Centre for Environment Fisheries & Aquaculture Science

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Sanitary Survey Report

Jersey Scallops

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V1	Price-Hayward	17/03/2022	First draft
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Executive Summary and Sampling Plan

The Centre for Environment, Fisheries & Aquaculture Science (Cefas), have undertaken a sanitary survey for king scallops (*Pecten maximus*) harvested from the offshore production areas around Jersey on behalf of the States of Jersey. This purpose of this sanitary survey is to demonstrate compliance with the requirements identified in Article 56 of EC Regulation 2019/627.

Scallops are harvested from throughout these waters by dredging and, increasingly, by diving. The managed fishery areas are located offshore from the island and include three Marine Protected Areas (MPAs): Les Minquiers, Les Écréhous, and the Paternosters. Scallop divers were reported to favour the protected areas.

Land-based sources of faecal contamination arising from the islands as well as the adjacent coasts of France was considered unlikely to significantly impact the bacteriological quality of scallops harvested from within the offshore fishery areas.

The nearest land-based sources of faecal contamination to the fishery areas are those arising on Jersey itself. Sewage discharges and land runoff carrying faecal bacterial are concentrated mainly along the south and east shores of the island, though there are potentially smaller discharges elsewhere on the island. The only sewage discharges directly to the fishery waters would come from boat and ship traffic. Untreated sewage wastes may be discharged from ships directly to sea more than 12 nautical miles (22.2 km) from land and treated (comminuted and disinfected) wastes may be discharged at least 3 nautical miles (5.6 km) from land. These might be predicted to most likely occur along regular shipping routes and more often during periods of higher activity; however due to the large tidal ranges and flows in the area, these discharges are likely to be highly diluted before reaching the seabed and the scallops.

Samples were provided from four areas (identified as North, East, South, and West) within Jersey's territorial waters. Faecal indicator (*E. coli*) results confirmed very low levels of faecal contamination at the seabed where the samples were collected. However, it must be noted that the sampling period was limited and a longer dataset would be needed to confirm that these results were stable and to assess any seasonal or temporal variability.

Little spatial variability was found. Most samples tested were below the lower limit of detection of the test used (<18 MPN *E. coli*/100g flesh and intravalvular liquid) and those with quantifiable results were close to this level.

Samples taken from the area identified as North did not map geographically within the offshore fishery area, but within 1.5 km of the north shore of Jersey. This survey only addresses the offshore harvesting of scallops and therefore inshore areas cannot be represented by the sampling plan recommended here.

It was recommended that a single monitoring point be established within the Southern fishery area, close to the ferry route between St Malo and Jersey, that could be used to represent the East, South, and West areas. A sampling tolerance of 2 km is recommended

to ensure sufficient scope for obtaining regular monitoring samples. Sampling frequency should be monthly until a sufficient monitoring history can be obtained to assess reducing the frequency. Details of the recommended sampling plan are given on page 1 of this report.

Table of Contents

Tables

Figures

1 Recommended Sampling Plan

Classified Area	Jersey Scallops – all fishery areas outside 3nm
Site	South
Species	*Pecten maximus*
Type of Fishery	Wild - subtidal
Representative Monitoring Point	Jersey South
Lat	48.975725N
Long	-2.26310E
Tolerance (m)	2000 m
Depth (m)	N/A
Area Boundaries	In accordance with Jersey offshore fishing zone map
Method of Sampling	Dredge or hand
Frequency of Sampling	Monthly

2 Statement of Purpose

This report has been produced for the purpose of documenting a sanitary survey of the Jersey king scallop (*Pecten maximus*) bivalve mollusc harvesting waters on behalf of the States of Jersey.

Filter-feeding, bivalve molluscan shellfish (e.g. mussels, clams, scallops) retain and accumulate a variety of microorganisms from their natural environments, including bacteria and viruses that could cause human illness. The microbiological safety of bivalve shellfish for human consumption therefore depends heavily on the quality of the waters from which they are taken. When consumed raw or lightly cooked, bivalves contaminated with pathogenic microorganisms may cause infectious diseases (e.g. norovirus-associated gastroenteritis, Hepatitis A and salmonellosis) in humans. The risk of contamination of bivalve molluscs with human pathogens is assessed via the microbiological monitoring (using the faecal indicator bacterium *E. coli*) of bivalves at primary production, resulting in the classification of production areas and determining the level of treatment required before they can be placed on the market for human consumption.

Rules relating to the organisation of official controls on products of animal origin for human consumption are set forth in EC Regulation 2019/627, which amongst other controls specifies that competent authorities must undertake a sanitary survey prior to classification of live bivalve mollusc production and relaying areas. The sanitary survey must include:

a) an inventory of the sources of pollution of human or animal origin likely to be a source of contamination for the production area;

b) an examination of the quantities of organic pollutants released during the different periods of the year, according to the seasonal variations of human and animal populations in the catchment area, rainfall readings, waste-water treatment, etc.;

c) determination of the characteristics of the circulation of pollutants by virtue of current patterns, bathymetry and the tidal cycle in the production area.

The competent authorities shall establish a monitoring programme for live bivalve mollusc production areas that is based on an examination of the sanitary survey and the number of samples, geographical distribution of sampling points and sampling frequency for the programme shall ensure that the results of the analysis are representative of the area in question.

The Centre for Environment, Fisheries & Aquaculture Science (Cefas), have undertaken a sanitary survey for the offshore production areas around Jersey on behalf of the States of Jersey. This purpose of this sanitary survey is to demonstrate compliance with the requirements identified in Article 56 of EC Regulation 2019/627.

The outcome of this sanitary survey is a recommendation of the locations of RMPs, frequency of sampling for microbiological monitoring and the boundaries of production areas deemed to be represented by the RMPs.

3 General Description and Shellfishery

Jersey, one of the Channel Islands, lies in the English Channel approximately 30km west of the Cotentin Peninsula in Normandy, France. The shortest distance between the northeast of the island and France is 22km. Other islands in the chain include Sark (19km to the north-northwest), Guernsey (28km to the northwest) and Alderney (50km to the north.) Herm, the smallest of the Channel Islands, lies between Guernsey and Sark.

3.1 Scallop fishery

Two species of scallop are found in waters around the Channel Islands and Jersey: king or great scallop (*Pecten maximus*) and queen scallop (*Aequipecten opercularis*). The main fishery is for king scallops.

Fishery conservation controls in Jersey include license/permit requirements for those wishing to dredge or collect scallops, minimum shell size limit of 102mm, and a recreational bag limit of 24 animals per day. Some fishing activities (e.g. dredging) are banned from certain inshore areas and seeding with juvenile seed scallops has been undertaken in the past. There are currently no seasonal controls on the fishery.

Information on the scallop fishery was obtained from the Jersey Marine Resources Annual Report 2019. Approximately 350,000kg of scallops were landed in 2019, a significant increase over 2018 although the overall trend since 2007 was slightly down. Other bivalves/gastropods landed by Jersey boats include cockles, queen scallops and ormers. Diving effort has increased markedly since 2016, from <500 dives in 2016 to approximately 2500 dives in 2019. The number of recorded dredging tows has declined from roughly 4500 to roughly 3000 over that same period, suggesting diving is becoming a more significant part of the total fishing effort than it has been in the past. The report noted that divers preferred fishing inside the marine protected areas as stocks were believed to be higher there. This suggests that a proportion of the total catch may be coming from shallower waters nearer to the coastline as well as from the offshore protected areas at Les Ecrehous and Les Minquiers.

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Figure 3.1 Location of Channel Islands, with adjacent French coast, major towns and industrial facilities. Main watercourses are labelled.

3.2 Designations

The waters around Jersey are home to four designated marine protected areas (OSPAR): Les Écréhous & Les Dirouilles, Jersey (UK23003); Les Minquiers, Jersey (UK23002), Les Pierres de Lecq (the Paternosters), Jersey (UK23004, and South East Coast of Jersey, Channel Islands (UK23001). Only three of these are listed in the OSPAR map data, shown in Figure 3.2. The Paternosters are a tiny group of rocks approximately 6 km off the northeast coast of Jersey.

Approximately 150km^2, or 6%, of the waters and seabed around Jersey are designated Marine Protected Areas, including Écréhous and Les Minquiers.

None of these conservation designations are expected to materially impact this shellfishery, although it has been noted that scallop divers prefer fishing within these areas.

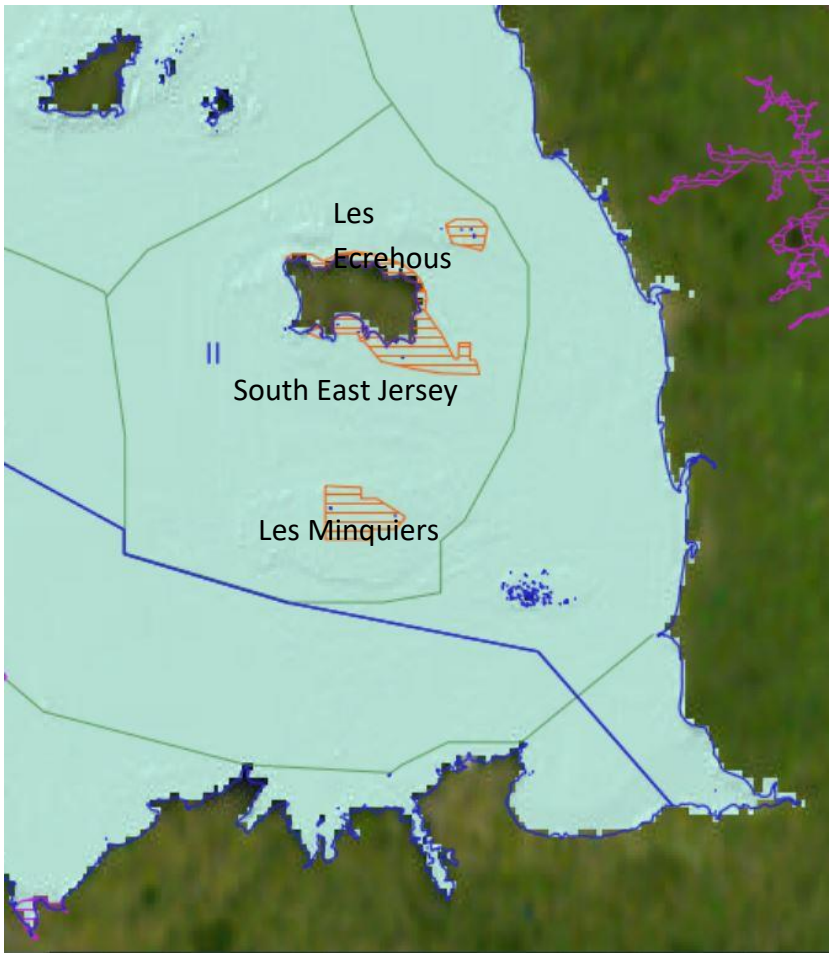

Figure 3.2 Location of Jersey MPA (OSPAR), shown in orange and labelled. Source OSPAR online map (https://carto.mpa.ospar.org/en/1/ospar.map)

3.3 Classification and harvesting

The offshore scallop beds have not historically been classified or monitored.

Harvesting is by dredge or by diving. The areas identified by States of Jersey for the purposes of scallop harvesting are within the solid-coloured bands shown in Figure 3.2. Divers may collect scallops throughout the fishery areas.

Classified bivalve production areas, mainly for Pacific oyster culture, are located on the intertidal shores of Jersey, Guernsey, and Herm as well as along the adjacent Normandy coast of France. Results from these are not considered here due to the differences in risk related to proximity to land-based sources of faecal contamination and the way the different species are typically processed and consumed.

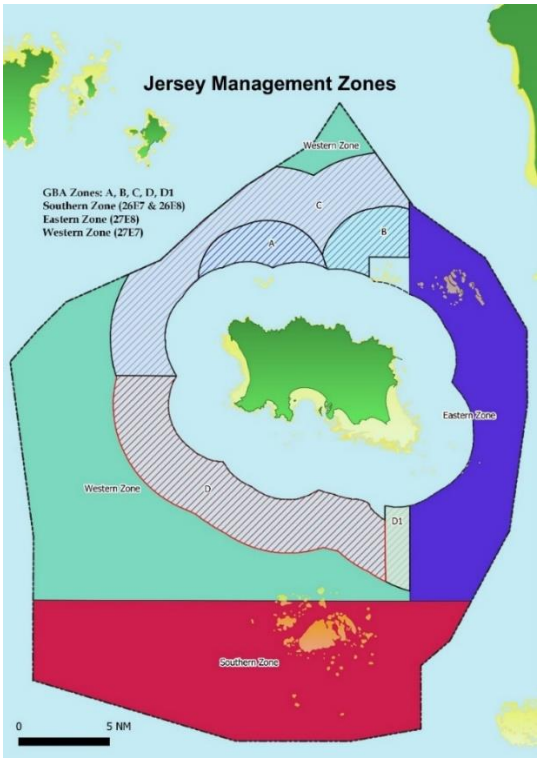

Figure 3.3 Jersey offshore management zones map. Source: States of Jersey

Further information was provided by the States of Jersey Department of Fisheries identifying main scalloping areas around the island (shown in pink shading in Figure 3.3.) The majority of these areas are located outside the 3 NM boundary around the island, though smaller areas lie close to the north, east, and south coasts.

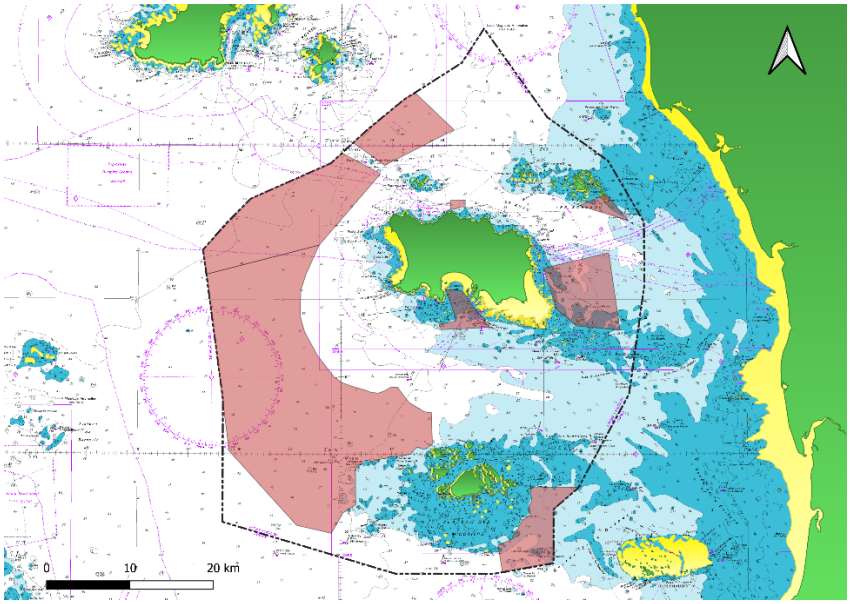

Figure 3.4 Scallop fishing areas. Source: States of Jersey

4 Assessment

4.1 Sources of contamination

The majority of zones identified for the scallop shellfishery are located more than 3 nm offshore of Jersey and away from direct sources of faecal contamination. Therefore, the main potential sources of contamination will be diffuse, arising on land adjacent to the fishery zones and from ships and boats passing through or near them.

Contamination carried from freshwater sources and sewage tend to float over the surface of the denser seawater until these are mixed by wave action or other turbulence.

Those scallop fishing areas within the 3 NM limit will be influenced by sources of faecal contamination arising from on Jersey and therefore excluded from the scope of this sanitary survey, which aimed to identify sources to the offshore production areas only.

4.1.1 Sewage

No sewage discharges were identified directly to the offshore fishery waters. Sewage discharges to either rivers or the sea from populated areas on the inhabited Channel Islands, including Jersey, Guernsey, and Herm, and settlements along the adjacent coast of France, would be expected to contribute to background levels of contamination in these waters. Discharges from

Population information from the populated islands nearest the fishery zones is given in Table 4.1. In the case of Sark, this was an undated estimate provided on the Island's website. Although part of the Bailiwick of Guernsey it is not included in the Guernsey electronic census.

Table 4.1 Most recent population census data for Jersey, Guernsey and Herm.

Jersey*	Guernsey** (including Herm, Lihou and Jethou)	Sark***
107,800	63,448	500

*Source Statistics Jersey: www.gov.je/statistics 2019 Estimate ; ** Source Guernsey Annual Electronic Census Report 2021: www.gov.gg; *** Source Island of Sark Chief Pleas www.sarkgov.co.uk

Population density data were available for Jersey and is shown in Figure 4.1. Most of the population of Jersey is concentrated along the southern shore of the island, particularly around the town of St. Hellier.

The populations of these islands increase significantly during holiday periods, particularly during the summer months.

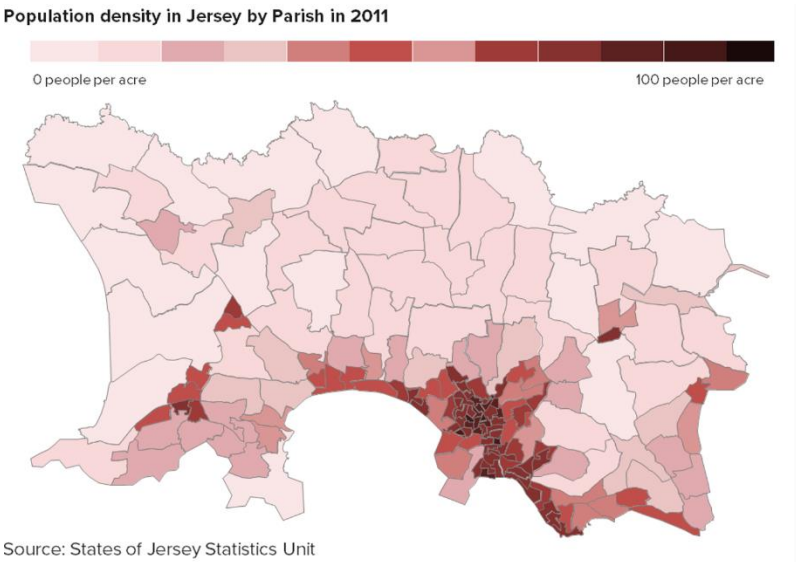

Figure 4.1 Population density map of Jersey.

The Islands of Jersey, Guernsey and Herm all discharge sewage to the marine environment.

The southern part of Jersey is served by the Bellozanne Wastewater Treatment Works (WWTW). UV-treated effluent is discharged via an outfall to the eastern end of St. Aubin's Bay, west of the port and centre of St Helier. The States of Jersey contracted a review of best available technology in 2012 to examine options for increasing capacity, improving nutrient removal, and reducing the number of spills from CSOs associated with the works. This work has been delayed by the failure of the main engineering contractor on the project in October 2021.

A local package treatment plant is located at Bonne Nuit, on the north shore of the island and a limited number of properties use onsite disposal via septic tanks or pits.

On the island of Guernsey, screened wastewater is discharged to sea from the Belle Greve Wastewater Centre via a long sea outfall pipe into the channel (the Little Russel) east of the island. This system was upgraded in 2015 and the long sea outfall extended to roughly 1.7km from shore. Modelling undertaken prior to the works suggested that the plume would be carried north and west around the northern end of the island (Metoc, 2011). Screened wastewater is also discharged to sea on the west side of Herm.

The Island of Sark has neither mains water nor mains sewerage; emptying of cess pits is provided by the island Public Works Department (Isle of Sark Government, https://sarkgov.co.uk). No information was found regarding disposal of pit contents.

Sewage may also be discharged from commercial vessels and pleasure craft that are either transiting or operating in the fishery waters. This is difficult to quantify, predict or control. Whilst discharges of sewage are prohibited from larger vessels engaged in international voyages under Annex IV of MARPOL, the prohibition does not apply to vessels under 400 gross tonnage or those certified to carry up to 15 persons. Ships subject to the annex may discharge sewage treated by an approved system more than 3 nautical

miles (5.6 km) from land and may discharge untreated sewage more than 12 nautical miles (22.2 km) from land, subject to certain conditions. Parts of the Southern and Western fishery zones lie more than 22.2 km from Jersey and France and could conceivably be used to discharge untreated wastes, either from ships with no treatment systems or ships whose systems are not in operation.

Cruise ships frequent the Channel Islands between April and September, with Guernsey scheduled to receive the majority of cruise calls (86), followed by Jersey (14), Herm (7), and Sark (4) during 2022 (Guernsey Harbours, www.harbours.gg/cruiseships; Ports of Jersey (https://cdn.ports.je/web/Cruise-Calls-2022.jpg). The ships range in passenger capacity from 75 to 6334 (plus crew). These ships will have systems onboard for the management of sewage waste and may discharge effluent within the fishery zone. A proportion of the vessels may also have advanced wastewater treatment systems onboard that are designed to provide a high level of treatment compliant with higher standards required by MARPOL for operation in sensitive areas (100-250 faecal coliforms/100ml maximum, depending on installation date of the treatment plant). These systems may not function as well in actual use as they were designed to (Koboevic and Kurtela).

For UK ships, the faecal coliforms in effluent from sewage comminuting and disinfecting systems should not exceed 1000 MPN/cm^3 (equivalent to 100,000 MPN/100ml).

Regular ferry services (either passenger only or car and passenger) operate from Jersey to the south coast of England, other Channel Islands, and France. These vessels would pass through different parts of the fishery area, depending on their routes. The Condor car and passenger ferries carry between 300 and 800 passengers plus crew on the route between England and Jersey. The ferries run more frequently during the summer when tourism demand is higher. No information was found on the means of handling sewage waste onboard these vessels, but as they regularly transit the fishery zone they could potentially discharge sewage waste to the parts of it greater than 3 nm from shore. Car ferries running from St. Malo to Jersey and to UK ports pass through the southern part of the Jersey fisheries zone, west of the Minquiers, before splitting to either go to St Helier or pass around Jersey enroute northward.

Both Guernsey and Jersey have extensive marina facilities, with berths and moorings for a large number of leisure yachts. Guernsey Harbours Code of Practice requests that holding tanks not be emptied in the marinas or harbours and that use of onboard toilets be avoided in the marina and mooring areas. There do not appear to be pump out facilities at Guernsey. Jersey offers bunkering operations, including the transfer of waste liquids such as sewage. Bellozanne STW has facilities for receiving tankered sewage waste. The web page for Jersey Marinas (www.ports.je/jerseymarinas/boatowners/) lists a pump out station amongst its facilities, but no further information was found on location, usage or charges.

There are further marina and port facilities along the Normandy coast, which will account for a portion of the traffic through the Channel Islands area. Fishing vessels will be present in or transiting through the area year-round.

Discharges from boats may be carried in either fresh or seawater. Generally, marine sanitation devices on smaller vessels use seawater to carry wastes; effluents from these would have a similar density to seawater and therefore may mix more readily than septic wastes carried in freshwater, which would be buoyant compared to seawater and would tend to remain at or near the surface until mixing could occur.

Overall, boats and yachts can be presumed to contribute diffuse faecal contamination within the offshore fisheries area. Impacts are likely to be highest from March to October when both commercial and recreational vessels and yachts are present and the ferries are more frequent. Although vessel discharge regulations are in force, it is not known how closely these are adhered to and some untreated sewage discharges from vessels could reasonably be anticipated to occur virtually anywhere within the fisheries zones.

4.1.2 Agricultural impacts

Information on agricultural activity on Jersey was obtained from the Jersey government website (Agriculture and fisheries statistics (gov.je)) and is summarised in Table 4.2. In 2018 (the most recent year for which data were available), agricultural land covered approximately 5,895 hectares or 51% of Jersey's land area. Principal agricultural production is of both indoor and outdoor fruits and vegetables including potatoes, tomatoes and berries. There is a significant dairy industry as well as other livestock production amounting to a total of 30,610 livestock animals on the island in 2018.

Table 4.2 Jersey livestock production figures by species for 2017 and 2018

Livestock	2017	2018	Trend
Cattle	4840	4430	↓
Pigs	390	200	↓
Poultry	28,560	24,490	↓
Sheep	910	630	↓
Goats	40	100	↑
Equines	810	760	↓
Total	35,560	30,610	↓

Source: Agricultural statistics report, Department of the Environment

Less information was available regarding agricultural land use and livestock production on Guernsey. Dairy production was reported to account for 19.8% of the island's land area in 2018, with the number of cattle (dairy and other) reported at 2,700 animals (States of Guernsey, 2019). No figures were reported for other livestock animals. Dairy cattle would be expected to generate parlour and housing wastes that would typically be held in slurry stores prior to spreading on arable crops, though no information was found regarding this activity.

Most of the land adjacent to the Normandy coast is in agricultural production, with largely discontinuous urban development along the coast and inland of the coastal strip.

4.1.3 Wildlife impacts

The only potential wildlife sources of direct faecal contamination within the shellfishery are marine mammals and seabirds that either reside in or transit the area. Information on distribution of common marine mammals species near Jersey was sought via the Marine Life Information Network (MarLIN) via their portal at https://www.marlin.ac.uk/species. The species observed are listed in Table 4.3. These animals travel widely and are likely to be present in or passing through the fishery area, though the frequency and duration of time spent in these areas is not known.

Both grey and harbour seals haul out on beaches along the French coast to moult and breed. The nearest haulout areas are in the southeastern corner of Baie du Mont-Saint-Michel. Telemetry and survey records presented in Vincent et al (2017) suggest that seal densities in and around the Channel Islands are low, although grey seals may transit these areas to forage.

Table 4.3 Marine mammal species recorded in the vicinity of Jersey

Species	Common name	Species	Common name
Delphinus delphis	Common dolphin	*Globicephala melas*	Long-finned pilot whale
Tursiops truncatus	Bottle-nosed dolphin	*Lagenophynchus albirostris*	White-beaked dolphin
Phocoena phocoena	Harbour porpoise	*Phoca vitulina*	Harbour seal
Grampus griseus	Risso's dolphin	*Halichoerus grypus*	Grey seal

The small amount of available information suggests that while marine mammals are present in the area, their contribution to faecal contamination in these waters is likely to be highly diffuse and difficult to predict in terms of timing and seasonality.

4.1.4 Other

Potential sources of radionuclide contamination to the seas and shellfish around Jersey include a nuclear power plant and a nuclear waste processing facility located along the west side of the Cotentin peninsula, northeast of Les Ecrehous, as well as from a historical radiological waste disposal site in Hurd Deep. Sand, seawater and marine biota (algae, crustaceans, and molluscs) from the Channel Islands are monitored annually and results are published in the Radioactivity in Food and the Environment (RIFE) report. The most recent report (RIFE-26) identified that "…activity concentrations in fish and shellfish were low and similar to those in previous years."

4.2 Transport pathways

The main transport pathways involved in carrying faecal contamination to the offshore fishery areas will be hydrodynamic transport on tidal currents. Rivers and other

watercourses will transport land-based contaminants and sewage discharges to sea at the coastline, from where it will be diluted and carried around the marine environment.

4.2.1 Rivers and streams

The islands themselves have no significant rivers or watercourses discharging to the sea. Areas of land drainage are likely after significant rainfall. These will carry contamination from agricultural sources and well as potentially carrying human sewage from misconnections or intermittent sewage overflows.

The largest watercourses discharging to the marine environment around the Channel Islands are located along the French coast. These are shown on Figure 3.1. All of these will carry diffuse pollution from agriculture as well as sewage from settlements along their catchments. Data from sanitary survey reports produced for two French production areas (Blainville-Gouville and Bretteville-sur-Ay) suggest that some of the watercourses in these areas carry significant faecal contamination to the coastal zone. These may contribute to background levels of contamination within the Jersey scallop fishery areas.

4.2.2 Direct discharges to the offshore fishery areas

As noted in Section 4.1.1, ships, boats, and yachts may carry and discharge sewage effluent directly to the waters of the shellfishery. The large number of harbours and ports in the Channel Islands and along the adjacent coasts of France indicate significant boat traffic in and around the fishery waters.

The impact to scallops at the seabed would likely be relatively minor and dependent on settlement of particulate matter to the seabed. Any impacts would be most likely around shipping and cruising routes beyond 3 nm from shore and would be higher from roughly April to October, when there is more ferry and cruising activity.

Septic wastes carried in seawater would tend to mix more readily in the marine environment as they would be more similar in density than septic wastes carried in a freshwater system. Where septic wastes are carried in freshwater, discharges would be less dense than the surrounding seawater and would be remain near the surface until mixing by mechanical forces, such as waves or propeller wash.

4.3 Circulation of pollutants

Tidal flow around the Channel Islands is complex. The area between Mont St. Michel and Jersey has some of the largest tidal ranges in the world (12-15 m) and therefore has significant potential for transport and dilution of contaminants. Connectivity analysis undertaken of the dispersion of edible crab larvae in the English Channel (Silva *et al,* 2021) showed no connectivity between the Jersey fishery region and any other channel

regions. Residual current data also suggests a circular area of flow around Jersey that may restrict interchange with waters along the French coast (Salomon & Breton, 1993).

Particle tracks developed in the Mars model were cited in both the Brettville-sur-Ay and Blainville-Gouville sanitary survey reports (Ifremer, 2013 and 2014). These show predicted residual particle paths tracking relatively close to the French coast over several tidal cycles with the exception of particles tracked from the coast off Denneville (approximately 17 km NNE of les Ecrehous), which were predicted to move northwestward away from the coast. It is presumed that these will be lower density surface plumes and not necessarily representative of particle movement at the depths where scallops are found. Due to the distances and extent of dilution involved, these sources are not expected to significantly impact on the bacteriological quality of scallops within the Jersey fishery area.

The report also identified a hydrological boundary at Pointe du Roc, where tidal movement splits between the Bay of Mont St. Michel to the south and the west coast of the Contentin peninsula to the north. This suggests that sources arising along the French coast south of the Jersey scallop fishery may be less likely to impact water quality there.

4.4 Microbiological monitoring history

Scallops have not historically been classified in this area. Sampling was initiated at the end of March 2021 at four areas identified as North, East, South, and West. A total of 28 samples were collected between March and November 2021. All samples were transported to Cefas Weymouth laboratory for analysis. Only those received within 48 hours of collection and not exceeding 10°C on arrival were tested. Samples were tested using a 5-tube, 3-dilution most probable number technique based on ISO 16649-3. Sample results are summarised in Table 4.4.

The results obtained from the limited monitoring undertaken thus far confirm very low levels of faecal contamination in scallops taken from the sampled locations. Most of the samples (79%) returned *E. coli* results below the lower limit of detection and there were no results greater than 45 *E. coli* MPN/100g.

Due to the large proportion of censored data (below LOD), it was not possible to undertake a statistical assessment of results based on substitution.

Sample location data, based on the mid-point of the dredge from which the sample was taken, was provided by States of Jersey. These were converted to decimal degrees in WGS84 and thematically mapped based on reported area (North, South, East or West). The sampled locations are shown in Figure 4.2.

Table 4.4 Scallop monitoring results by area

Date	North	East	South	West
13/04/2021	<18	<18	NS	NS
10/05/2021	<18	<18	<18	<18
14/06/2021	<18	<18	45	<18
27/06/2021	<18	20	20	20
19/07/2021	20	<18	<18	<18
17/08/2021	<18	18	<18	<18
14/09/2021	<18	<18	NS	NS
08/11/2021	<18	<18	<18	<18

NS = not sampled

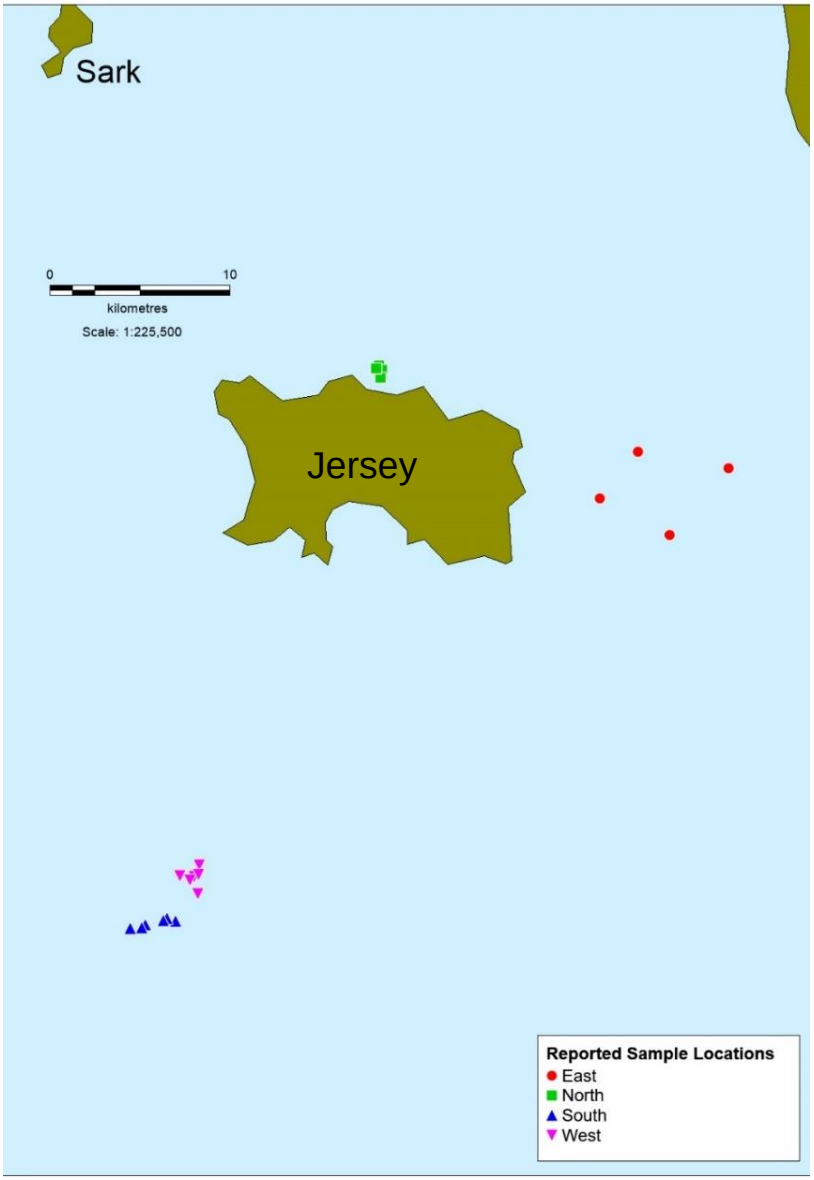

Figure 4.2 Jersey scallop sampling locations

All samples reported against the South and West areas were taken within a 3 km radius centred at 49.002074N -2.291145E, approximately 24 km SSW of St Helier.

Samples taken from the East area came were more scattered, with the most distant samples over 7 km apart, and between 4 and 12 km off the east coast of Jersey. Five of the samples were reported from the same location (49.20396N 1.965352W).

A similar situation applies to the samples reported against the North area, where five samples were reported to have come from 49.268637N 2.135238W and the rest from within 600 m of this location. These sample locations were all within 1.5 km of the north shore of Jersey.

In the cases of the samples identified as having come from the same location, these were for samples taken from 27/06/2021 to 08/11/2021. It is presumed that the June samples were likely to have been taken from these locations, but that subsequent samples were unlikely to have accurately reported locations.

The highest result, 45 *E. coli* MPN/100g, was collected from the South area. However, this result is still low and not indicative of significant faecal contamination.

Caution should be exercised in interpreting these data as they represent a small dataset and do not cover the period from December to March inclusive (experience in other areas has often shown that this period can return higher results due to higher incidence of rainfall-associated contamination).

4.5 Conclusions

The scallop fishery at Jersey is largely offshore and contaminating sources arising on the Jersey and nearby Sark, Herm and Guernsey, as well as those arising along the coast of France are sufficiently distant and diluted to ensure little impact on the microbiological quality of scallops harvested within the fishery zones. The waters around Jersey are subject to large tides and strong tidal flows that effectively dilute contaminants before they reach the offshore areas.

Faecal bacteria and other contaminants are concentrated in the viscera of the scallops, which is generally (though not always) discarded. The microbiological risk of consuming the adductor and roe is relatively low if the scallops are properly shucked and cleaned. None of the Jersey scallop samples analysed thus far have indicated any significant microbiological contamination and results have fallen well within the limits required for A classification.

Based on the reported sample locations attributed to the North area, scallops are being harvested closer to the island (and therefore to any sources of contamination arising there) than the managed fishery areas suggested. Samples for the North area were

collected within 1.5 km of the north shore of Jersey, however results from these showed no significant faecal contamination. If this is also happening along the south side of the island, then additional sampling should be undertaken there to ensure it is not significantly more contaminated than elsewhere in the fishery area.

There was some confusion regarding sampling location for some of the samples collected from the North and East areas. Accurate and true geographic location data is important for all monitoring samples to provide assurance and to ensure that any high results can be adequately investigated.

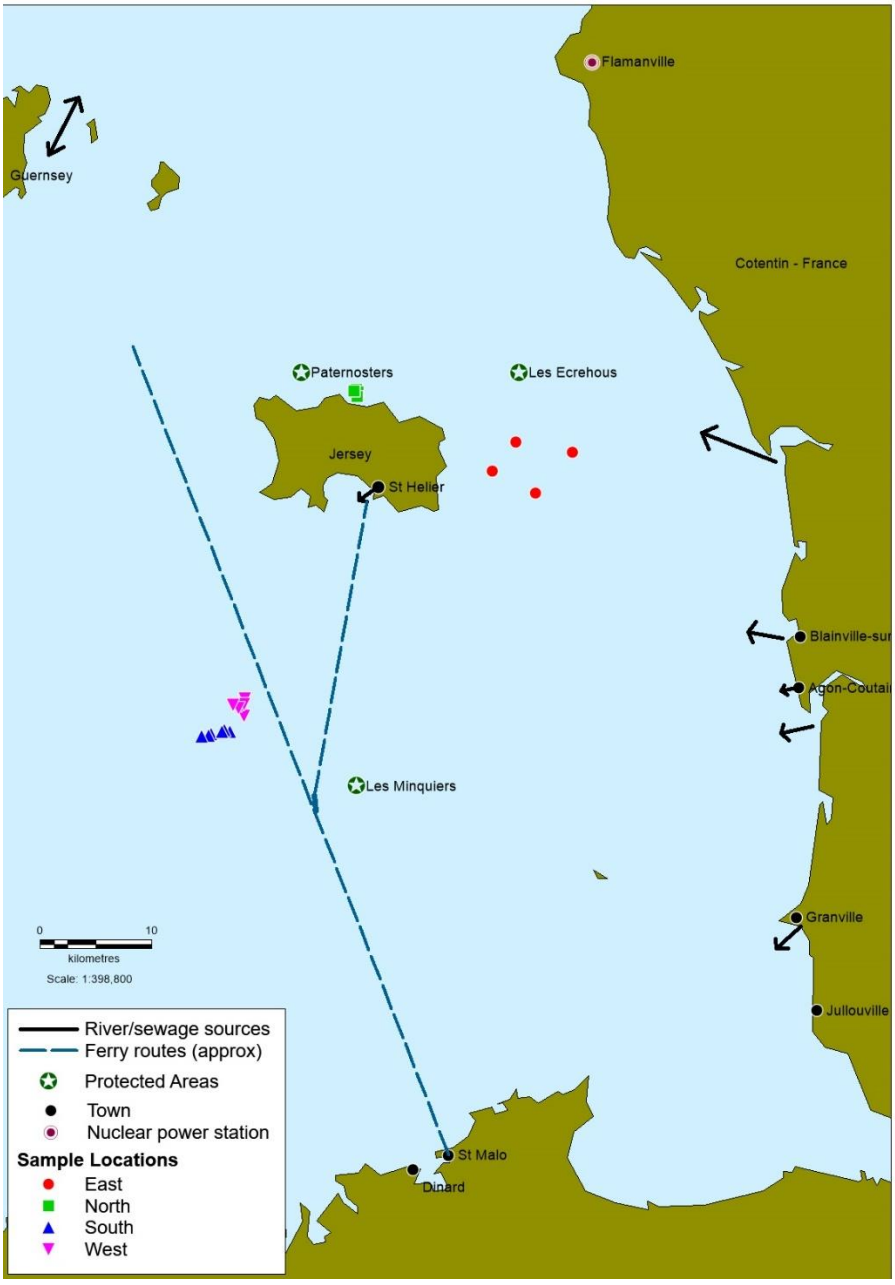

Figure 4.3 Pressures map showing significant sources and likely movement

5 Recommendations

None of the areas sampled appeared to be more contaminated than others. The offshore fishery zones are recommended to be classified together as a single scallop area, with routine monitoring samples to come from within what was identified as the Eastern Zone. Samples should be taken monthly until sufficient data has been obtained to assess any seasonal variation in results. The recommended RMP is 48.975725N -2.263010E with a sampling tolerance of 2 km. This should allow sufficient scope to provide routine monitoring samples on a monthly basis.

The recommended production area boundaries should be aligned with the offshore fisheries boundaries shown in Figure 3.2, excluding any parts of the scallop fishery that lie within 3 NM of shore.

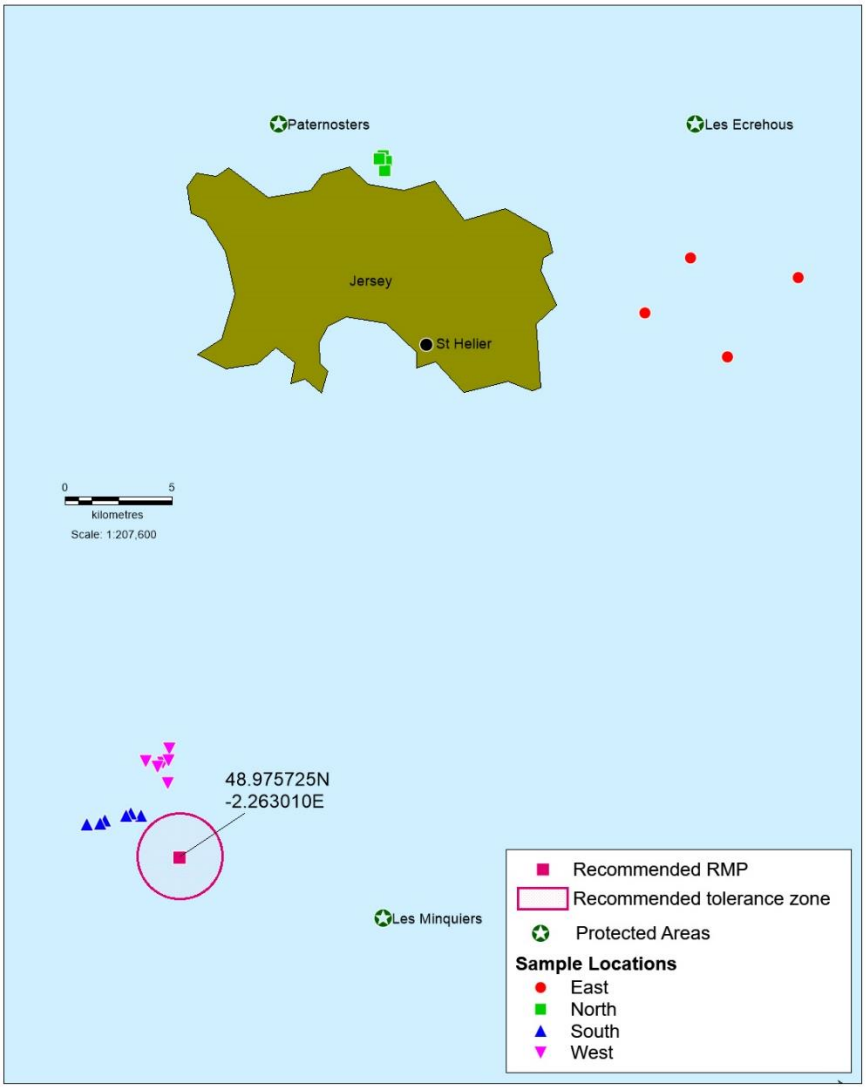

Figure 5.1 Recommendations for monitoring – Jersey scallops

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Appendix 1: Data Sources and Verification

The majority of data and information used in this report were obtained via internet searches. These included population census, agricultural census, and infrastructure reports from the island governments themselves.

Information on sewage discharges within the Channel Islands survey area was obtained from reports published by the island governments or by their engineering contractors. This information was not verified.

- Sanitary content of discharges not available
- Spill frequency and volume not available
- Locations of disposal/reuse of sewage sludge not available
- Treatment effectivity data not available

All georeferenced data were plotted on a map using MapInfo Professional 12.0 and visually checked for:

- All points plot within the expected catchment area and, if land-based, do not plot at sea.

Data on shellfish monitoring results are plotted to ensure that they fall within the expected production area.

Centre for Environment Fisheries & Aquaculture Science

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