Sanitary Survey - Review

Start Bay – 2024

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Document QA and Approval

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Consultation on draft report

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Environment Agency (EA)	July 2024

A sanitary survey relevant to the bivalve mollusc beds in Start Bay was undertaken in 2015 in accordance with Regulation (EC) 854/2004 (which was replaced by assimilated EU Law Regulation (EU) 2017/625, with sanitary survey requirements now specified in assimilated EU Law Regulation (EU) 2019/627). This provided appropriate hygiene classification zoning and monitoring plan based on the best available information with detailed supporting evidence. In line with regulatory and EU guidance the Food Standards Agency undertake targeted sanitary survey reviews to ensure public health protection measures continue to be appropriate. This report provides a review of information and recommendations for a revised sampling plan if required. Carcinus Ltd. (Carcinus) undertook this work on behalf of

the FSA. Carcinus Ltd accepts no liability for any costs, losses or liabilities arising from the reliance upon or use of the contents of this report other than by its client.

Dissemination

Food Standards Agency, South Hams District Council. The report is publicly available via the Carcinus Ltd. website.

Recommended Bibliographic Citation:

Carcinus Ltd., 2024. Review of the Start Bay 2015 Sanitary Survey. Carcinus report on behalf of the Food Standards Agency, to demonstrate compliance with the requirements for classification of bivalve mollusc production areas in England and Wales under assimilated EU Law Regulation (EU) 2019/627.

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1 Introduction

1.1 Background

The Food Standards Agency (FSA) is responsible for carrying out sanitary surveys in classified production and relay areas in accordance with Article 58 of assimilated (EU) Regulation 2019/627 and the EU Good Practice Guide (European Commission, 2021). In line with these requirements, sanitary surveys must be reviewed to ensure public health protection measures continue to be appropriate. Carcinus is contracted to undertake reviews on behalf of the FSA.

The report considers changes to bacterial contamination sources (primarily from faecal origin) and the associated loads of the faecal indicator organism *Escherichia coli* (*E. coli*) that may have taken place since the original sanitary survey was undertaken. It does not assess chemical contamination, or the risks associated with biotoxins. The assessment also determines the necessity and extent of a shoreline survey based on the outcome of the desktop report and identified risks. The desktop assessment is completed through analysis and interpretation of publicly available information, in addition to consultation with stakeholders.

1.2 Start Bay Review

This report reviews information and makes recommendations for a revised sampling plan for existing *Spisula solida* (Surf Clam – also referred to as Thick Trough shells) classification zones in Start Bay (Figure 1.1). This review explores any changes to the main microbiological contamination sources that have taken place since the original sanitary survey was conducted. Data for this review was gathered through a desk-based study and consultation with stakeholders.

An **initial consultation** with the Local Authority (LA), Inshore Fisheries and Conservation Authority (IFCA) and the Environment Agency (EA) responsible for the production area was undertaken in February 2024. Responses were received from the Environment Agency and the Local Authority. This supporting local intelligence is valuable to assist with the review and was incorporated in the assessment process.

Following production of a draft report, a wider **external second round of consultation** with responsible Local Enforcement Authorities (LEAs), Industry and other Local Action Group (LAG) members was undertaken in July 2024. It is recognised that dissemination and inclusion of a wider stakeholder group, including local industry, is essential to sense-check findings and strengthen available evidence. The draft report is reviewed taking into account the feedback received. Responses were received from the Environment Agency.

The review updates the assessment originally conducted in 2015 and sampling plan as necessary and the report should read in conjunction with the previous survey.

Specifically, this review considers:
(a) Changes to the shellfishery (if any);
(b) Changes in microbiological monitoring results;

(c) Changes in sources of pollution impacting the production area or new evidence relating to the actual or potential impact of sources;

(d) Changes in land use of the area; and

(e) Change in environmental conditions.

Sections 2- 6 detail the changes that have occurred to the shellfishery, environmental conditions and pollution sources within the catchment since the publication of the original sanitary survey. A summary of the changes is presented in section 7 and recommendations for an updated sampling plan are described in section 8 - 9.

1.3 Assumptions and limitations

This desktop assessment is subject to certain limitations and has been made based on several assumptions, namely:

- Accuracy of local intelligence provided by the Local Authorities and Environment Agency;
- The findings of this report are based on information and data sources up to and including March 2024;
- Only information that may impact on the microbial contamination was considered for this review; and
- Official Control monitoring data have been taken directly from the Cefas data hub[1], with no additional verification of the data undertaken. Results up to and including January 2024 have been used within this study. Any subsequent samples have not been included.

[1] Cefas shellfish bacteriological monitoring data hub. Available at: https://www.cefas.co.uk/data-and-publications/shellfish-classification-and-microbiological-monitoring/england-and-wales/.

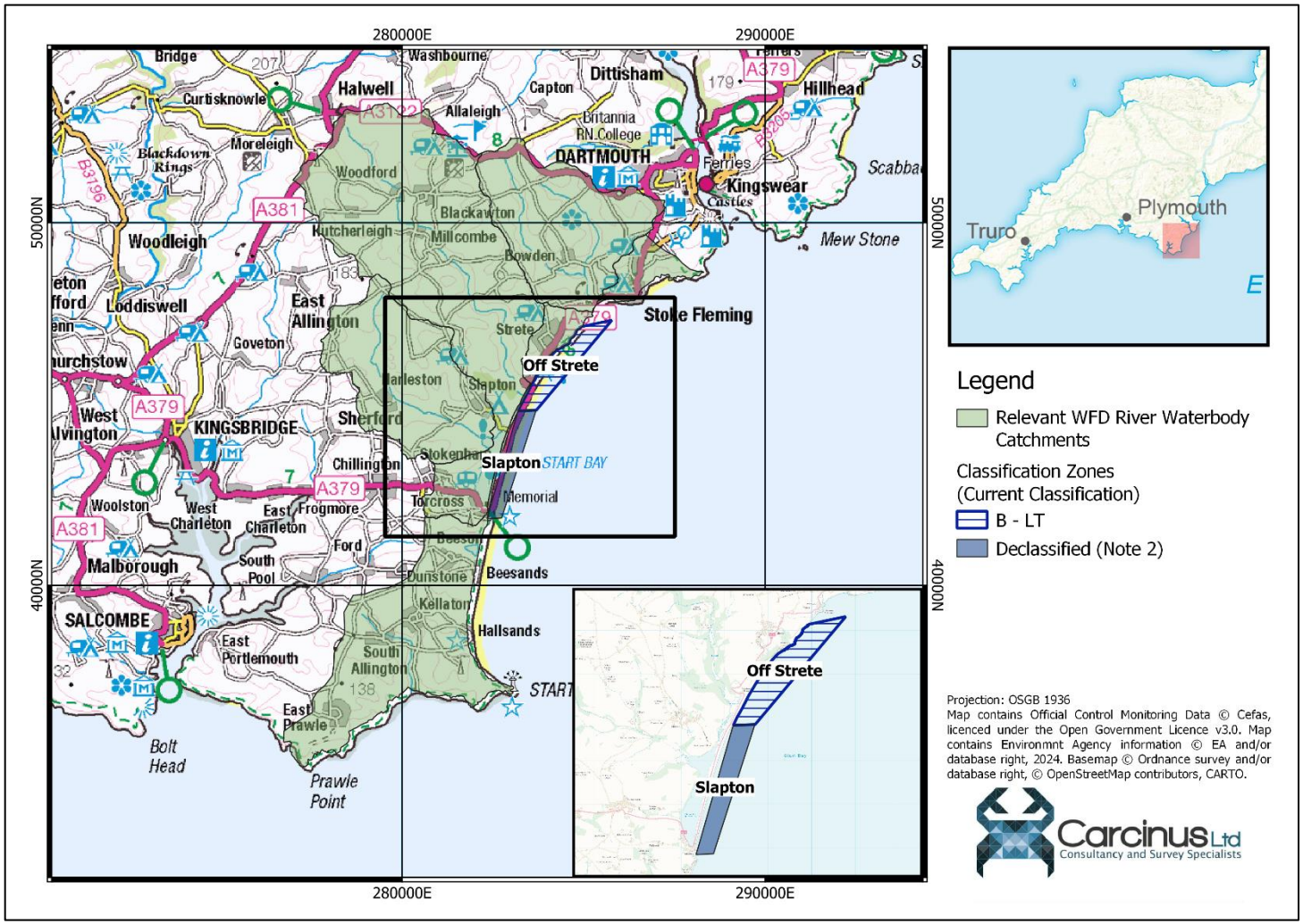

Figure 1.1 Location of the Start Bay BMPA in Devon, and the Water Framework Directive River Waterbody catchment relevant to this report. Black box highlights position of Classification Zones. Lower inset map shows the location of the Classification Zone within the BMPA. Upper inset map pink overlay shows location of BMPA in geographical context of the UK.

2 Shellfisheries

2.1 Description of Shellfishery

The Start Bay Bivalve Mollusc Production Area (BMPA) is situated on the Southwest coast of England, between Start Point and Combe Point, Devon. It is an east-facing embayment near the mouth of the Dart Estuary. The surf clam fishery is located on the coast close to Strete (Figure 1.1). The closest BMPA is that of the Dart Production Area (M028) approximately 7 km to the north.

The Local Enforcement Authority (LEA) for this fishery in terms of food hygiene official control purposes (including sampling) is South Hams District Council. At the time of the 2015 sanitary survey three zones were proposed for surf clams within Start Bay. The stocks were naturally occurring in a narrow subtidal strip off the shore in Start Bay. They were harvested by dredge by one operator on a part time, annual basis with rotation on harvesting areas over a four-year cycle. Currently, only one CZ is active in the BMPA. The harvester only takes clams four years or older from this site, and there is no closed season for the species.

The fishery is within the area regulated by Devon and Severn Inshore Fisheries and Conservation Authority (D&S IFCA). D&S IFCA byelaws area state a minimum size of 2.5 cm applies for surf clam harvest within the district[2]. The use of mobile demersal fishing gear was, and still is, prohibited in the southern half of Start Bay and around the mouth of the Dart estuary, which in-turn prevents fishing in the northern part of the Classification Zone (CZ) and expansion of the fishery in the southern direction. At the time of writing (April 2024), no consultation response had been received from D&S IFCA and the authors of this review have no information to suggest the situation above had changed. At secondary consultation, no response was received from the D&S IFCA. It is assumed the situation above has not changed.

A summary of the fishery for surf clams is provided in the subsequent paragraphs.

2.2 Classification History

2.2.1 Surf Clams

At the time of writing the 2015 sanitary survey, the fishery was active with harvesting by one harvester on a part-time, annual basis. The areas harvested were rotated over a four-year cycle. There were three Classification Zones: *Blackpool*, *Strete*, and *Slapton*. Currently, there is one active CZ (*Off-Strete*, or *Strete*) with one official control monitoring point (RMP) (Table 2.1). The *Blackpool* CZ received three B grade between 2013 – 2015 and was then declassified. The *Slapton* CZs was declassified in 2022.

The declassified *Slapton* CZ is currently monitored on a 3-monthly basis using the RMP Off Torcross (B087J). This RMP is 4.5 km to the south from the *Off Strete* CZ. Results from this

[2] https://www.devonandsevernifca.gov.uk/wp-content/uploads/2023/08/DSIFCAByelawBook-December2020.pdf

sampling have been included in the report since commercial interest in this CZ may resume and subsequent reclassification requested.

During initial consultations, the LEA stated the current commercial landings from the Start Bay production area is approximately 10 to 15 tonnes annually. There are currently no new areas in the Start Bay BMPA that require classification.

2.2.2 Other Species

The 2015 sanitary survey mentions no additional bivalve mollusc species for harvesting from Start Bay, and the authors of this study have not been made aware of any further applications or plans to harvest alternate species here.

Table 2.1 Summary of all Classification Zones and RMPs in the Start Bay BMPA.

Classification Zone	Species	Current RMP Classification (as of February 2024)	RMP
Off-Strete	Surf Clam	Long-term B	Off Strete (B087I)
Slapton (Declassified CZ)	Surf Clam	Temporarily declassified because the bed is not commercially active, and a reduced rate of monitoring has been agreed with the Local Authority.	Off Torcross (B087J)

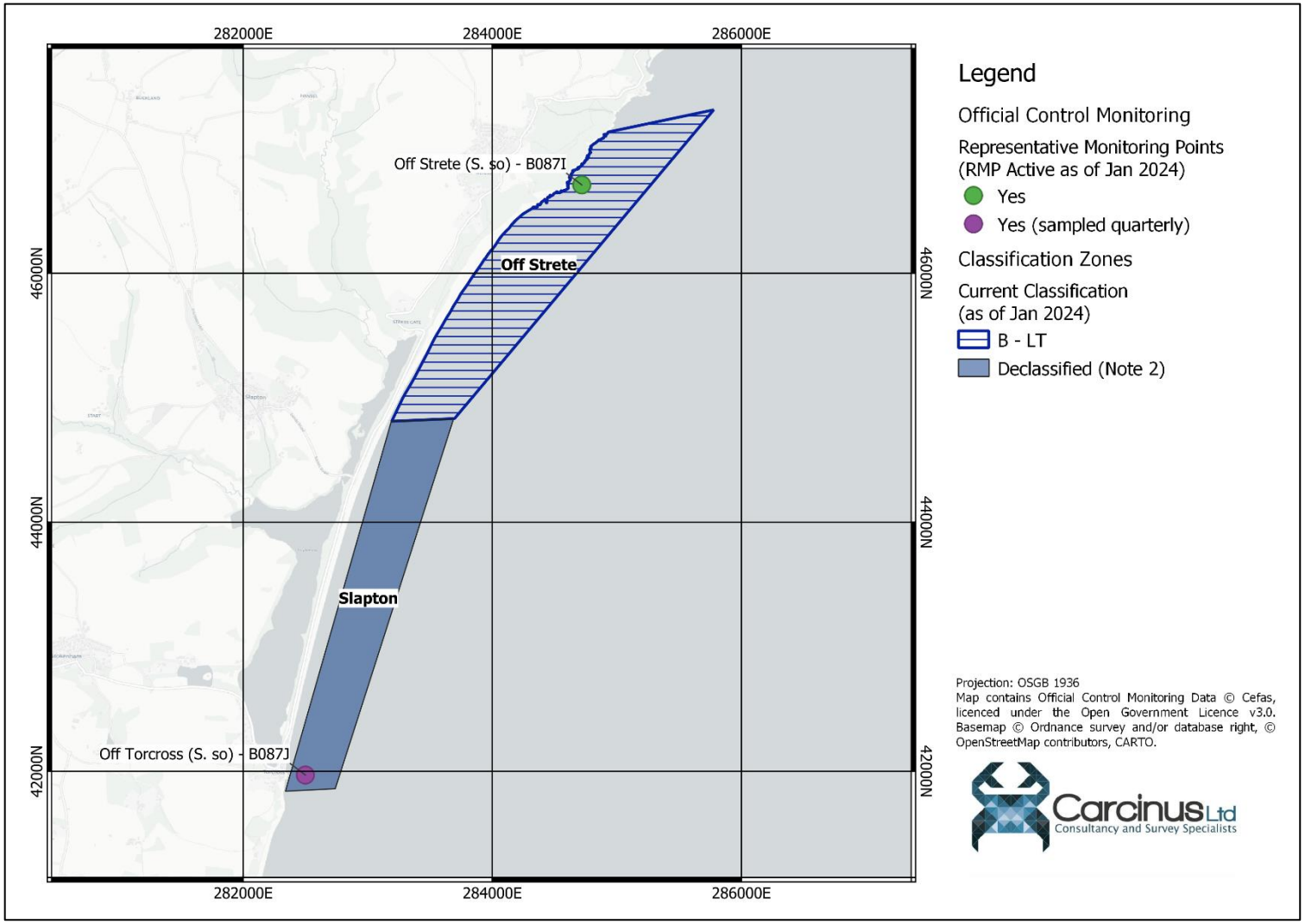

Figure 2.1 Current Classification Zones and associated Representative Monitoring Points in the Start Bay BMPA.

3 Pollution sources

3.1 Human Population

The 2015 Sanitary Survey cites population data based on the 2011 Census of the United Kingdom. A subsequent Census was conducted in March 2021 and so the results of the two censuses have been compared to give an indication of the changes in human population in the Start Bay catchment.

Figure 3.1 shows the human population density (persons per square kilometre) in Census Output Areas wholly or partially contained within the Start Bay catchment at the 2011 and 2021 Censuses. It shows that the population across the catchment has remained very rural, with the majority of the catchment having population densities of less than 100 people per square kilometre. The highest population densities are Dartmouth to the north, Strete (adjacent to the CZ) and Kingsbridge to the south-west of the CZ. The total population in the catchment at the time of the 2011 census was approximately 7,600, which rose to 8,209 in 2021 (an increase of 8%). The Shellfish Water Action Plan for Start Bay and Stoke Fleming classifies the overall contribution of various sources of contamination to the shellfish water and assesses that the impact of urban associated runoff is 'low'[3]. The highest potential for urban associated runoff comes from the towns of Kingsbridge and Dartmouth, and the villages of Strete and Slapton. Strete and Slapton are particularly close to the *Off-Strete* CZ (Strete is approximately 700 m from the northern end of the CZ and Slapton is approximately 1 km from the CZ boundary).

During initial consultations the LEA indicated that there has been some small-scale housing development in the catchment, but generally overall development has been limited. Between 2013 – 2023, three dwellings were completed in Strete and 19 in Slapton. As these settlements are very small, the overall level of urban runoff the shellfishery is likely to experience is also small in comparison to other sources of contamination, which are discussed later in this report. The number of dwellings completed in other Parishes in the catchment is also of significance. Between 2013 – 2023, a total of 75 dwellings were completed in Blackawton (to the north west of the CZ), 27 in Halwell & Moreleigh (to the north west of Blackawton), and 29 in Stokenham (to the west of the BMPA, behind Slapton Ley). These settlements are not adjacent to the BMPA, and therefore any potential contamination associated with urban runoff is likely to experience bacteriological die-off before reaching the Classification Zones.

[3] 'Low contribution': considered to account for less than 10% of total contamination to a shellfish water.

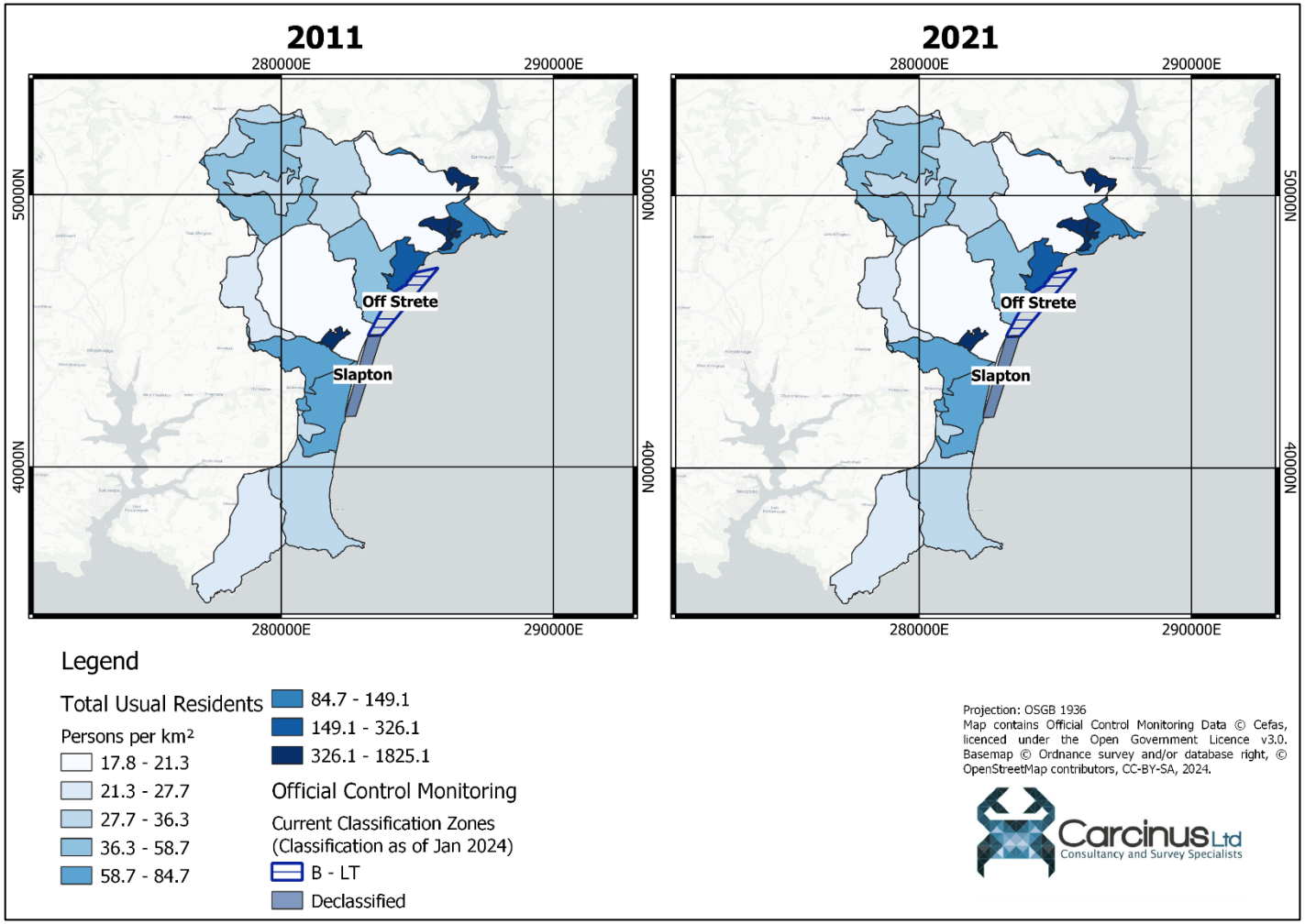

Figure 3.1 Human population density (persons per square kilometre) in Census Output Areas wholly or partially contained within the Start Bay catchment at the 2011 and 2021 Censuses.

The 2015 Sanitary Survey notes tourism as important to the local economy. The population in the catchment was said to increase significantly during the summer which is reflected by an increased sewage output, particularly within the village of Slapton where the population is reported to treble during the peak summer holiday period (June-September). 2014 data cited from the Slapton Sands Beach Management Plan showed 288,000 visitors per year (Slapton Line Partnership, 2017), leading to increased loading to the wastewater treatment network. During initial consultations, the LEA stated that they had no concerns over the adequacy of the network to handle the seasonal increase as no increase in spills was noted. The EA shared concerns over water company assets in the catchment (discussed in the next section) which have all been deemed below required treatment standards, particularly when tourism increases in the summer months. Upgrades are due in the next AMP round (AMP 8 2025-2030) (Table 3.1). Specific improvements will be confirmed in the last quarter of 2024.

Analysis of Census data shows that there has been an 8% increase in populations between 2011 and 2021, but that the majority of the catchment is rural with population densities of less than 100 people per square kilometre. The main urban centres have not changed significantly since the 2015 Sanitary Survey was published, and the area continues to be a popular tourist destination, particularly in the summer months. Overall, the recommendations made in the 2015 Sanitary Survey to account for the impact of human populations remains valid i.e. limited impact from surface runoff although loadings to wastewater treatment network may increase in the summer months.

3.2 Sewage

Details of all consented discharges in the vicinity of the Start Bay BMPA were taken from the most recent update to the Environment Agency's national permit database at the time of writing (February 2024 Update). The locations of these discharges within the catchment and near the Classification Zones are shown in Figure 3.2.

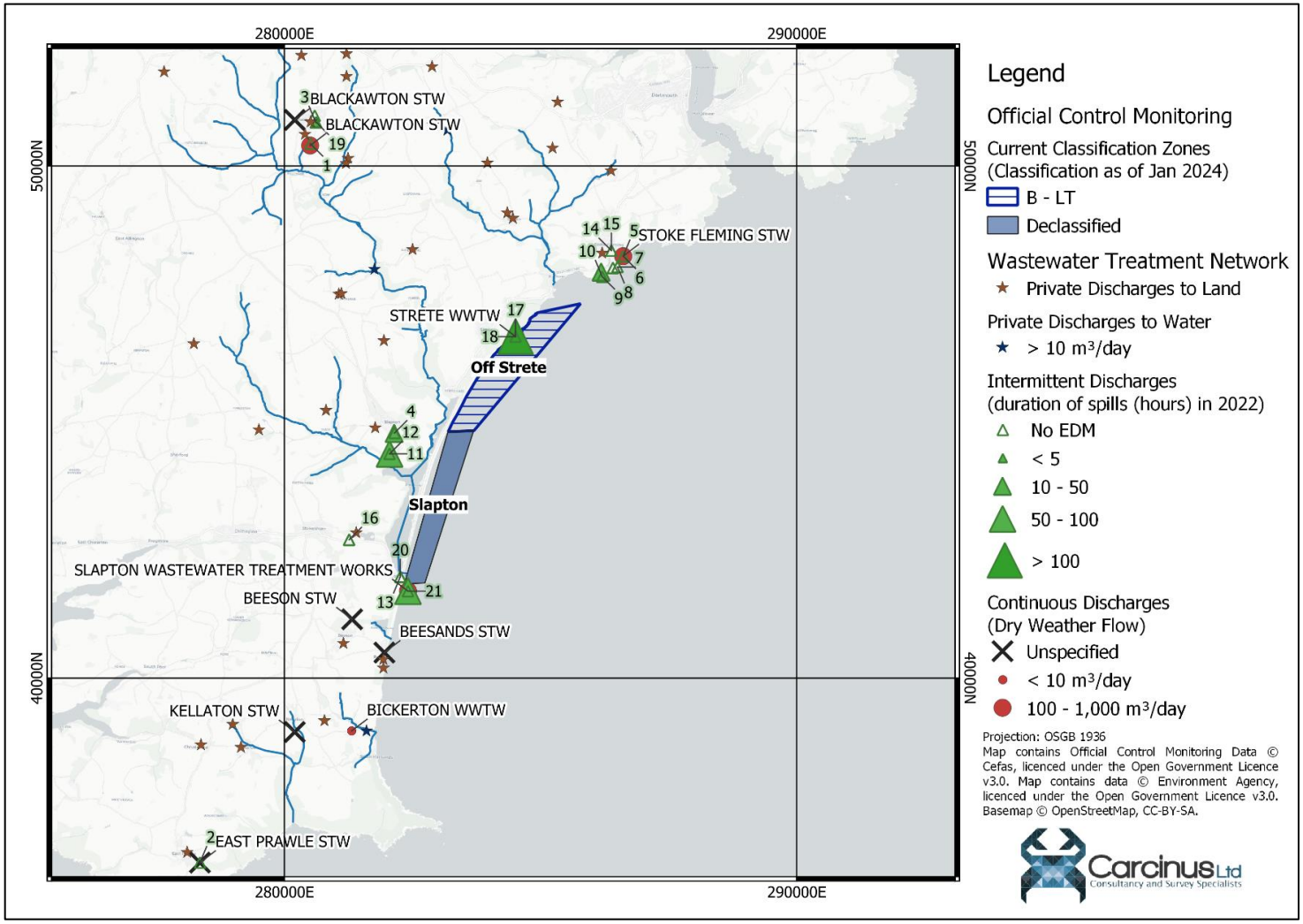

Figure 3.2 Location of all consented discharges in the Start Bay Catchment. Details of continuous discharges are shown in Table 3.3.

The 2015 Sanitary Survey identified 8 continuous water company discharges within the survey area. This review has identified 10 (Table 3.3). The Silver Cloud septic tank is no longer listed, and East Prawle STW, Kellaton STW, and an additional STW at Blackawton are newly identified. The three continuous discharges likely to be of most significance to the BMPA remain the same as in the 2015 Sanitary Survey; Slapton STW, Strete STW, and Stoke Fleming STW. The Slapton STW treatment methodology (secondary treatment) and consented Dry Weather Flow (DWF) of 777 m^3/day noted in the 2015 survey remains unchanged. This STW is 4.8 km from the *Off Strete* CZ, and <100 m south from the Off Torcross RMP (B087J) in the declassified *Slapton* CZ. Strete STW was identified as a smaller secondary works with a DWF of 122 m^3/day discharging to the lower intertidal at the northern end of the fishery, 600 m from the *Off Strete* CZ. This discharge and its DWF also remain unchanged. The final discharge of significance to the BMPA is Stoke Fleming STW. This was identified in the 2015 survey to provide primary treatment and discharge to a small watercourse about 2 km northeast of the BMPA around the mouth of the Dart estuary. It had a consented DWF of 260 m^3/day, which has since increased to 280 m^3/day. This discharge now also undergoes biological filtration, showing an upgrade to the treatment employed. The remaining discharges identified are more than 5 km from the *Off Strete* CZ, and so any potential contamination from these sources is likely to experience significant dilution/die-off before reaching the CZs, particularly given the coastal location of the BMPA.

In addition to the continuous discharges within the catchment, the 2015 Sanitary Survey identified 13 intermittent discharges with the potential to impact the bacteriological health of the BMPA. Intermittent discharges comprise Combined Storm Overflows (CSOs), Storm Tank Overflows (STOs), Pumping Station Emergency Overflows (PSs), and Sewer Pumping Stations (SPSs). This review has identified 21 intermittent discharges, and a summary of the information available for these discharges in the vicinity of the Start Bay BMPA is presented in Appendix I (Environment Agency, 2023). Several of the discharges have EDM capability fitted, with some further information provided during initial consultation by the EA (discussed in the next paragraphs). The intermittent discharges closest to the BMPA have been labelled in alphabetical order on Figure 3.2, which can be cross-referenced to the table in Appendix I.

The closest intermittent discharge to the *Off Strete* CZ is Strete WwTW, approximately 60 m from the CZ boundary off the coast of Strete village. This discharge spilled for 195 hrs in 2022. The closest discharge to the declassified *Slapton* CZ is Slapton WwTW. At initial consultation the EA stated this discharge has a DWF of 777 m^3/day and undergoes secondary treatment. The WwTW is <1.5 km from the CZ boundary and discharges directly into the shellfish water.

Spill data was available for the intermittent storm discharge at Torcross PS. This discharge has a DWF of 494 m^3/day and is 1.5 km from the declassified Slapton CZ boundary. The previous 2015 sanitary survey identified this discharge to be made via the Slapton STW outfall. At initial consultation, the EA shared that this asset spilled for 2,251 hours in 2020, 896 hours in 2021, and 87 hours in 2022. It was impacted in winter 2020/21 by a blockage of

the Slapton Ley discharge tunnel with shingle. This caused water levels to increase and put pressure onto the surrounding sewage network leading to prolonged and significant infiltration. An uncontrolled and prolonged discharge to Start Bay via the Torcross PS was experienced. This continues to be a risk governed by tides/weather/tunnel maintenance. Upgrades have been made to the Torcross PS to limit this incident in the future. Further information was requested on these upgrades at secondary consultation. The EA stated that during the above incident in 2020/2021, it was identified that the Torcross PS pumps were unable to meet the required flow in the permit. Southwest Water then upgraded the pumps, and a flow metre was installed. The EA believes these are now VSD (Variable Speed Drive) pumps, and 'various panel upgrades' were completed too. In addition, the EA advised Southwest Water has become an active stakeholder in the Slapton Line Partnership[4] since this incident. The EA stated the Field Studies Council is responsible for all Ley Maintenance, and Southwest Water do not own the tunnel where the incident occurred. Following these blockages, improvements were also made in the form of new silt trap and trash screens on the Ley outflow.

Other intermittent discharges that should be noted within 3 km of the BMPA are Kimberley Nurseries CSO (no treatment, flows to stream in catchment), Stokenham Caravan Park CSO (no treatment, flows to Slapton Ley), Overseas Estate West PS (undergoes Screening, flows to English Channel north of BMPA), Overseas Estate East PS (no treatment required due to design, flows to English Channel north of BMPA), and Stoke Fleming PS (no treatment required due to design, flows to Leonard Cove Stream). Further examination of the hydrodynamics of the BMPA (Section 4) suggests the open coastal location and large tidal amplitude in this area will enable strong water mixing and therefore dilution of bacteriological contamination before it reaches the BMPA.

The remaining intermittent discharges shown in Figure 3.2 and Appendix I are more than 3 km from the CZ, and so are likely to experience dilution and die-off due to distance before reaching the shellfish waters. No spill data was available in the previous 2015 sanitary survey, but the position of intermittent discharges within or near to CZs should be taken into consideration in any updated sampling plan.

At initial consultation, the EA were able to share elements of their Water Company Asset Improvement Scheme. All water company assets in the catchment have been deemed to be below the required treatment standards and will require upgrades. Some are planned in AMP 8 (2025-2030) and can be seen in Table 3.1.

Table 3.1 Water Company Asset Improvement Scheme data. Source: Environment Agency.

AMP	Asset	Improvements
6 (2015 – 2020)	Strete STW, Blackawton STW, Shady Lane SPS	EDM installed

[4] "The **Slapton Line Partnership** was formed in 2001 to promote a coordinated policy for managing coastal change in the area" - https://www.slaptonline.org/

AMP	Asset	Improvements
	Slapton STW	EDM spill monitoring installed, Pass Forward Flow (PFF) monitoring fitted
7 (2020 – 2025)	Blackawton STW	Storm Storage increased, EDM installed on storm overflow
	Start Bay Shellfish Water (SFW)	Investigations modelling bacterial loading and distribution
	Stoke Fleming STW, Shady Lane PS, Leonards Cove PS, Overseas Estate East PS, Overseas Estate West PS	Investigations for performance and EDM installed on overflows
	Torcross PS, Slapton STW (and sea outfall)	Intensive and daily sampling of influent and effluent for *E.coli* to inform site optimisation. EDM fitted to all Storm Overflows.
	Strete STW	EDM fitted to storm overflow
	The Anchorage CSO, Kimberley Nurseries CSO, Stokenham Caravan Park CSO, Blackawton STW SO	Investigations focussing on impacts to SFW
8 (2025 – 2030)		Expect to see improvements to match environment act drivers and SOAF (Storm Overflow Assessment Framework) reductions.

Table 3.2 was also provided during initial consultation and shows a reduction in the number of hours the relevant overflows spilled into Start Bay between 2019 and 2022. This suggests that the improvements that have already been undertaken are effective, and the further improvements planned in Table 3.1 should provide additional reductions in overflows of this nature.

Table 3.2 Spill data into Start Bay from 2019 - 2023. Source: Environment Agency. X indicates no spill data.

Year	Storm Overflow	Emergency Overflow	Combined Storm Overflow
2019	180	3	1323
2020	540	2	2251
2021	298	0	895
2022	50	1	86

Year	Storm Overflow	Emergency Overflow	Combined Storm Overflow
2023	X	X	1

In addition to the water company owned infrastructure, there continues to be many privately owned discharges throughout the catchment. Some houses in the catchment are connected to septic tanks that discharge directly to groundwater or soakaway, rather than the main sewerage network. Limited details of these private discharges can be provided due to data protection requirements, and it is possible that there are some non-consented septic tanks present throughout the area. The EA advised during secondary consultation that it was unable to comment on the general state of septic tank discharges in the area due to funding constraints against competing priorities. Where septic tank failures are identified, advice is provided to owners/operators to ensure adherence to the general binding rules and manufacturers instructions regarding maintenance/upkeep and desludging. Under general binding rules a septic tank does not require a permit if it is discharging under 2 m^3/ day. The 2015 sanitary survey notes that the majority of private discharges are small and only serving one or two properties. The majority all discharged to soakaway, which remains the case, and they should therefore be of little impact to the BMPA if they are functioning correctly. At secondary consultation the EA stated drainage fields can fail over time; however they do not tend to investigate these low priority, minor impact discharges due to a lack of resourcing. There are two private discharges to water with volumes > 10 m^3/day. One discharges to the Blackpool Brook which flows into the north of the shellfishery. The discharge is 4.8 km upstream from the *Off Strete* CZ. The second private discharge with a spill volume > 10 m^3/day discharges to The Gara and is 3.3 km from the *Off Strete* CZ. Both are likely to be of little influence regarding contamination in the CZ given the distance available for dilution and relatively small discharge volume. There are no miscellaneous trade discharges in the catchment.

In the Shellfish Water Action Plan for 2022, water company assets are a 'medium'[5] point source contributor of contamination to the shellfish water. The EA have shared recent upgrades/ improvements within the area (Table 3.1), and those that are planned for the future which could potentially reduce this level to 'low' should the Action Plan be reassessed. The presence of intermittent discharges and privately owned discharges near Classification Zones should continue to be taken into consideration in any updated sampling plan.

[5] Medium contribution (10% to 39%)

Table 3.3 Details of continuous discharges within the vicinity of the Start Bay BMPA.

Discharge Name	Permit Number	Receiving Water	Outlet NGR	Treatment Methodology	DWF (m^3/day)[6]	Distance (km) from centre of *Off Strete* CZ
BEESANDS STW	NRA-SW-7664	KINGSBRIDGE ESTUARY	SX8195040500	UNSPECIFIED	Unspecified	6.11
BEESON STW	SWWA 500	BEESON STREAM	SX8132041150	BIOLOGICAL FILTRATION	Unspecified	5.85
BICKERTON WWTW	NPSWQD006348	GROUNDWATER VIA INFILT SYSTEM	SX8131038970	SEPTIC TANK	4.6	7.77
BLACKAWTON STW	NRA-SW-7665	UNNAMED STREAM(S)	SX8020050900	BIOLOGICAL FILTRATION	Unspecified	5.89
BLACKAWTON STW	SWWA 1138	BLACKAWTON STREAM	SX8050050400	BIOLOGICAL FILTRATION	104	6.47
EAST PRAWLE STW	SWWA 448	EAST PRAWLE STREAM	SX7835036400	BIOLOGICAL FILTRATION	Unspecified	11.45
KELLATON STW	SWWA 510	LANNACOMBE STREAM	SX8020038950	UNSPECIFIED	Unspecified	8.30
SLAPTON WASTEWATER TREATMENT WORKS	203034	START BAY/SLAPTON LEY	SX8241041700	BIOLOGICAL FILTRATION	777	4.83
STOKE FLEMING STW	203364	TRIB OF LEONARDS COVE STREAM	SX8661048240	BIOLOGICAL FILTRATION	280	3.04

[6] 'Unspecified' – confirmed at secondary consultation by the EA as descriptive works (serving a population < 250 people) and would therefore have a different set up at each site. Due to them being descriptive works, they also will not have any DWF conditions on the permits.

Discharge Name	Permit Number	Receiving Water	Outlet NGR	Treatment Methodology	DWF (m^3/day)[6]	Distance (km) from centre of *Off Strete* CZ
STRETE WWTW	203410	START BAY, ENGLISH CHANNEL	SX8451046670	BIOLOGICAL FILTRATION	122	0.61

3.3 Agricultural Sources

The 2015 Sanitary Survey cites livestock data for the catchment in 2013 based on the Livestock Census of the same year. To provide an indication of changes in the livestock population of the catchment, a data request was made to the Farming Statistics Office for the Department of Environment, Food and Rural Affairs (DEFRA) for livestock populations within the WFD catchment presented in Figure 1.1 for 2015 and 2022 based on the June Survey of Agriculture and Horticulture[7]. The data could not be broken down into the various sub catchments to prevent disclosure of information about individual holdings. Figure 3.3 presents the changes in livestock populations within the Start Bay catchment.

The data presented in Figure 3.3 shows that in 2015 there was an overall larger population of livestock when all groups are combined. 8,312 cattle in 2015 decreased to 6,605 in 2022 (21% decline), 188 pigs in 2015 rose to 220 in 2022 (17% increase), 16,031 sheep in 2015 decreased to 14,037 in 2022 (12.5 % decline), and 13,444 poultry in 2015 decreased to 11,106 in 2022 (17.5 % decline). Whilst a decline in livestock may result in less faecal matter deposits on land, and therefore lower contamination levels in runoff to the shellfishery, it should be noted that the June Survey of Agriculture and Horticulture presents a snapshot of population sizes at one point in a year. Actual numbers will vary throughout the year; highest numbers of animals will occur in spring, following the birthing season, and the lowest in autumn and winter when animals are sent to market. Therefore, the potential levels of contamination from this source are hard to capture due to the temporal variation.

The principal route of contamination of coastal waters by livestock is surface runoff carrying faecal matter. The land cover of the Start Bay catchment in 2012 and 2018 is shown in Figure 3.4. The map shows that the majority of the catchment is rural and dominated by arable farmland and pasture. There are also small areas of forest with four discontinuous urban fabric zones. The land cover between 2012 and 2018 is very similar, and so there is unlikely to be any changes in the levels of both urban and agricultural runoff since the previous sanitary survey. Pasture areas adjacent to shorelines represent the greatest contamination risk to the classification zones. This is due to run-off from the land travelling less distance before reaching the CZs, resulting in less dilution and *E. coli* die-off. Run-off from rivers further up the catchment will have a lower risk of contamination to the CZs, because the increased distance will result in further dilution and *E. coli* die-off. These may, however, contribute to background levels of contamination in the CZs, particularly following significant rainfall events. No further information regarding pasture/grazing areas close to the CZs was gained during secondary consultation, therefore the authors of this review adopt a precautionary approach and assume that areas close to the BMPA are grazed, resulting in a high risk of agricultural runoff. The potential for contamination to reach the CZs from this source should be considered in any updated sampling plan.

[7] https://www.gov.uk/guidance/structure-of-the-agricultural-industry-survey-notes-and-guidance#june-survey-of-agriculture-and-horticulture-in-england

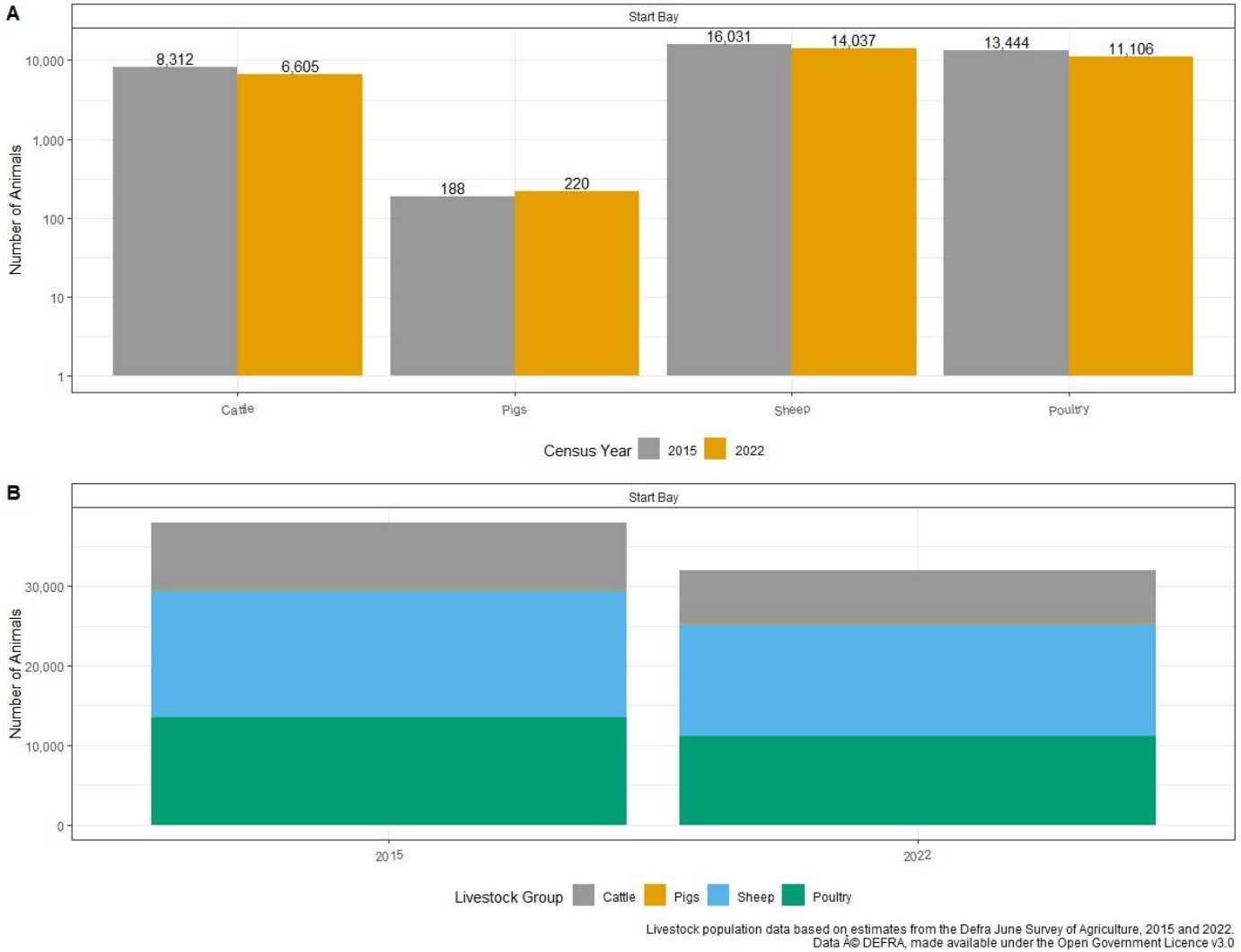

Figure 3.3 Changes in livestock populations in the Start Bay catchment between 2015 and 2022.

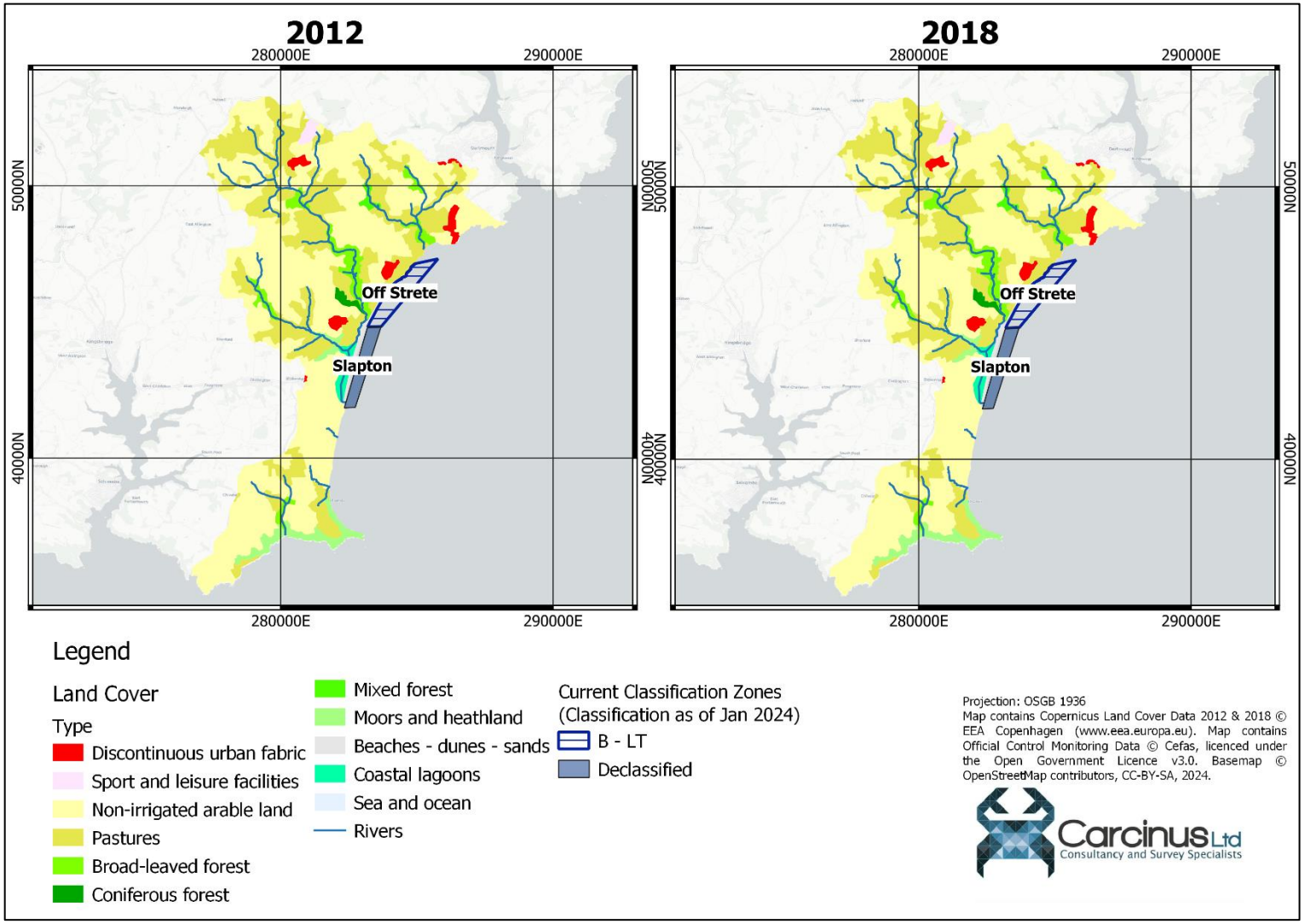

Figure 3.4 Land cover in the Start Bay catchment in 2012 and 2018.

Arable farmland can also represent a risk to the bacteriological health of a shellfishery, particularly where slurry is applied to fields. The spreading of slurry to fields is controlled under the Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018, known as the Farming Rules for Water, which came into force in April 2018[8]. This legislation lays out a set of rules that require good farming practice, so that farmers manage their land both to avoid water pollution and benefit their business. Rules include requiring farmers to judge when it is best to apply fertilisers, where to store manures, and how to avoid pollution from soil erosion. Furthermore, silage and slurry storage for agricultural purposes is subject to The Water Resources (Silage, Slurry and Agricultural Fuel Oil) (England) Regulations 2010 (SSAFO)[9]. All farmers must comply with the SSAFO regulations when building new slurry stores, or substantially altering (e.g., enlarging) existing ones. All stores must be built at least 10 m from any watercourse, including field drains or ditches, and be built or altered to last for at least 20 years with proper maintenance. At initial consultation, the EA stated there is no agricultural officer for this area. However, all farms should be compliant with Farming Rules for Water. There are currently no planned inspections in the area, and EA officers only respond when incidents are reported. At secondary consultation, the EA confirmed that the Farming Rules for Water (FRfW) came into force in 2018, three years after the 2015 Sanitary Survey. There have been 11 farm inspections in total in the catchment, with 7 of these covering FRfW. 71% of these were non-compliant with the rules. EA officers have also attended 8 incidents related to agriculture in the catchment since the 2015 Sanitary Survey. This reinforces the conclusions made previously in this report that agricultural contamination is likely to be a significant influence on the bacteriological health of the Start Bay BMPA and should be taken into consideration in any updated sampling plan.

The 2022 Shellfish Action Plan for Start Bay and Stoke Fleming states agriculture has a 'high'[10] contribution to pollution in the shellfish waters. There are 207 farms in the whole catchment. 25 of these are engaged with the Catchment Sensitive Farm (CSF) scheme operated by the EA and Natural England which aims to improve our understanding of pollution issues and identify farmers who can enhance farm practices and reduce run-off from farmland. 27 farms are also engaged with Countryside Stewardship (CS) government funding; providing financial incentives for farmers to look after and improve the environment), and 43 farm holdings have received advice from these initiatives to reduce Faecal Indicator Organisms (FIO). In total, there have been 253 CSF measures to reduce FIO and 87 CS and CSF grants. At secondary consultation, the EA did not provide comment on the impact of these measures on agricultural contamination in the BMPA.

This desktop assessment supports the conclusion that agriculture has a high potential to contaminate shellfish waters in this area. A significant proportion of the catchment is farmland, and all rivers and watercourses (shown in Figure 3.4) are likely to be affected by

[8] https://www.legislation.gov.uk/uksi/2018/151/made
[9] https://www.legislation.gov.uk/uksi/2010/639/contents/made
[10] - High contribution (>40%)

agricultural runoff to varying degrees, particularly following significant rainfall events (see Section 5). Information gained at secondary consultation from the EA showed 71% of farms inspected since the 2018 FRfW legislation came into place were non-compliant, and EA officers have attended 8 incidents relating to agriculture since the 2015 Sanitary Survey. This further reinforces the conclusion that agricultural contamination sources are high risk to the BMPA. The potential contamination caused by agriculture should be considered in any updated sampling plan.

3.4 Wildlife

Overwintering and wading birds often represent a potentially significant source of microbiological contamination to shellfisheries because avian species frequently forage (and therefore defecate) on areas of shellfish beds. Start Bay runs adjacent to the Slapton Ley nature reserve, the largest natural lake in the South-west of England. Whilst the site has no nationally or internationally important designations for overwintering waterbirds, there are important reedbeds, marshes and woodland habitat for many wildlife species. Slapton Ley is a site of Special Scientific Interest (SSSI) and is a National Nature Reserve (NNR).

Figure 3.5 shows the temporal trend in total overwintering waterbird counts from the winter of 2008/2009 to 2021/2022 (the most recent for which data are available). It shows that the dominant group in terms of population size are gulls, with small populations of other groups throughout.

In the five winters to 2012/2022 an average of 796 waterbirds were found (Austin *et al.*, 2023). In the five winters until 2012/2013 an average peak count of 1,096 was recorded, showing a decrease of 37%. The largest aggregations of waterbirds, and therefore the highest risk of contamination due to defecation, will occur in winter months. The distribution of waterbirds within the nature reserve will be driven by the aggregations of their foraging resource, which will shift from year to year. The precise timing and locations of the contamination will however be variable, and it is challenging to define RMPs which reliably capture this source of pollution. Currently, the situation has not changed since the original sanitary survey was published and waterbird counts do not need consideration in placement of the RMP due to the temporal and spatial variation of contamination, alongside the relatively small bird population near the catchment.

The 2015 Sanitary Survey does not comment on the presence of any other significant wildlife species within the Start Bay catchment. Marine mammals such as seals may also contribute some contamination, particularly when foraging in the area. The closest significant colony is in the Solent (approx. 148 km north-east) (Castles *et al.*, 2021). However, the area is not considered to be a significant habitat for this group and so any contamination will be occasional and minimal and does not need to be taken into consideration in the placement of RMPs for this BMPA. Several species of dolphin and porpoise are regularly sighted in Lyme Bay (approx. 20 km north-east) and so will frequent Start Bay occasionally. As with seals, their presence is unpredictable spatially and temporally, so their potential influence is not possible to define in RMP locations. No other

wildlife species needs consideration in the sampling plan and the recommendations of the 2015 sanitary survey remain valid.

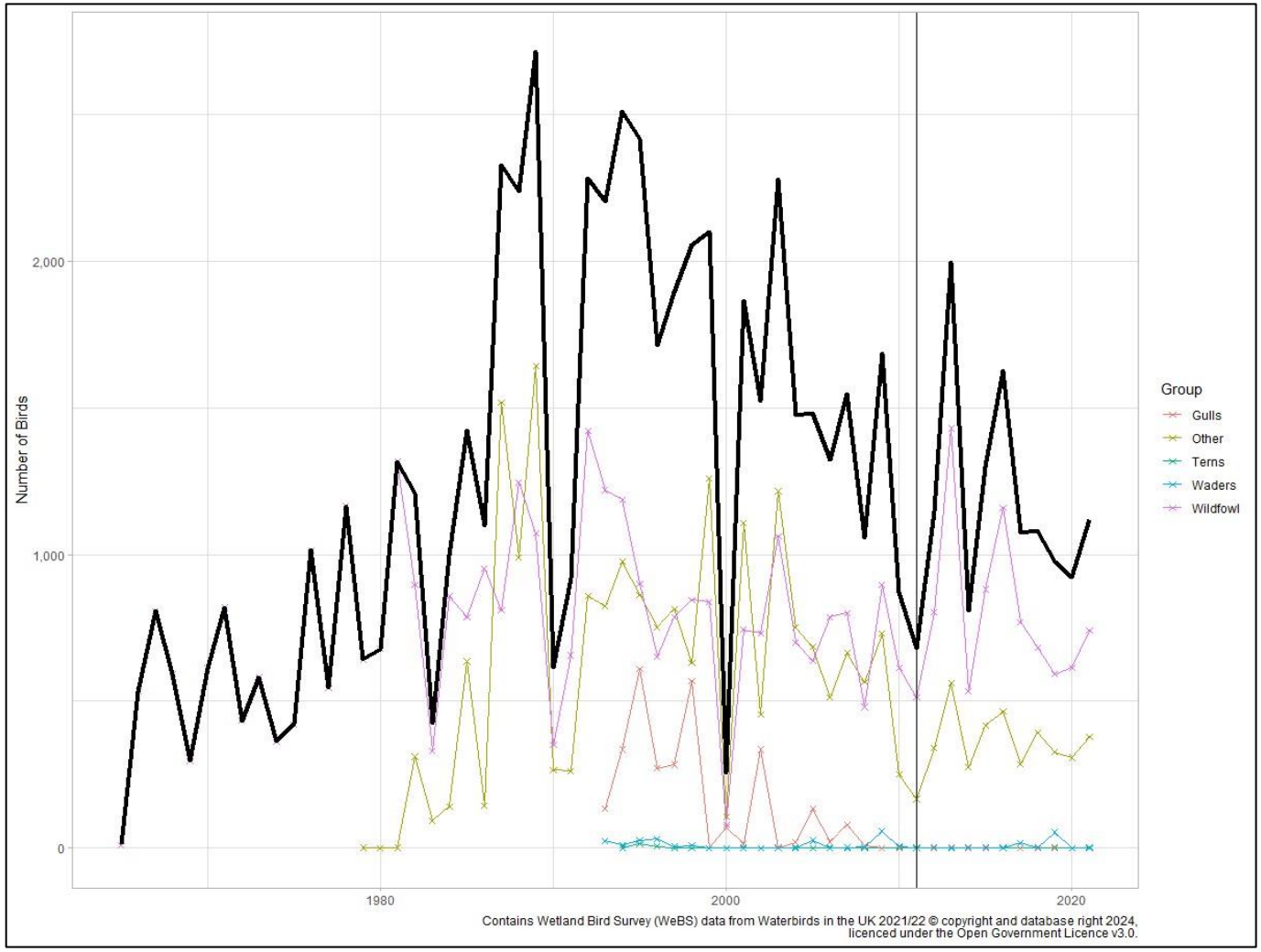

Figure 3.5 Temporal trend in waterbird counts from the Slapton Ley nature reserve adjacent to Start Bay. Data from the Wetland Bird Survey (Austin et al.*, 2023). Black line indicates total number of birds.*

3.5 Boats and Marinas

The discharge of sewage from boats is a potentially significant source of contamination to the Start Bay BMPA. Boating activities in the area have been derived through analysis of satellite imagery and various internet sources and compared to that described in the 2015 Sanitary Survey. Their geographical positions are shown in Figure 3.6.

Given the coastal location of the BMPA, there are very limited moorings close to the shellfishery itself. Any likely contamination from boating activities will be from the Dart estuary to the north, and the Salcombe estuary to the south. In the Dart, there are three large marinas and several hundred moorings used by recreational crafts (Carcinus Ltd., 2023). In the 2015 sanitary survey, Dartmouth and Salcombe had 47 resident fishing vessels less than 10 m (<10 m) in length and more than 10 m (>10 m) in length. At the time of writing this report, there are 18 fishing vessels in the Dart and 16 fishing vessels in Salcombe <10 m in length (total 34; 38 % reduction in vessels). There are 9 fishing vessels > 10 m in length in the Dart, and 4 in Salcombe (total 13; 15% reduction in vessels). A full assessment of boating activities in the Dart estuary is available from the site specific Sanitary Survey review for this area (Carcinus Ltd., 2023).

There is not likely to be any merchant shipping traffic as there are no commercial ports in the area. The nearest pump out facilities are in Plymouth and so recreational vessels of a sufficient size to contain onboard toilets are likely to make overboard discharges from time to time, particularly when moving between the estuaries of the Dart and Salcombe. The greatest impacts are likely to occur in summer months, when vessel numbers are at their highest, but it is impossible to accurately predict the timing or volumes of any contamination. During initial consultation, the LA suggested boating activity is unlikely to be a problem in the Start Bay BMPA as the CZs are close to the shore and are inaccessible to most boats. Given there is no significant aggregation of moorings within the BMPA, boating activity is unlikely to cause significant levels of contamination to the CZs, and does not need to be taken into consideration in any updated sampling plan.

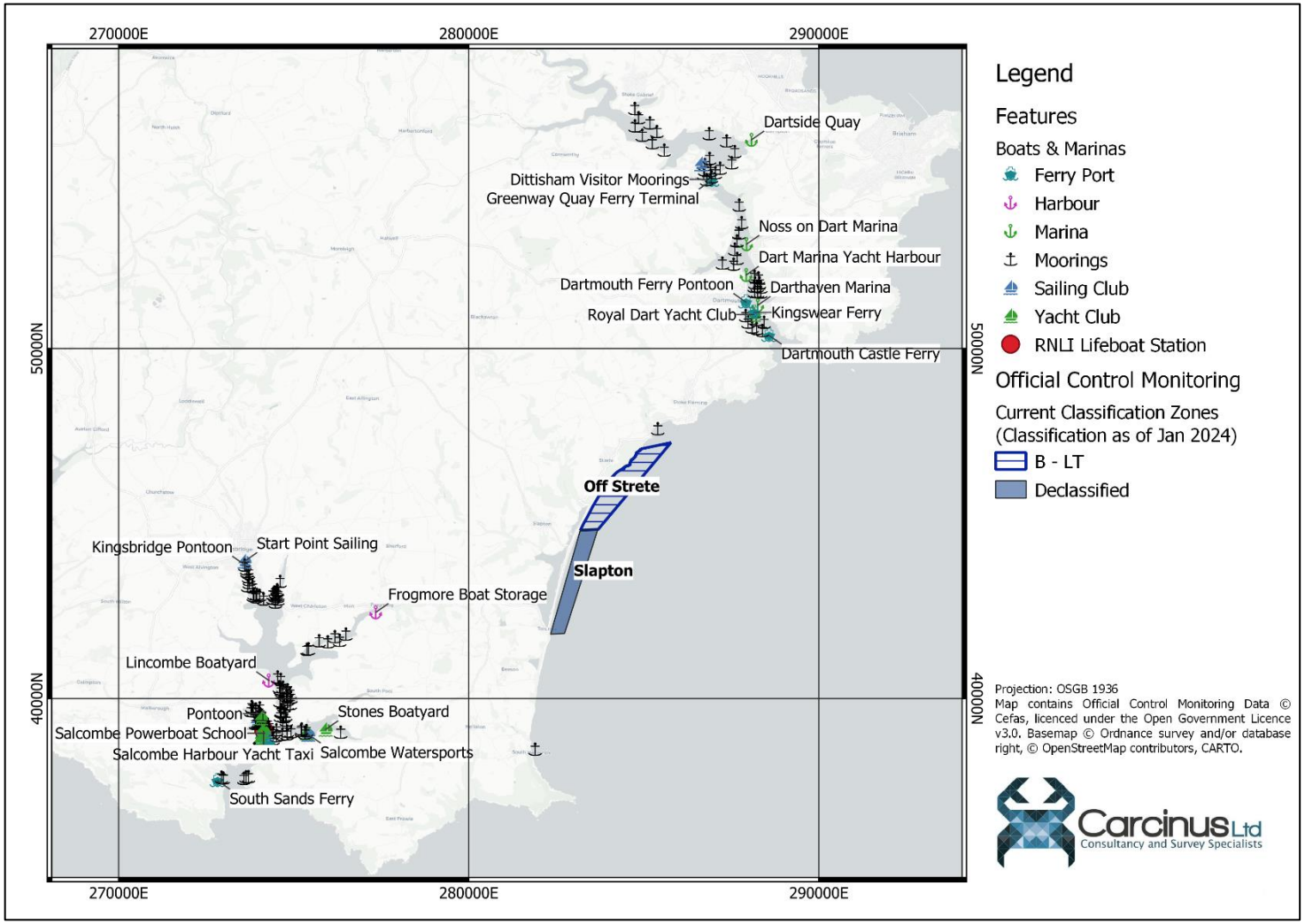

Figure 3.6 Locations of boats, marinas and other boating activities in the vicinity of the Start Bay BMPA.

3.6 Other Sources of Contamination

Utility misconnections are when foul water pipes are wrongly connected and enter surface waters without treatment, potentially putting raw sewage directly into watercourses via surface water drains. During initial consultations, the EA did not indicate of the presence of misconnections. The 2022 Shellfish Action Plan states there has been no work carried out to identify misconnections in the local area, so these may well have a small impact on contamination in the shellfishery if they do exist. At secondary consultation, the EA stated it does not undertake works or surveys of misconnections, and this falls under the purview of the water company (Southwest Water). If the EA is made aware of a potential misconnection, it is passed on to Southwest Water to investigate. No further information regarding investigations was provided as part of this review. It should therefore still be assumed that misconnections may have a minor impact on contamination in the shellfishery, however as the locations of any misconnections are unknown it is impossible to reliably account for them in any updated sampling plan.

There is likely to be a minor impact associated with dog fouling along coastal paths and beaches, but this is not expected to be a significant source of contamination.

4 Hydrodynamics/Water Circulation

The Start Bay BMPA is located off the coast of Strete, Devon, at the western extremity of the larger Lyme Bay. It is a large, open, east facing embayment that stretches 16 km round from Start Point to Combe Point. The closest estuaries are Dart to the north and Salcombe/Kingsbridge to the south. The open coastal location provides ample potential for dilution and dispersion of potential contamination.

The bathymetry of the Bay is relatively uncomplicated, and slopes gradually from the coast to a depth of *circa* 20 m relative to chart datum in the outreaches of the Bay. The clam beds sit between 5 – 10 m water depth. Freshwater inputs to the BMPA are limited to a few minor watercourses which drain either over or through the beach. Contamination from the larger catchment of the Dart estuary will only drain to Start Bay on an ebbing tide due to the enclosed nature. The River Gara and River Start flow into Slapton Ley which has an outflow directly into the south-western end of the Start Bay BMPA. Two small unnamed streams flow directly into the southern end of the Stoke Fleming shellfish water. Blackpool stream enters at Blackpool Sands and the Leonards Cove stream enters close to Stoke Fleming (both northern end of the BMPA). The 2015 sanitary survey reports tidal amplitude in the area as large at 4.4 m on spring tides and 1.9 m on neap tides. Tidal streams are therefore more likely to dominate patterns of water circulation in the bay. Further analysis of freely available nautical chart data suggests that the water depths and extents of the subtidal areas are unchanged from the situation described in the 2015 Sanitary survey.

5 Rainfall

A complete record of the rainfall data from the Harbertonford rainfall monitoring station at NGR: SX 79180 55990 (ID:364799) was downloaded from the Environment Agency's

hydrology data explorer. This station was chosen as it is the closest monitoring station to the BMPA with records panning dates preceding the publication of the 2015 Sanitary survey. The monitoring station is approximately 10 km to the northwest of the Start Bay BMPA. The data were subdivided into 2008 – 2015 (pre-sanitary survey) and 2015 – present (post sanitary survey) and processed in R (R Core Team, 2021). These data were used to determine whether any changes in rainfall patterns had occurred since the original sanitary surveys were published. The rainfall data are summarised in Table 5.1 and the rainfall levels per month are shown in Figure 5.1.

Table 5.1 Summary statistics for rainfall preceding and following the 2015 Sanitary Survey.

Period	Mean Annual Rainfall	Percentage Dry Days	Percentage Days Exceeding 10 mm	Percentage Days Exceeding 20 mm
2008 - 2015	1213.28	40.34	33.73	19.81
2015 - 2024	1163.68	42.50	33.34	20.77

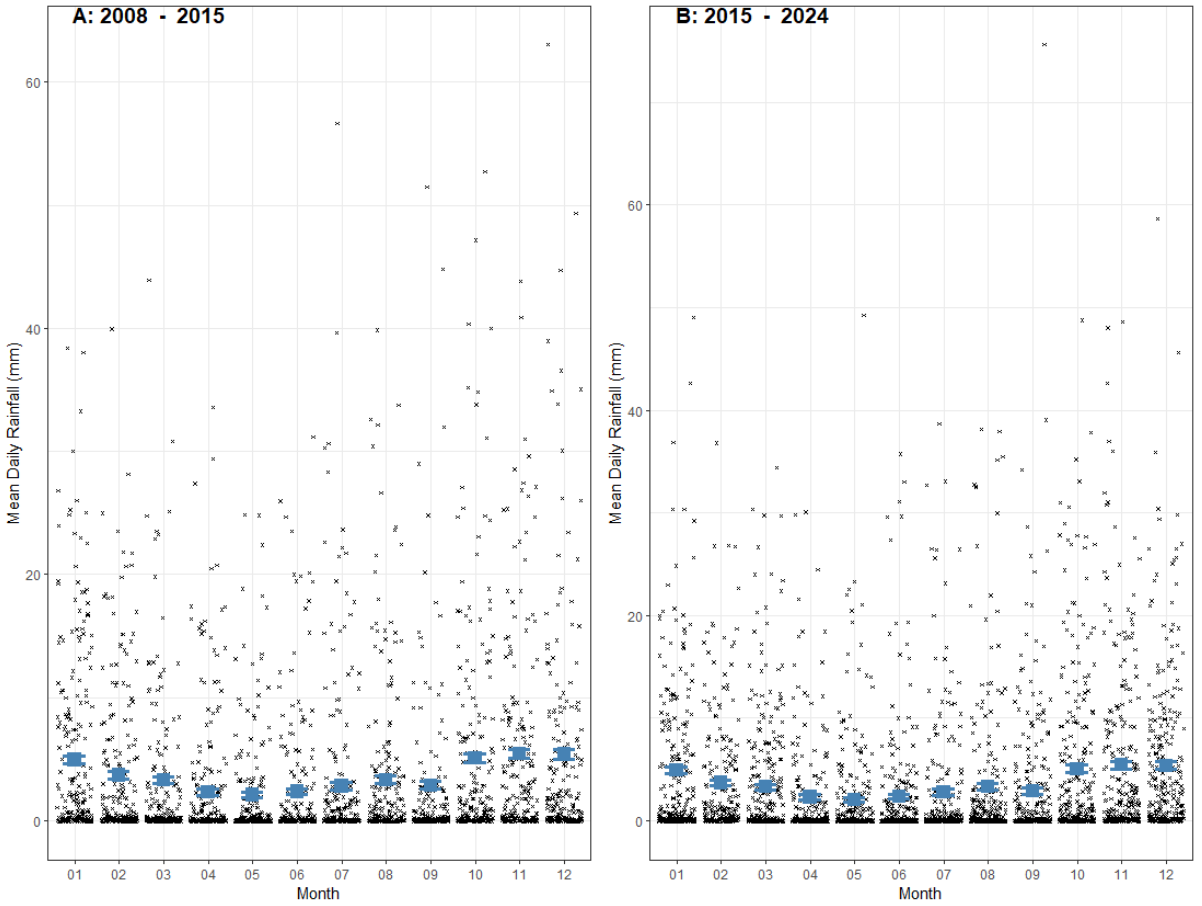

Figure 5.1 Mean daily rainfall per month at the Harbertonford monitoring station at NGR SX 79180 55990 for the period (A) 2008 – 2015 and (B) 2015 – 2024.

The data shows that between 2008-2015 and 2015-2024, the mean annual rainfall has decreased by approximately 50 mm. Average rainfall amounts of more than 1,000 mm per year also indicate that this area receives a significant volume of rainfall compared to other areas around the country. The percentage of dry days has increased by 2%, and the percentage of days exceeding 10 mm and 20 mm of rainfall have changed by < 1%.

Two-sample t-tests indicated that there was no significant difference ($p > 0.05$)[11] in the mean daily rainfall per month between the 2008 - 2015 and 2015 – 2024 periods, meaning that rainfall levels across the catchment have remained statistically similar. Rainfall leads to increased faecal loading through two factors: elevated levels of surface runoff and increased spill events from intermittent discharges, particularly during periods of heavy rain. Rainfall levels during both periods were greatest in winter months (November – February), and so levels of runoff and number of spills would be expected to be greatest during this time. As the rainfall patterns have remained (statistically) similar across the two time periods, it is unlikely that bacterial loading due to these factors has changed significantly, and as such RMP recommendations made in the original sanitary survey to capture the influence of runoff and spill events remain valid.

6 Microbial Monitoring Results

6.1 Official Control Monitoring

6.1.1 Summary Statistics and geographical variation

Mean Official Control monitoring results for *E. coli* concentrations at RMPs sampled in the Start Bay BMPA since September 2015 are presented spatially in Figure 6.1 and summary statistics are presented in Table 6.1. Only monitoring data freely available for download from the Cefas datahub has been used in this section. No additional verification of the data has been undertaken.

Please note, the *Slapton* CZ (monitored by the Off Torcross RMP B087J) is currently declassified because it is not commercially active and so reduced monitoring has been agreed. Sampling on a regular 3-monthly basis allows sufficient results for the analyses described in this section.

[11] A p-value of 0.05 means that there is a greater than 95% probability that the observed differences between the groups didn't occur by chance.

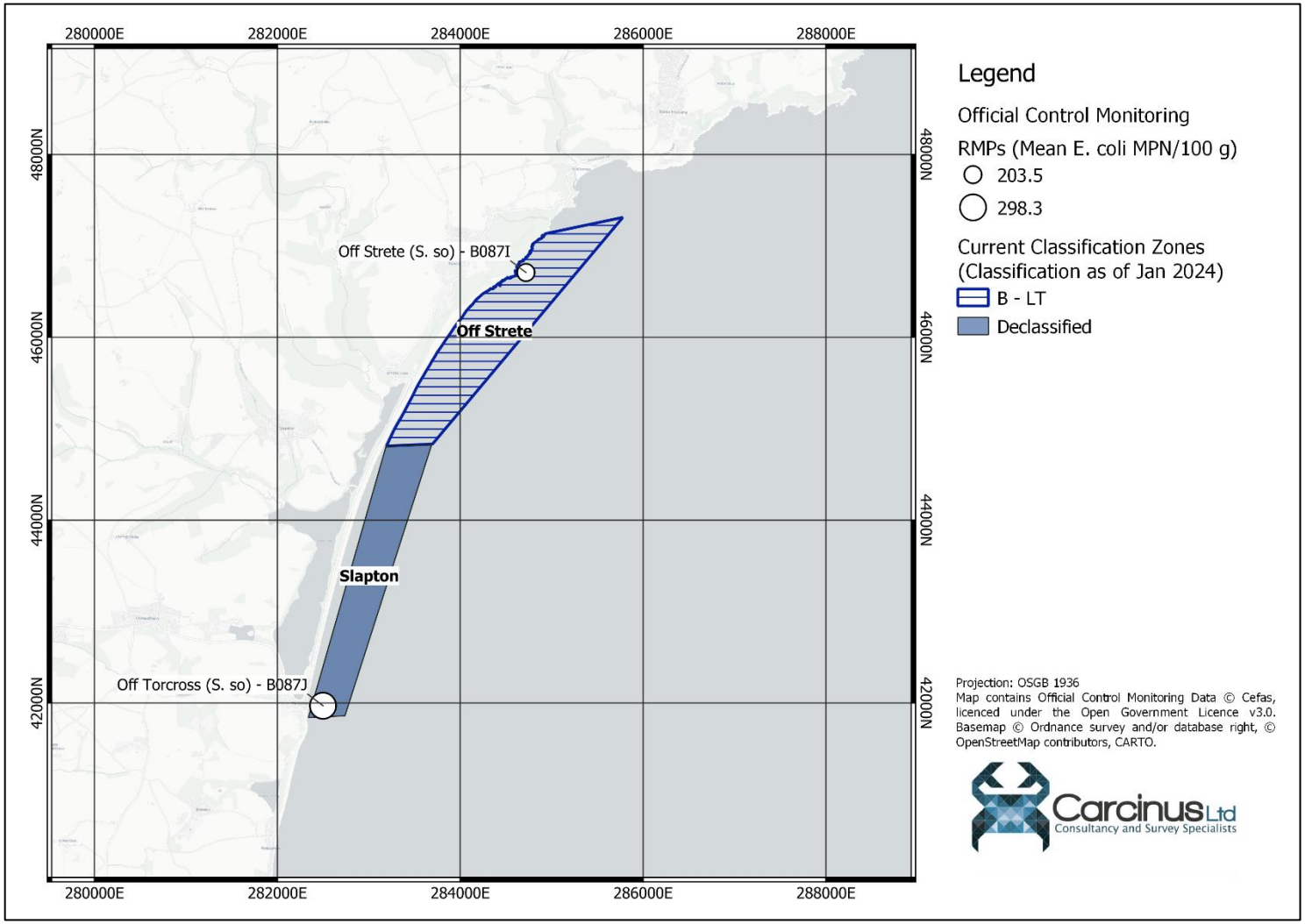

Figure 6.1 Mean E. coli results from Official Control monitoring at bivalve RMPs in the Start Bay BMPA. Please note, Off Torcross is currently declassified and sampled on a 3-monthly basis.

Table 6.1 Summary statistics from Official Control monitoring at bivalve RMPs in the Start Bay BMPA. Please note, the Slapton CZ (monitored by Off Torcross RMP B087J) is currently declassified and sampled on a 3-monthly basis.

RMP (Species)	NGR	Species	No.	First Sample	Last Sample	Mean	Min Value	Max Value	% > 230	% > 4,600	% > 46,000
Off Strete (S. so) - B087I	SX84724671	Thick Trough Shell	92	02/09/2015	16/01/2024	203.47	18	3,300	19.57	0	0
Off Torcross (S. so) - B087J	SX82504197	Thick Trough Shell	65	02/09/2015	16/01/2024	298.31	18	4,900	20	1.54	0

The datahub provides Official Control monitoring data for two RMPs, both of which are for Thick Trough shells sampled since September 2015. The original sanitary survey was conducted in March 2015 and recommended 3 RMPs for Surf Clams in the Start Bay BMPA. Two of the three recommended are currently sampled in 2024. Off Stoke Fleming (B087H) is located in the now declassified *Blackpool* CZ and is not sampled, Off Torcross (B087J) is located in the declassified *Slapton* CZ (but sampled quarterly), and Off Strete (B087I) is located in the active *Off Strete* CZ. At initial consultation, the LA confirmed that the Production Area had been larger previously with 4 RMPs, as mentioned in the 2015 sanitary survey. Details of RMPs pre-2015 Sanitary Survey are not available on the datahub, and further information could not be gained during secondary consultation. Since then, two RMPs (those currently sampled – see Table 6.1) have been found to be sufficient.

As mentioned previously, the RMP Off Torcross B087J (in the *Slapton* CZ) is declassified with reduced monitoring. It is currently sampled on a 3-monthly basis. Official Control monitoring data on the Cefas datahub for the Off Torcross RMP shows 09 June 2021 to be the last sample taken on a monthly basis. Following this, the frequency changes to every 3 months.

Neither of the currently sampled RMPs have returned results higher than 46,000 *E. coli* MPN/100 g. The Off Strete RMP (B087I) has also not returned any results above 4,600 *E. coli* MPN/100 g. The mean values of both RMPs are low (< 300 *E. coli* MPN/100 g).

Figure 6.2 presents box and violin plots of *E. coli* monitoring at RMPs within the Start Bay BMPA. One-way analyses of variance (ANOVA) tests were performed on the data to investigate the statistical significance of any differences between the monitoring results from the two RMPs. Significance was taken at the 0.05 level. All statistical analysis described in this section was undertaken in R (R Core Team, 2021).

Figure 6.2 demonstrates that results from the two RMPs are statistically similar ($p = 0.283$).

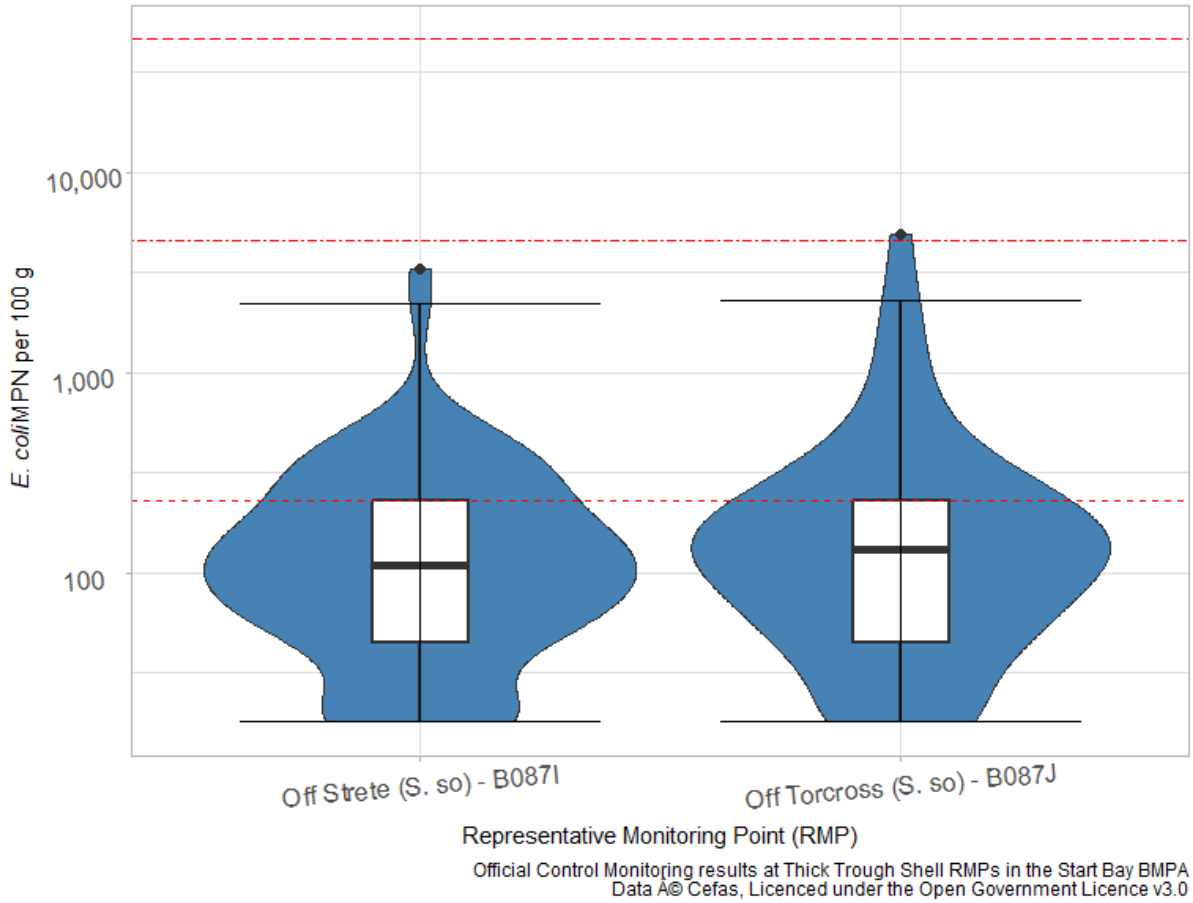

Figure 6.2 Box and violin plots of E. coli monitoring at Thick Trough Shell RMPs in the Start Bay BMPA. Central line indicates median value, box indicates lower-upper quartile range and whisker indicates minimum/maximum values, excluding outliers. Boxplots are overlaid on the distribution of the monitoring data. Horizontal dashed lines indicate classification thresholds at 230, 4,600 and 46,000 E. coli MPN/100 g.

6.1.2 Overall temporal pattern in results

The overall temporal pattern in shellfish flesh monitoring results within the Start Bay BMPA are shown in Figure 6.3. The monitoring data from the RMPs suggests that the concentration of *E. coli* in shellfish flesh at both RMPs is relatively similar and follows the same trend. Both are consistently achieving results of around 100 *E. coli* MPN/100 g. More recently, Off Torcross has experienced slightly elevated results in comparison to Off Strete. The timeseries reinforces the lack of significant difference across the RMPs identified in Section 6.1.1.

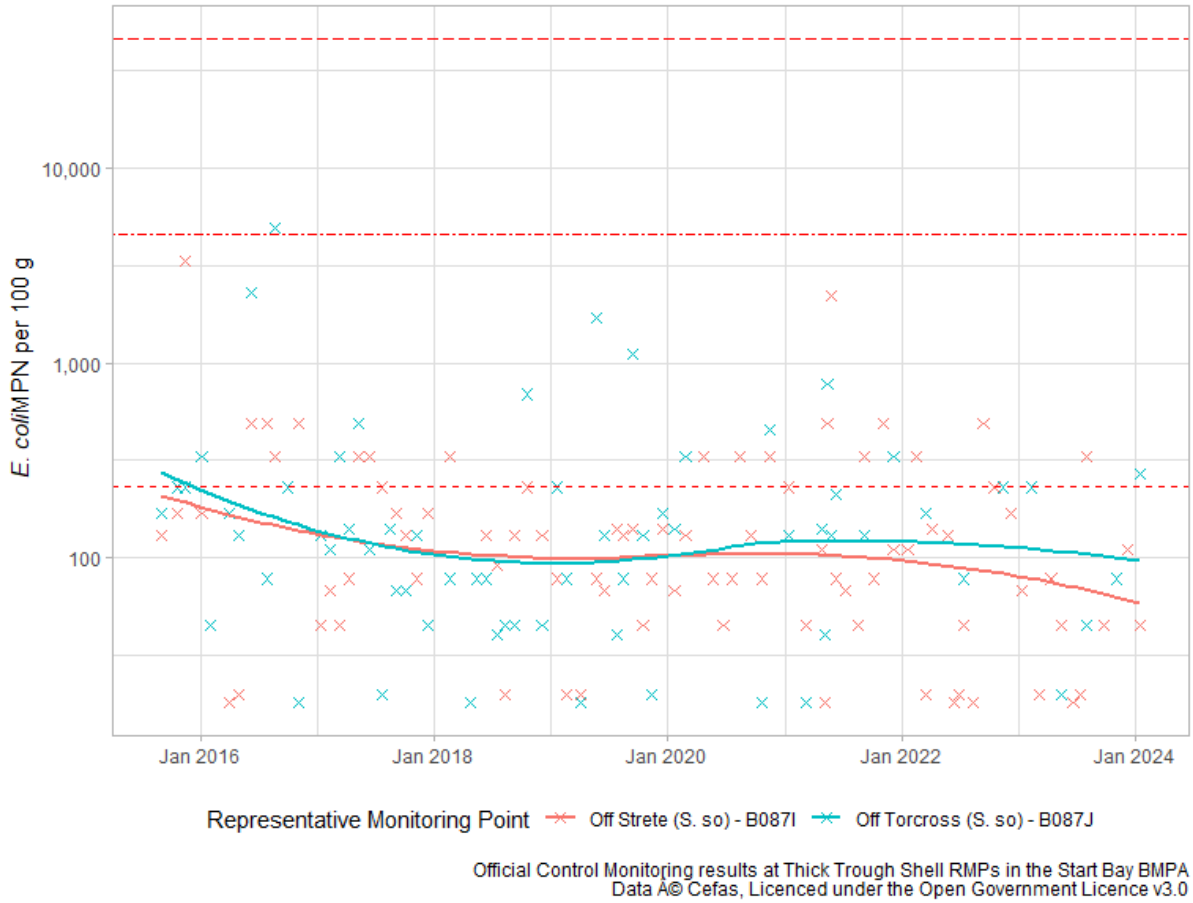

Figure 6.3 Timeseries of E. coli monitoring at Thick Trough shell RMPs sampled in the Start Bay BMPA since September 2015. Scatter plots are overlaid with a loess model fitted to the data. Horizontal lines indicate classification thresholds at 230, 4,600 and 46,000 E. coli MPN/100 g.

6.1.3 Seasonal patterns of results

Seasonal patterns of *E. coli* flesh concentrations at RMPs in the Start Bay BMPA were investigated and shown for Thick Trough shells in Figure 6.4. The data for each year were averaged into the four seasons, with spring from March – May, summer from June – August, autumn from September – November and winter comprising data from December – February the following year. Two-way ANOVA testing was used to look for significant differences in the data, using both season and RMP (if there is more than one RMP for a given species) as independent factors (i.e., pooling the data across season and RMP respectively), as well as the interaction between them (i.e., exploring seasonal differences within the results for a given RMP). Significance was taken at the 0.05 level.

No significant differences were found in the Thick Trough shell RMPs in the Start Bay BMPA ($p > 0.05$)[12].

[12] A p-value of 0.05 means that there is a greater than 95% probability that the observed differences between the groups didn't occur by chance.

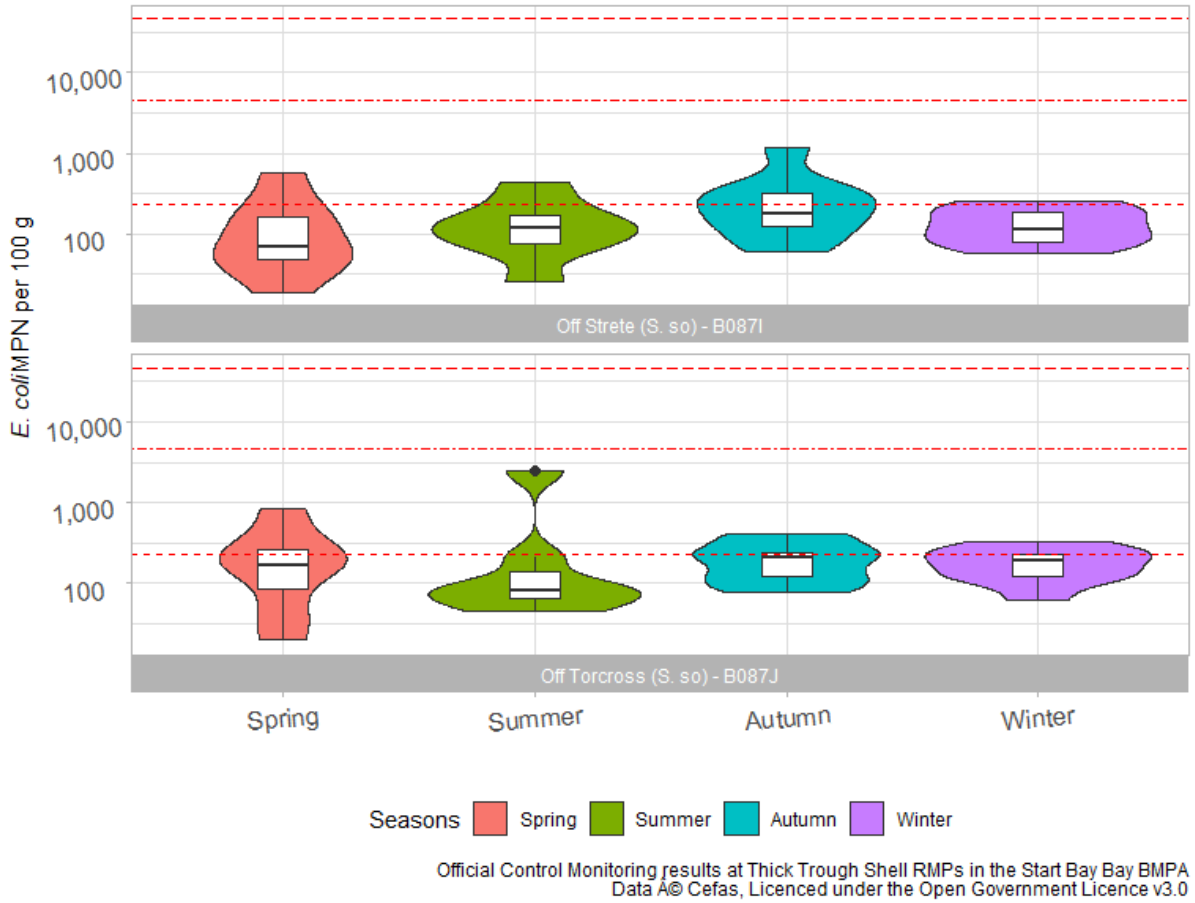

Figure 6.4 Box and violin plots of E. coli levels per season at Thick Trough shell RMPs sampled within the Start Bay BMPA. Horizontal lines indicate classification thresholds at 230, 4,600 and 46,000 MPN/100 g respectively.

6.2 Action States

Since the publication of the 2015 Sanitary Survey of the Start Bay BMPA, there has been one Action State triggered within the BMPA.

- On 25 May 2021, an Action State was triggered by a result of 2,300 *E. coli*/100 g at the Off Strete RMP. A subsequent monthly sampling on 9th June returned a result of 78 *E. coli*/100 g. There was no evidence to waive the Action State result in accordance with the agreed waiver criteria[13] and the CZ was downgraded to long-term class B on 2 July 2021.

6.3 Bathing Water Quality Monitoring

The status of EC bathing waters near to and within the BMPA is also of relevance to this assessment. There are three designated bathing water quality monitoring points within the vicinity of the CZ. Blackpool Sands (approx. 1.4 km to the north of Off Strete RMP) is classified excellent[14], Slapton Sands Monument off the coast of Slapton (approx. 3 km south

[13] 'Dealing with high results' - Shellfish classification | Food Standards Agency
[14] 'The highest, cleanest class' - https://environment.data.gov.uk/bwq/profiles/

of Off Strete RMP) is classified excellent, and Slapton Sands Torcross (approx. 150 m from Off Torcross RMP) is classified excellent. All three bathing waters have been classified excellent for the previous four sampling years. It should be noted that bathing water sampling only occurs during the bathing water season, which falls within the summer period (May to September inclusive) and therefore may not represent the potential for increased faecal loading during winter months. That being said, the increased risk of contamination in summer months from tourism is likely captured by this type of monitoring, and given the proximity of Bathing Water monitoring points to the RMPs and *Off Strete* CZ, the excellent water quality results shown here could be used to further reinforce the overall good health of the BMPA.

7 Conclusion and overall assessment

The Start Bay BMPA is located on the southwest coast of England between Start Point and Combe Point, Devon. It is an eastern facing embayment, and the shellfishery itself is situated in the subtidal on the coastline of the village Strete. The BMPA is currently classified for one species, Thick Trough shells (Surf clams). There is one active CZ, with one active RMP B087I, plus one additional declassified CZ with an RMP B087J that is sampled on a 3-monthly basis. There was also previously a third CZ, Blackpool, which was declassified in 2015. Surf clams occur naturally within the BMPA and are harvested by dredge.

The results of the 2021 Census were compared to that of the 2011 Census to give an indication of changes in human population within the catchment since the publication of the 2015 Sanitary survey. These data suggest that the population of the catchment has risen by 8% in this time. The catchment remains very rural with the majority having a population density of less than 100 people per square kilometre. The main population centres of the catchment are the towns of Kingsbridge and Dartmouth, and the villages of Strete and Slapton. These villages are 700 m and 1 km from the BMPA, respectively. The area receives a significant increase in population each year with tourism, particularly in the summer months. Urban associated run-off is not considered to be a significant source of contamination within this area.

There are 10 continuous water company owned discharges within the Start Bay catchment. Those likely to be of most significance are Slapton STW (777 m^3/day DWF), Strete STW (122 m^3/day DWF), and Stoke Fleming STW (280 m^3/day DWF). An upgrade to secondary treatment from primary treatment in the 2015 sanitary survey was noted for the Stoke Fleming STW. The remaining continuous discharges are > 5 km from the Classification Zones, and so are unlikely to be a significant contribution to contamination in the BMPA. Intermittent discharges were also identified in the catchment, and 15 of these are within 3 km of the BMPA. Those discharges within or near to CZs should be considered in any updated sampling plan.

During initial consultation, the EA advised various updates had occurred to these since 2015. Updates include EDM installation at storm overflows, modelling bacterial loading and distribution, and performance investigations. All water company assets in the catchment have been deemed to be below the required treatment standards, and some improvements

have been proposed for AMP 8 (2025-2030 round) under the Water Company Asset Improvement Scheme. Further details on specific improvements will not be confirmed by the EA until the last quarter of 2024. At secondary consultation, the EA reconfirmed that the improvement programme for AMP 8 will not be formally and finally agreed until the end of the year, and until then further details cannot be shared. Most private discharges are soakaway so should have little effect on the BMPA bacteriological health. Those that discharge more than 10 m^3/day to water are at least 3.5 km from the BMPA and so are unlikely to be of significance. Water company assets are currently considered a 'medium' point source contributor of contamination to the Shellfish Waters. Therefore, those in the vicinity of this BMPA should be taken into consideration in any updated sampling plan.

Livestock population data shows that there has been some change in the population of each group in the catchment between 2015 and 2022. Cattle numbers decreased by 21%, pig numbers increased by 17%, sheep numbers decreased by 12.5 %, and poultry decreased by 17.5%. Land cover maps show most of the catchment is reserved for either arable or pasture farmland. The Shellfish Action Plan published by the EA considers agricultural runoff to be a high diffuse source of contamination to the BMPA. At initial consultation the EA stated there is no agricultural officer for this area. However, in total there have been 253 CSF measures to reduce faecal indicator organisms, alongside 87 CS and CSF grants for farmers. No further information on the impact of these measures on contamination from agriculture to the BMPA is available. During secondary consultation, the EA stated that the Farming Rules for Water (FRfW), discussed in Section 3.3, came into legislation in 2018 (3 years after the 2015 Sanitary Survey). Since then, EA officers have attended 8 incidents related to agriculture in the catchment. 11 inspections have taken place, with 7 covering the FRfW and concluding 71% of these were non-compliant with the rules. The potential contamination from agriculture in the catchment is high. The influence of agricultural contamination should be considered in any updated sampling plan.

Waterbird counts suggest that this estuary continues to support of a population of waterbird species, but that the five-year average over-wintering count has fallen by 37%. Some minor impacts from either avian species or marine mammals may occur, but these are impossible to reliably predict and are therefore challenging to account for in any updated sampling plan.

There is no merchant shipping activity in Start Bay, and given its coastal location there are limited moorings close to the shellfishery itself. Boating activity from the nearby Dart and Kingsbridge/Salcombe estuaries have been reviewed. There has been a 38% reduction in less than 10 m fishing vessels, and a 15% reduction in greater than 10 m fishing vessels that use the Salcombe and Dart estuaries as their home port. The main source of contamination will be from recreational vessels of sufficient size to contain onboard toilets; the nearest pump out facilities are in Plymouth. That being said, both the *Off Strete* CZ and *Slapton* CZ are in the shallow subtidal so boats will be unlikely to make overboard discharges directly into or within the close vicinity of the BMPA.

There is monitoring data available for two RMPs sampled in the Start Bay BMPA. Both of these are for Thick Trough shells, although one is declassified and sampled every 3 months.

The declassified *Slapton* CZ (represented by the Off Torcross RMP) has 1.54 % of results > 4,500 *E. coli* MPN/100g. 19.57% of results at the Off Strete RMP are above 230 *E. coli* MPN/100g. Monitoring results from both RMPs are not significantly different, nor show any significant differences seasonally.

Based on the information available, there does not appear to be any significant knowledge gaps that would justify a shoreline survey. There have been no notable changes to the sources of pollution since the 2015 Sanitary Survey was published. The *Off Strete* CZ was downgraded from Class A to Class B-LT in 2021, and since then only 6 results have exceeded the 230 *E. coli* MPN/100 g classification threshold.

8 Recommendations

Recommendations for the *Off Strete* and declassified *Slapton* CZ in the Start Bay BMPA are summarised below, and a recommended sampling plan is provided in Table 9.1.

8.1 *Off Strete* Classification Zone

This CZ covers an area of 1.72 km^2 and is the only active CZ situated in Start Bay.

8.1.1 Off Strete RMP

The 2015 Sanitary Survey describes that the main source of contamination to this CZ is the Strete STW. To the north, potential sources of contamination were the Blackpool Stream, Stoke Fleming STW, and a small number of anchorage areas. It was recommended an RMP be placed close to the Strete STW outfall as far inshore as the stocks extend. This remains the case now, and the RMP will also reliably capture any potential contamination from agricultural runoff from pasture areas close to the BMPA which has been identified as high risk. It is recommended this RMP be maintained as it's current position effectively captures all identified sources of contamination in this area.

8.2 *Slapton* Classification Zone

8.2.1 Off Torcross RMP

This RMP (B087J) is used to capture the main contaminating influences to the south of the BMPA. At the time of the 2015 sanitary survey, when this RMP was recommended, the main contaminating influences to the south were the Slapton STW outfall, the Torcross PS, and the Slapton Ley outfall at Torcross. This remains unchanged in 2024. B087J is also likely to capture runoff from Slapton Ley, and agricultural contamination including runoff from nearby pasture. The survey recommended this RMP be located at the Southern end of the zone, off Torcross, as far inshore as stocks extend. The *Off Strete RMP B087I*cannot be used to accurately determine contamination affecting the Slapton CZ due to its distance (approximately 4.5km). If the *Slapton* CZ is to be reclassified in the future, it is recommended the B087J RMP be maintained as its current position effectively captures all identified sources of contamination in this area.

9 General Information

9.1 Location Reference

Production Area	**Start Bay**
Cefas Main Site Reference	M087
Ordnance survey 1:25,000	Explorer OL20
Admiralty Chart	No 1634

9.2 Shellfishery

Species	Culture Method	Seasonality of Harvest
***Spisula solida* Thick trough shell**	Wild	Year round

9.3 Local Enforcement Authority(s)

Name	**South Hams District Council** Follaton House Totnes TQ9 5NE
Website	https://www.southhams.gov.uk/
Telephone number	01803 861 234
E-mail address	Environmental.health@swdevon.gov.uk

9.4 Recommended Sampling Plan

*Table 9.1 Proposed sampling plan for the Start Bay BMPA. Suggested changes are given in **bold red** type.*

Classification Zone	RMP	RMP Name	NGR (OSGB 1936)	Lat / Lon (WGS 1984)	Species Represented	Harvesting Technique	Sampling Method	Sampling Species	Tolerance	Frequency
Off Strete	B087I	Off Strete	SX 8472 4671	50°18'33"N, 003°37'13"W	Surf clams	Dredge	Dredge	Surf clams	100m	Monthly
Slapton (declassified)	B087J	Off Torcross	SX8250 4197	50°15'58"N, 003°39'00"W	Surf clams	Dredge	Dredge	Surf clams	100m	3-monthly

10 References

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Appendices

Appendix I. EDM Return Data for intermittent Discharges

ID	Site Name	EA Permit	Type of Discharge	Outlet NGR	Total Duration of Spills (hours) in 2022	Number of Spills in 2022	Distance (km) to centre of nearest CZ	Nearest CZ
1	BLACKAWTON SEWAGE TREATMENT WORKS	NPSWQD006916	WwTW/Sewage Treatment Works (water company)	SX8055150428	Not available	Not available	5.92	Off Strete
2	EAST PRAWLE STW	202193/CS/01	WwTW/Sewage Treatment Works (water company)	SX7830036410	Not available	Not available	8.36	Slapton
3	FIELD ADJ COUNCIL HOUSES CSO	201809	Storm Tank/CSO on Sewerage Network (water company)	SX8056850865	Not available	Not available	6.16	Off Strete
4	KIMBERLEY NURSERIES CSO	201721	Storm Tank/CSO on Sewerage Network (water company)	SX8215044787	Not available	Not available	1.69	Slapton
5	LEONARDS COVE PS	203368	Pumping Station on Sewerage Network (water company)	SX8650048200	Not available	Not available	3.04	Off Strete
6	LEONARDS COVE PS	203368	Pumping Station on Sewerage Network (water company)	SX8650048200	Not available	Not available	3.04	Off Strete
7	OVERSEAS ESTATE EAST PS	203453	Pumping Station on Sewerage	SX8641048010	Not available	Not available	2.82	Off Strete

ID	Site Name	EA Permit	Type of Discharge	Outlet NGR	Total Duration of Spills (hours) in 2022	Number of Spills in 2022	Distance (km) to centre of nearest CZ	Nearest CZ
			Network (water company)					
8	OVERSEAS ESTATE EAST PS	203453	Pumping Station on Sewerage Network (water company)	SX8641048010	Not available	Not available	2.82	Off Strete
9	OVERSEAS ESTATE WEST PS	203452	Pumping Station on Sewerage Network (water company)	SX8618047930	Not available	Not available	2.47	Off Strete
10	OVERSEAS ESTATE WEST PS	203452	Pumping Station on Sewerage Network (water company)	SX8618047930	Not available	Not available	2.47	Off Strete
11	SLAPTON WASTEWATER TREATMENT WORKS	203034	WwTW/Sewage Treatment Works (water company)	SX8201744722	Not available	Not available	1.42	Slapton
12	SLAPTON WASTEWATER TREATMENT WORKS	203034	WwTW/Sewage Treatment Works (water company)	SX8201744722	Not available	Not available	1.42	Slapton
13	SLAPTON WASTEWATER TREATMENT WORKS	203034	WwTW/Sewage Treatment Works (water company)	SX8201744722	Not available	Not available	1.55	Slapton
14	STOKE FLEMING PUMPING STATION	203363	Pumping Station on Sewerage Network (water company)	SX8636048360	Not available	Not available	2.97	Off Strete

ID	Site Name	EA Permit	Type of Discharge	Outlet NGR	Total Duration of Spills (hours) in 2022	Number of Spills in 2022	Distance (km) to centre of nearest CZ	Nearest CZ
15	STOKE FLEMING PUMPING STATION	203363	Pumping Station on Sewerage Network (water company)	SX8636048360	Not available	Not available	2.97	Off Strete
16	STOKENHAM CARAVAN PARK CSO	201706	Storm Tank/CSO on Sewerage Network (water company)	SX8128742672	Not available	Not available	1.86	Slapton
17	STRETE WWTW	203410	WwTW/Sewage Treatment Works (water company)	SX8430046964	Not available	Not available	0.61	Off Strete
18	STRETE WWTW	203410	WwTW/Sewage Treatment Works (water company)	SX8430046964	Not available	Not available	0.61	Off Strete
19	THE ANCHORAGE CSO	201808	Storm Tank/CSO on Sewerage Network (water company)	SX8059050983	Not available	Not available	6.16	Off Strete
20	TORCROSS PUMPING STATION	203035	Pumping Station on Sewerage Network (water company)	SX8229042000	See Section 3.2	See Section 3.2	1.55	Slapton
21	TORCROSS PUMPING STATION	203035	Pumping Station on Sewerage Network (water company)	SX8229042000	See Section 3.2	See Section 3.2	1.74	Slapton

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CLASSIFICATION OF BIVALVE MOLLUSC PRODUCTION AREAS IN ENGLAND AND WALES

SANITARY SURVEY REPORT

Start Bay

March 2015

About Carcinus Ltd

Carcinus Ltd is a leading provider of aquatic environmental consultancy and survey services in the UK.

Carcinus was established in 2016 by its directors after over 30 years combined experience of working within the marine and freshwater environment sector. From our base in Southampton, we provide environmental consultancy advice and support as well as ecological, topographic and hydrographic survey services to clients throughout the UK and overseas.

Our clients operate in a range of industry sectors including civil engineering and construction, ports and harbours, new and existing nuclear power, renewable energy (including offshore wind, tidal energy and wave energy), public sector, government, NGOs, transport and water.

Our aim is to offer professional, high quality and robust solutions to our clients, using the latest techniques, innovation and recognised best practice.

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Environmental Consultancy

Carcinus provides environmental consultancy services for both freshwater and marine environments. Our freshwater and marine environmental consultants provide services that include scoping studies, Environmental Impact Assessment (EIA) for ecological and human receptors, Habitats Regulations Appraisal (HRA), Water Framework Directive (WFD) assessments, project management, licensing and consent support, pre-dredge sediment assessments and options appraisal, stakeholder and regulator engagement, survey design and management and site selection and feasibility studies.

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Carcinus delivers ecology surveys in both marine and freshwater environments. Our staff are experienced in the design and implementation of ecological surveys, including marine subtidal and intertidal fish ecology and benthic ecology, freshwater fisheries, macro invertebrate sampling, macrophytes, marine mammals, birds, habitat mapping, River Habitat Surveys (RHS), phase 1 habitat surveys, catchment studies, water quality and sediment sampling and analysis, ichthyoplankton, zooplankton and phytoplankton.

In addition, we provide aerial, topographic, bathymetric and laser scan surveys for nearshore, coastal and riverine environments.

Our Vision

"*To be a dependable partner to our clients, providing robust and reliable environmental advice, services and support, enabling them to achieve project aims whilst taking due care of the sensitivity of the environment".*