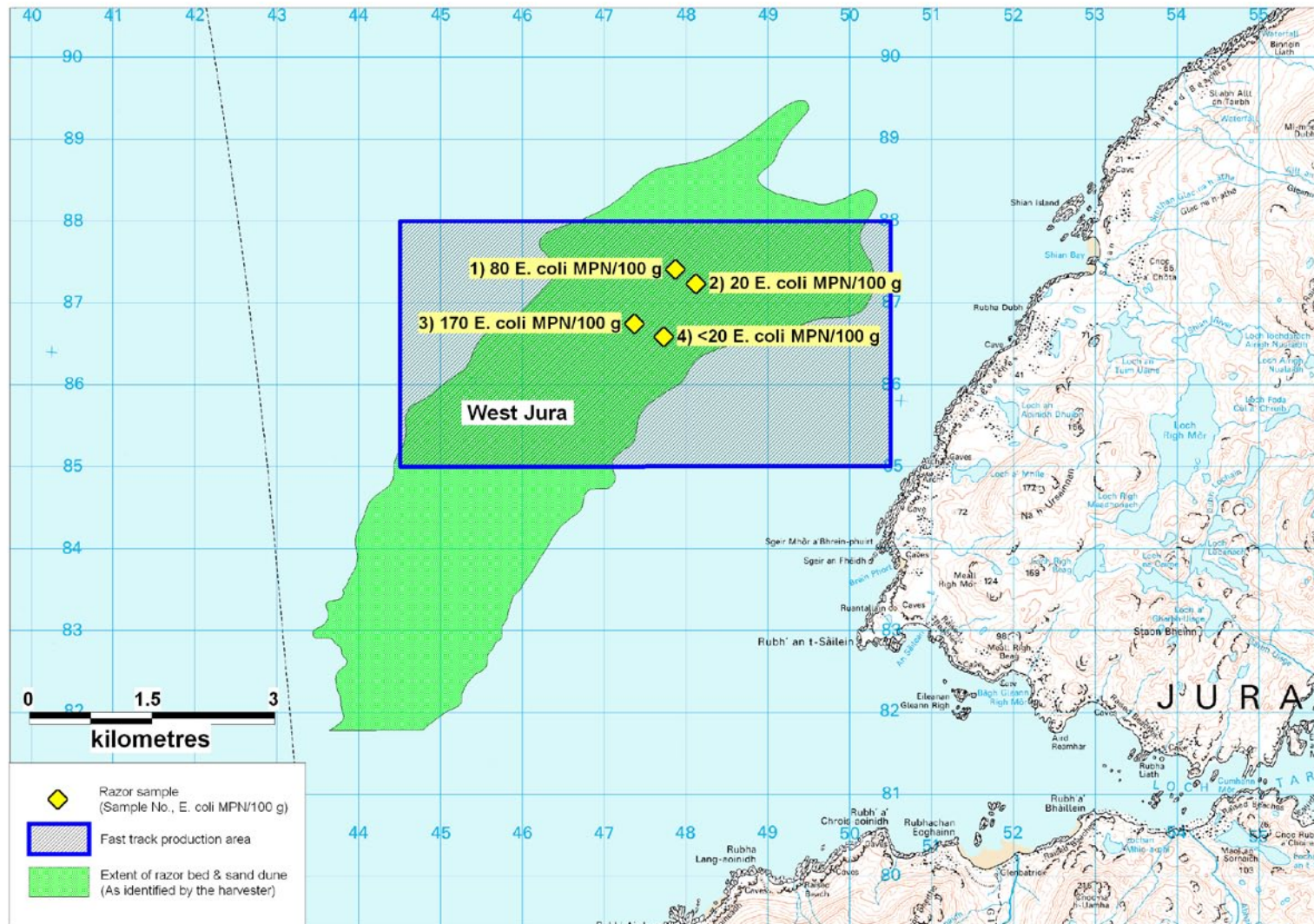
No.	Date sampled	Sample	Grid Ref	Type	E. coli (cfu/100ml)	Salinity (g/L)
1	01/09/2010	JURA SEAWATER 1	NR 47868 87419	Sea water	<10	36.5
2	01/09/2010	JURA SEAWATER 2	NR 48120 87239	Sea water	<10	36.5
3	01/09/2010	JURA SEAWATER 3	NR 47366 86753	Sea water	<10	36.3
4	01/09/2010	JURA SEAWATER 4	NR 50161 84339	Sea water	<10	37.1
5	01/09/2010	JURA SEAWATER 5	NR 50988 85717	Sea water	<10	36.7
6	01/09/2010	JURA SEAWATER 6	NR 52213 87448	Sea water	<10	36.2

Table 3. Shellfish Sample Results

No.	Date sampled	Sample	Grid Ref	Type	E. coli (MPN/100 g)
1	01/09/2010	JURA RAZOR 1	NR 47868 87419	Razors	80
2	01/09/2010	JURA RAZOR 2	NR 48120 87239	Razors	20
3	01/09/2010	JURA RAZOR 3	NR 47366 86753	Razors	170
4	01/09/2010	JURA CLASSIFICATION	NR 47727 86591	Razors	<20



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 Figure 2. Water sample results



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Figure 3. Shellfish sample results

Photographs



Figure 4. Western edge of bank. Location of sea water sample 1 (JURA SEAWATER1) and shellfish sample 1 (JURA RAZOR1)



Figure 5. Location of sea water sample 4 (JURA SEAWATER4)



Figure 6. Location of sea water sample 5 (JURA SEAWATER5)



Figure 7. Location of sea water sample 6 (JURA SEAWATER6)