Sanitary Survey - Review

Butley – 2023

Document No. – *J0591/23/06/15*

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Document QA and Approval

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Initial Consultation

Consultee	Date of consultation
East Suffolk Council	May 2023
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Consultation on draft report

Consultee	Date of consultation
East Suffolk Council	July 2023
Environment Agency	July 2023
Local Action Group (including Anglian Water)	July 2023
Food Business Operator	July 2023
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A sanitary survey relevant to the bivalve mollusc beds in Butley was undertaken in 2014 in accordance with Regulation (EC) 854/2004 (which was replaced by retained EU Law

Regulation (EU) 2017/625, with sanitary survey requirements now specified in retained 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, East Suffolk Council. The report is publicly available via the Carcinus Ltd. website.

Recommended Bibliographic Citation:

Carcinus Ltd., 2023. Review of the Butley 2014 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 retained EU Law Regulation (EU) 2019/627.

Contents

List of figures

List of tables

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 retained (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 Butley Review

This report reviews information and makes recommendations for a revised sampling plan for existing Pacific oyster (*Crassostrea gigas*) and mussel (*Mytilus* spp.) classification zones in the river Butley (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 Local Authorities (LAs), Inshore Fisheries and Conservation Authorities (IFCAs), Water Company (Anglian Water, AW) and the Environment Agency (EA) responsible for the production area, as well as the main Food Business Operator (FBO) for the area, was undertaken in May 2023. 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 2023. 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.

The review updates the assessment originally conducted in 2014 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.

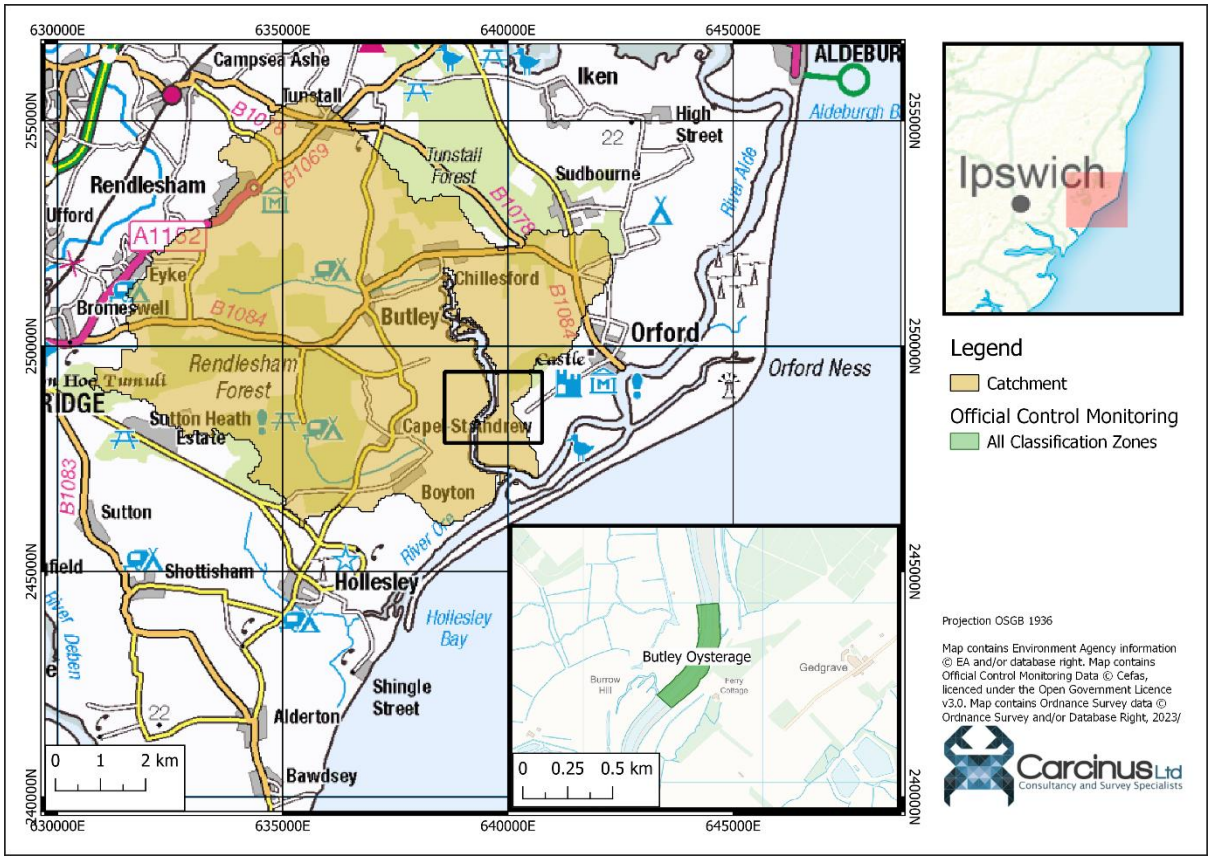


Figure 1.1 Location of the Butley bivalve mollusc production area (BMPA). Inset map shows the location of the Classification Zones.

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 May 2023;
- Only information that may impact on the microbial contamination was considered for this review; and
- Official Control monitoring data have been provided through a request to Cefas, with no additional verification of the data undertaken. The data are also available on the

Cefas data hub[1]. Results up to and including May 2023 have been used within this study. Any subsequent samples have not been included.

2 Shellfisheries

2.1 Description of Shellfishery

The Butley BMPA is contained within the Butley estuary, a small tributary of the river Ore situated on the Suffolk Coast. The river Tang meets the Butley in the outer estuary, before the waterbody joins the river Ore near Boyton, approximately 3 km from the Ore's mouth. The closest Classification Zones are those of the river Deben, 10 km farther down the coast (Cefas Reference: M010). The river Alde (8 km north) is also a designated Shellfish Water under the Water Framework Directive and Shellfish Water Protected Areas (England and Wales) Directions 2017, but is not currently classified for any species.

The Local Enforcement Authority (LEA) responsible for this fishery in terms of food hygiene Official Control purposes (including sampling) is the East Suffolk Council. The precise legal nature of the fishery is unknown, but during initial consultations the Eastern Inshore Fisheries and Conservation Authority (E-IFCA) noted that the fishery is owned and operated by a single harvester. Several E-IFCA byelaws apply to the cultivation of shellfish within the Butley (E-IFCA, 2020):

- Byelaw 3: *"No person shall fish for oysters, mussels, cockles, clams, callops or queens except by hand or with a hand rake…".*
- Byelaw 4: *"No person shall remove from any fishery, or from one part of a fishery to another part thereof, any mussel (Mytilus edulis) less than 50 mm in length…".*
- Byelaw 8: *"The Committee may, for the purpose of protection of the fishery, fishery management and controlling the level of exploitation, and after consultation with persons or bodies appearing to them to represent local fisheries interests, close for a specifiable period any shellfish fishery, or part thereof, provided the Committee has been advised by fishery scientists who appear to them to be suitably qualified, as to the need for such action…".*

The 2014 Sanitary Survey made recommendations for the creation of Classification Zones for Pacific oysters, noting that there had been previous, unsuccessful attempts to culture mussels in the estuary. There are however currently active classification zones for Pacific oysters and mussels. A summary of the fishery for each species is summarised in the sections below.

2.1.1 Pacific oysters

The 2014 Sanitary Survey describes that the fishery for Pacific oysters in the Butley is bed culture, where oysters are bought from external hatcheries and laid on the seabed until they have reached market size. During initial consultations, E-IFCA stated that the spat for

[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/.

this operation is sourced from North America. There are no minimum landing sizes, close seasons or other conservation controls for the harvest of this species. The LEA stated that the current output of this fishery is 30 tonnes per annum, this represents a marked increase on the output described in the 2014 Sanitary Survey (5 tonnes per annum).

2.1.2 Mussels

An application to classify mussels for harvest within the river Butley was submitted by the LEA in March 2022, and the CZ has been formally classified since November 2022. This fishery also runs as a bed culture operation. No conservation controls other than the minimum landing size of 50 mm length apply. During initial consultations, the LEA stated that the current output of this fishery is approximately 5 tonnes per annum.

2.1.3 Other species

During initial consultations, the authors of this review were advised that various clam species (*Mercenaria mercenaria*, *Tapes* spp. etc.) are occasionally found within the BMPA, but that classification is not currently required. During secondary consultation it was confirmed that native oysters were not classified. The LEA and FBO confirmed classification is desired. This has been reflected in the recommended sampling plan provided in Sections 8 and 9.

2.2 Classification History

The 2014 Sanitary Survey recommended the creation of a single Classification Zone within the Butley BMPA, covering the entirety of the oyster growing and nursery area. This CZ has been classified continually since then. The same area was also classified for mussels in 2022. The location and classification status of all active CZs, along with all RMPs sampled in the area since 2010, are presented in Table 2.1 and Figure 2.1.

Table 2.1 Summary of all currently active classification zones in the Butley BMPA.

Classification Zone	Species	Current Classification (as of June 2023)
Butley Oysterage	Pacific oysters	B-LT
	Mussels	C

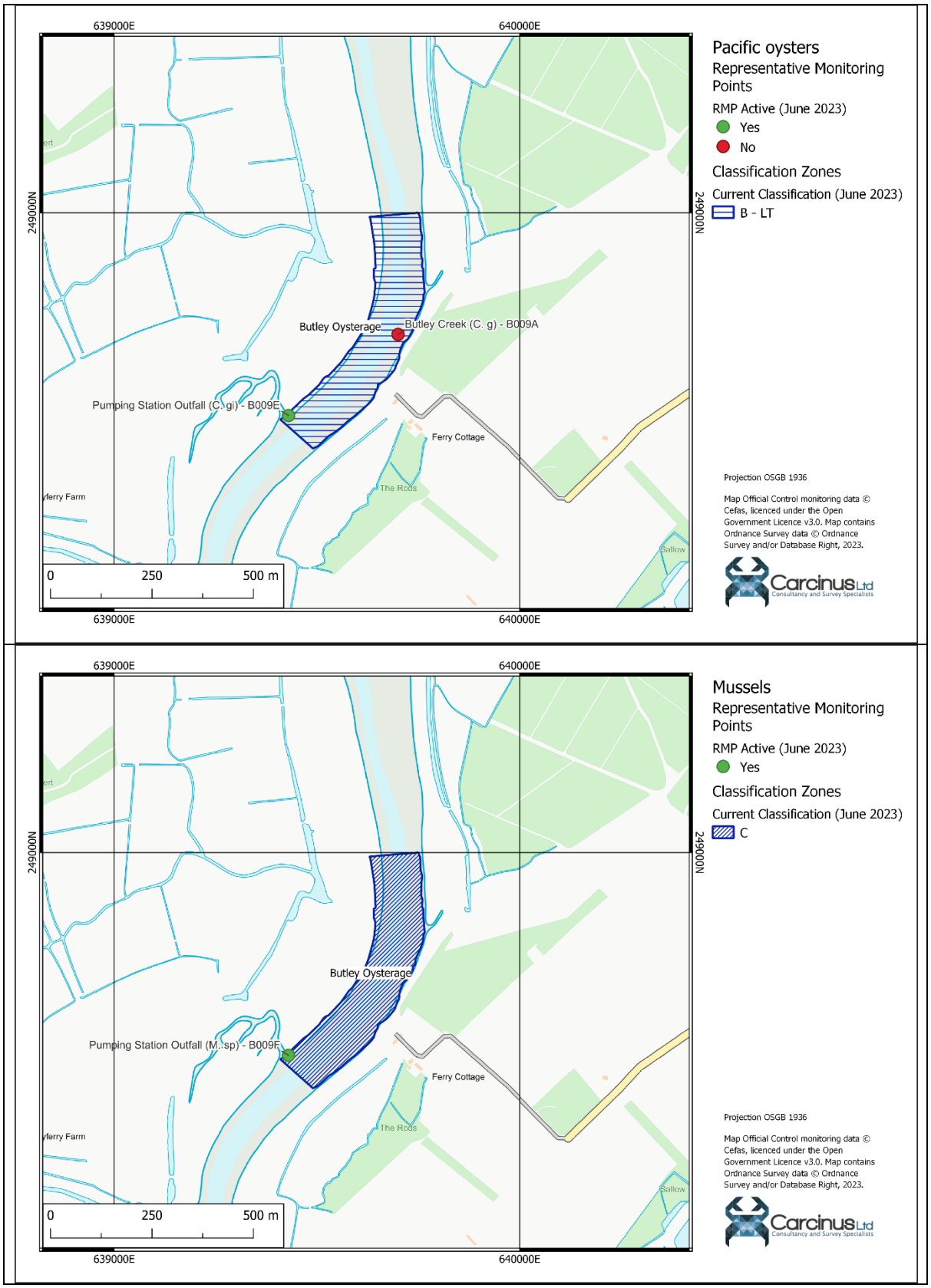


Figure 2.1 Current classification zones and associated Representative Monitoring Points in the Butley BMPA.

3 Pollution sources

3.1 Human Population

The 2014 Sanitary Survey cites population data for the catchment based on the 2001 Census and notes that population data for the majority of the catchment were missing from the 2011 Census dataset available at the time of publication of that report. However, as the 2011 Census is more relevant to the distribution of human population in the catchment at the time of publication of the original sanitary survey, the results of that Census have been compared to that of the 2021 Census to give an indication of population trends across the catchment in the last 10 years. Changes in human population density within Census Super Output Areas (lower layer) in the Butley catchment at the 2011 and 2021 Censuses are shown in Figure 3.1.

Figure 3.1 shows that the catchment of the Butley BMPA is predominantly rural, with very low population densities throughout. The main population centres within the catchment continue to be the villages of Rendlesham and Sutton Heath, both of which are in the upper reaches of the catchment. Even within these conurbations however, population densities are less than 1000 people per km² and in the areas adjacent to the estuary population densities are less than 50 people per km². At the 2011 Census, the population in the catchment was approximately 9430. By the 2021 Census, the population had increased to 10,107, an increase of 7.18%. The Shellfish Water Action Plan for the Alde and Butley, published in 2021, classifies the contribution of diffuse urban contamination as being 'low'[2], and the findings of this study support that assessment. The Local Plan for East Suffolk Council (East Suffolk Council, 2020) does not list any areas near the Butley BMPA as being designated for housing development, and so it is not expected that the risk associated with urban runoff will increase in the coming years.

The 2014 Sanitary Survey does not cite any tourism statistics for the area. In the Suffolk Coasts and Heaths Area of Outstanding Natural Beauty (AONB), there were approximately 3.7 million day trips made to the area in 2014, with the majority of these visits happening between June and September (Jarques, 2015). In 2021, there were approximately 3.3 million day trips made (Jarques, 2021), again with the majority of visitors coming in summer months. There may be some increased loading to the wastewater treatment network expected in summer months, but no information has been received to suggest that the existing wastewater treatment network is insufficient to handle this increase. Full details of the changes to the wastewater treatment network are discussed in the next section.

Analysis of changes to Census data for the catchment suggests that the area continues to be very rural, with a low risk of contamination from urban sources as the main population centres are in the upper reaches of the catchment. Overall, the recommendations made in the 2014 Sanitary Survey to account for the impact of human populations remains valid.

[2] Low contribution: estimated to account for less than 10% of contamination affecting a particular shellfish water.

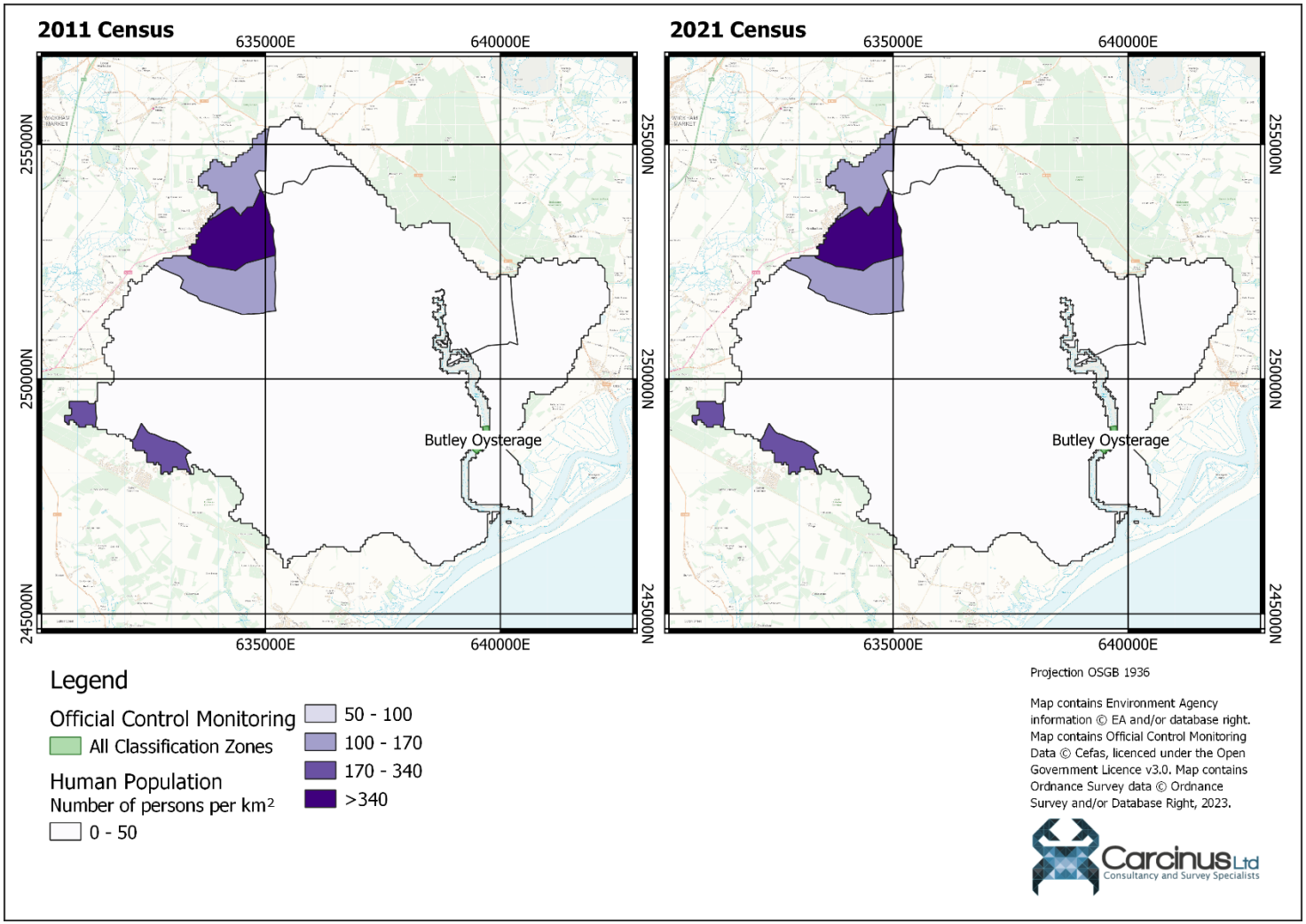


Figure 3.1 Human population density in Census Super Output Areas (lower layer) wholly or partially contained within the Butley catchment at the 2011 and 2021 Censuses.

3.2 Sewage

Details of all consented discharges in the vicinity of the Butley BMPA were taken from the most recent update to the Environment Agency's national permit database at the time of writing (June 2023). The locations of these discharges within the catchment and near the Classification Zones are shown in Figure 3.2.

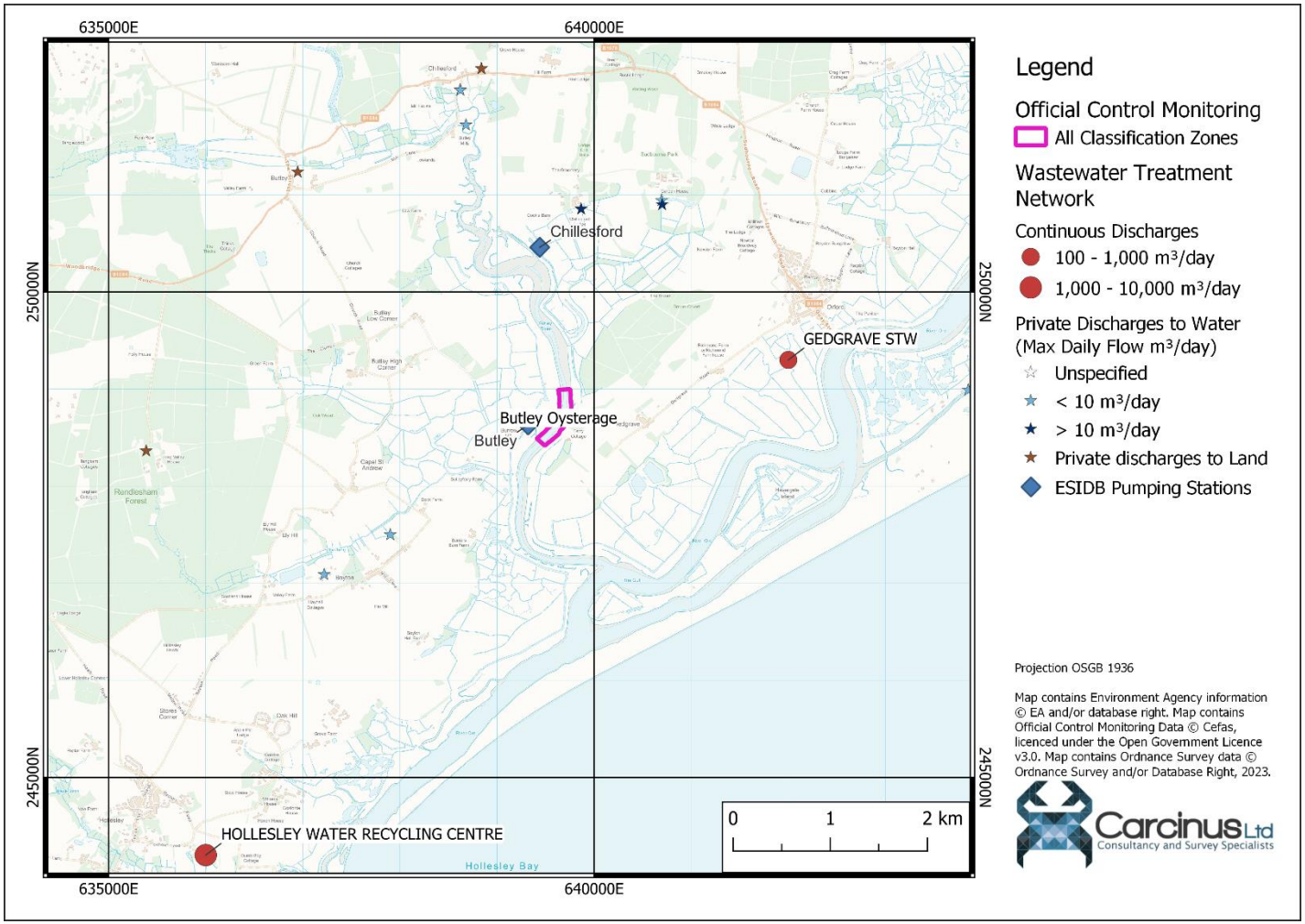


Figure 3.2 Locations of all consented discharges in the vicinity of the Butley Catchment. Details of continuous discharges are provided in Table 3.1.

Table 3.1 Details of all continuous discharges within the vicinity of the Butley BMPA.

Discharge	Permit Number	Receiving Water	Outlet NGR	Treatment	Dry Weather Flow (m^3/day)	Distance from centre of nearest CZ (km)
Gedgrave STW	AW4TS374BX	Marsh Drain (River Ore Tributary)	TM 42000 49300	Biological Filtration	188	2.40
Hollesley Water Recycling Centre	AW4NF675X	Black Ditch River Ore	TM 36000 44200	Biological Filtration	1,400	5.55

The water-company owned sewerage infrastructure within the Butley catchment is very sparse, reflecting the small population size of the area. There are no continuous discharges that discharge to watercourses within the Butley catchment. The only discharge with the potential to impact the bacteriological water quality is the Gedgrave STW, which discharges to a marsh drain entering the river Ore channel. Some impact from this discharge may occur on a flooding tide (see Section 4). Any impacts are considered to be minimal as the consented discharge volume is only 188 m^3/day (which is unchanged from the 2014 Sanitary Survey) and there is limited pathway for connectivity. The 2014 Sanitary Survey also mentions the Hollesley STW, but the impact of this discharge will also be minimal given the distance from the outfall to the *Butley Oysterage* CZ.

There are no water company owned intermittent discharges (Combined Storm Overflows (CSOs), Storm Tank Overflows (STOs) and Pumping Station Emergency Overflows (PSs)) within the vicinity of the Butley BMPA. This situation has not changed since the 2014 Sanitary Survey was published.

During initial consultations, Anglian Water stated that they intend to carry out a modelling investigation during AMP8 (2025 – 2030) to fully investigate the impact of its assets on the Butley shellfish water, but overall, these impacts are considered to be minimal. The Shellfish Water Action Plan for the Alde and Butley, published in 2021, classifies the contribution of water company discharges to contamination levels within the river Butley as being 'low', and the findings of this review support that assessment.

In addition to the water company owned infrastructure, there continue to be a few private discharges within the vicinity of the Butley BMPA. Limited details of these discharges can be provided due to data protection requirements, but the impact of these discharges is considered to be minimal, as none are within 2 km and none have consented discharge volumes above 15 m^3/day.

Overall, the wastewater treatment network of the Butley area continues to be relatively sparse, reflecting the small population size. There have been no improvements/upgrades of note to the infrastructure, but the impact continues to be small. No updates to the sampling plan are necessary, as the recommendations made in the 2014 sanitary survey to account for the impact of this source of pollution remains valid.

3.3 Agricultural Sources

The 2014 Sanitary Survey cites livestock population data for the Butley catchment based on the 2010 Livestock Census. 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 for Environment, Food and Rural Affairs (DEFRA) for livestock populations within the catchment presented in Figure 1.1 for 2013 and 2021 based on the June Survey of Agriculture and Horticulture[3]. The authors of this review were advised that there were fewer than five agricultural holdings within the catchment provided, and so no livestock population data could be provided to prevent disclosure of information about individual holdings.

The principal route of contamination of coastal waters by livestock is surface runoff carrying faecal matter. The change in land cover of the Butley catchment between 2012 and 2018 is shown in Figure 3.3. This figure confirms the findings of Section 3.1, that the catchment is predominantly rural with only a few small urban areas in the upper reaches of the catchment. The figure does however show that the land immediately upstream of the Classification Zones on both sides of the estuary, and level with the Classification Zones on the western side of the estuary, is reserved for pasture. Whilst whatever population of livestock is there is likely to be small, there may be some risk from agricultural pollution, particularly during periods of heavy rainfall. Pasture areas adjacent to shorelines can 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. During initial consultations, the EA did state that there had been a pollution incident near Chillesford (at the head of the Butley river and upstream of the CZ) in 2020, related to pig manure storage in a field near Chillesford at the head of the estuary. This event was minor and dealt with by EA officers, and no other agricultural pollution events have occurred in the last five years. During initial consultations, the authors of this review were advised that a flood defence river wall runs along both sides of the river, meaning that any agricultural runoff is prevented from draining directly to the shellfishery, and will instead reach the river via small drainage channels and pumping stations.

[3] June Survey of Agriculture and Horticulture. Further information available at: https://www.gov.uk/guidance/structure-of-the-agricultural-industry-survey-notes-and-guidance#june-survey-of-agriculture-and-horticulture-in-england.

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. 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). 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. During initial consultations, the EA confirmed that there are no other byelaws relating to the usage of slurry in this area, so all activities are regulated under the existing legislation.

The Shellfish Water Action Plan for this area states that the contribution of agricultural contamination to overall pollution levels in the Butley Shellfish Water is 'medium'[4]. This desktop assessment supports that conclusion; whilst livestock populations in the area are likely to be small, there are areas of pasture and arable farmland immediately adjacent to the Classification Zones of the Butley BMPA. However, the locations of these areas have not changed, and river walls running adjacent to the river will prevent direct contamination. There is no evidence to suggest that the recommendations made in the 2014 Sanitary Survey to account for agricultural pollution are no longer valid. No update to the sampling plan is therefore necessary on this basis.

[4] Medium contribution: defined as accounting for 10 – 39% of total contamination to a particular shellfishery.

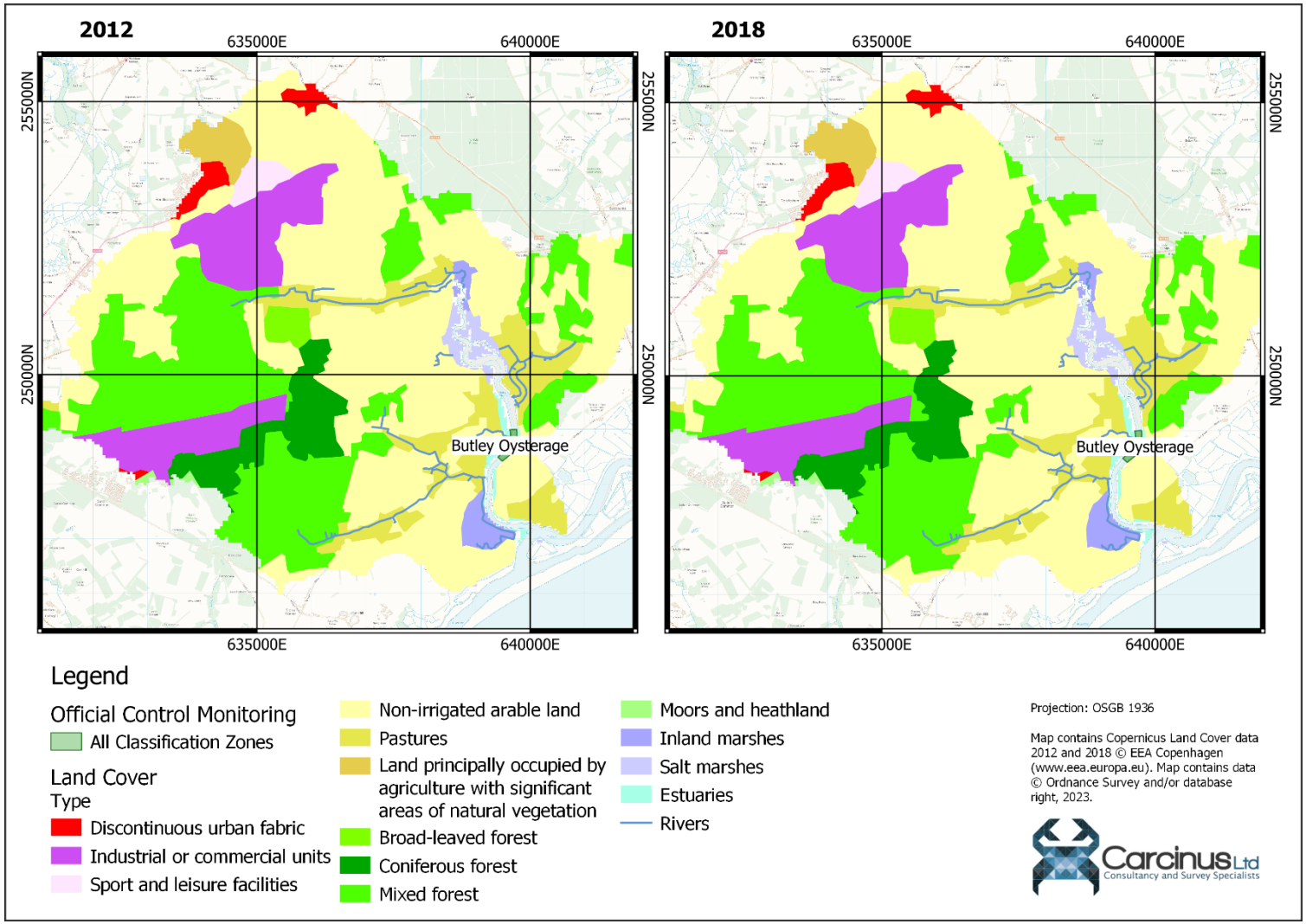


Figure 3.3 Land cover change between 2012 and 2018 for the Butley catchment.

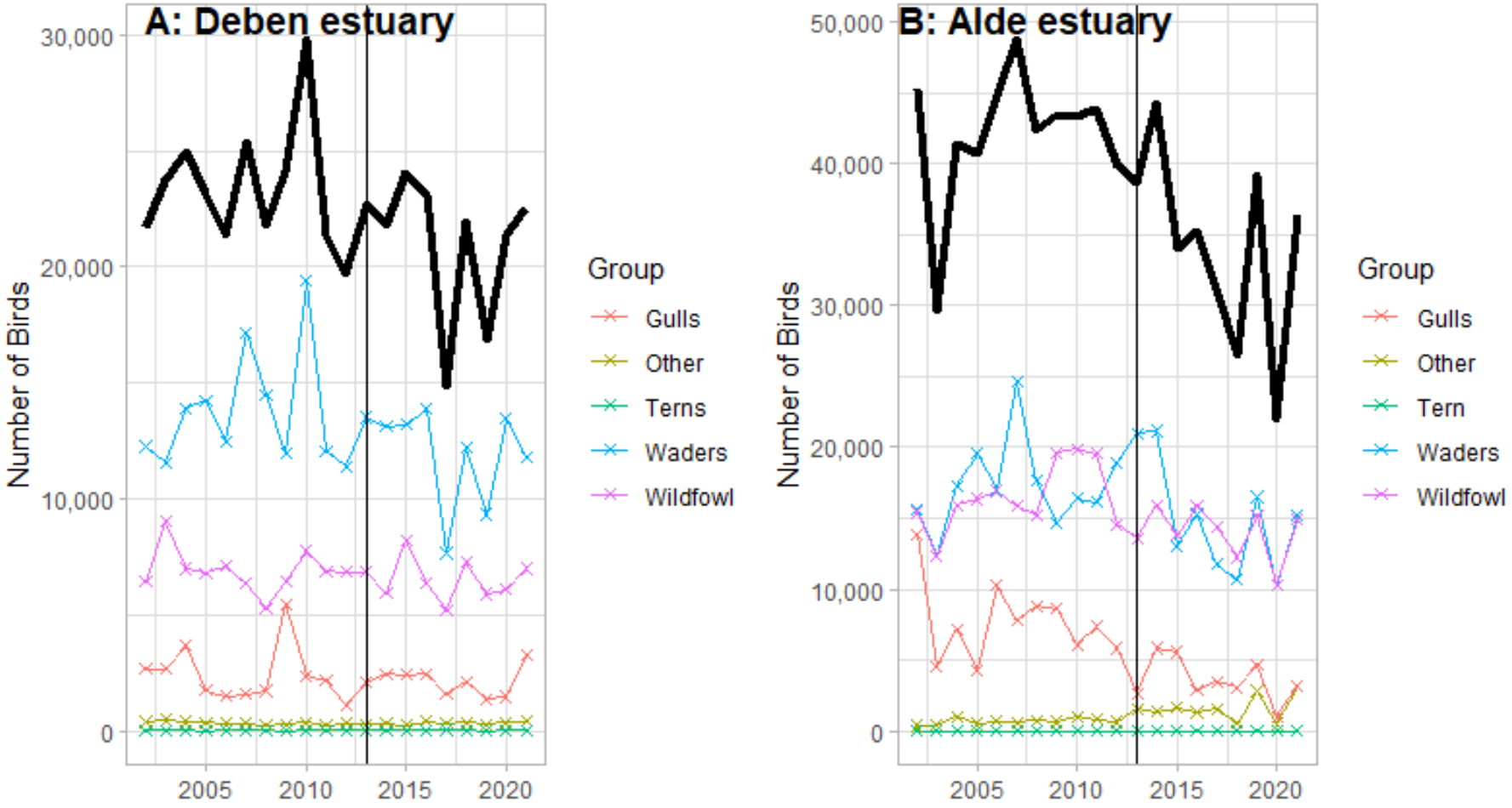
3.4 Wildlife

The 2014 Sanitary Survey describes that the Butley estuary contains a variety of habitats, including intertidal mud and sandflats, lagoons and saltmarsh areas. The land cover maps presented in Figure 3.3 suggest that these habitats remain. These habitat types support a significant diversity of wildlife. The 2014 report identifies that the most significant wildlife aggregation in terms of its impact on shellfish hygiene was overwintering waterbirds (waders and wildfowl). This group are important to the bacteriological health of a BMPA given that they frequently forage (and therefore defecate) directly on intertidal shellfish beds.

The Wetland Bird Survey (WeBS) does not provide waterbird count data for the Butley estuary, and so the counts for the two nearest estuaries, the Deben (10 km south-west) and the Alde (8 km north) have been used to give an indication of waterbird populations in the area. Figure 3.4 shows the temporal trend in total overwintering waterbird counts from the winter of 2002/2003 – 2021/2022 (the most recent for which data are available) from these two estuaries. It shows that in the Deben, waders are the dominant group in terms of population size are waders, but in the Alde waders and wildfowl have similarly sized populations. Overall, populations in the Alde are larger than the Deben. In the five winters to 2013/14, the total population of overwintering waterbirds was 18,531. In the five winters to 2021/22, the average was 16,155 (a decrease of 12%). In the Alde, the average population in the five winters to 2013/14 was 32,899 and in the five winters to 2021/22 was 24,786, a decrease of 24.6%. Both estuaries do still contain nationally and internationally significant populations of several species.

The largest aggregations of waterbirds, and therefore the highest risk of contamination, will occur in winter months. The distribution of waterbirds within the estuary will be driven by the aggregations of their foraging resource, which will shift from year to year. As a consequence, it is challenging to define RMPs which reliably capture this source of pollution. This situation has not changed since the original sanitary survey was published.

The 2014 Sanitary Survey describes that whilst the east coast of England contains significant populations of both harbour and grey seals, there were no known colonies within the estuary complex of which the Butley forms a part. The populations within the Thames estuary and the estuaries of the Essex coast are increasing (Cox *et al.*, 2020), and so it is likely that animals will visit the estuary from time to time when foraging. The FBO agreed that seals are spotted more frequently than usual in the estuary. However, as described in the 2014 Sanitary Survey, their impacts will be minor at most and spatially unpredictable, which is challenging to account for in the sampling plan. No update to the sampling plan is therefore necessary.



(WeBS) data from Waterbirds in the UK 2021/22 © copyright and database right 2023, licenced under the Open Government Licence v3.0.

Figure 3.4 Temporal trend in waterbird counts from the Deben and Alde estuaries. Data from the Wetland Bird Survey (Austin et al.*, 2023).*

The Shellfish Action Plan for this waterbody classifies Animal/Bird contamination as being of 'medium' contribution to overall levels of contamination in the shellfishery. Waterbird populations are the main wildlife group likely to contribute significant amounts of bacteriological contamination to the BMPA, although it remains challenging to account for the pollution from wildlife in any updated sampling plan, due to the spatial and temporal variability of the pollution source. Some minor impacts from seals may occur, but again it is not possible to reliably account for this in any updated sampling plan.

3.5 Boats and Marinas

The discharge of sewage from boats is a potentially significant source of contamination to the shellfish beds within the Butley 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 2014 Sanitary Survey. Their geographical positions are presented in Figure 3.5.

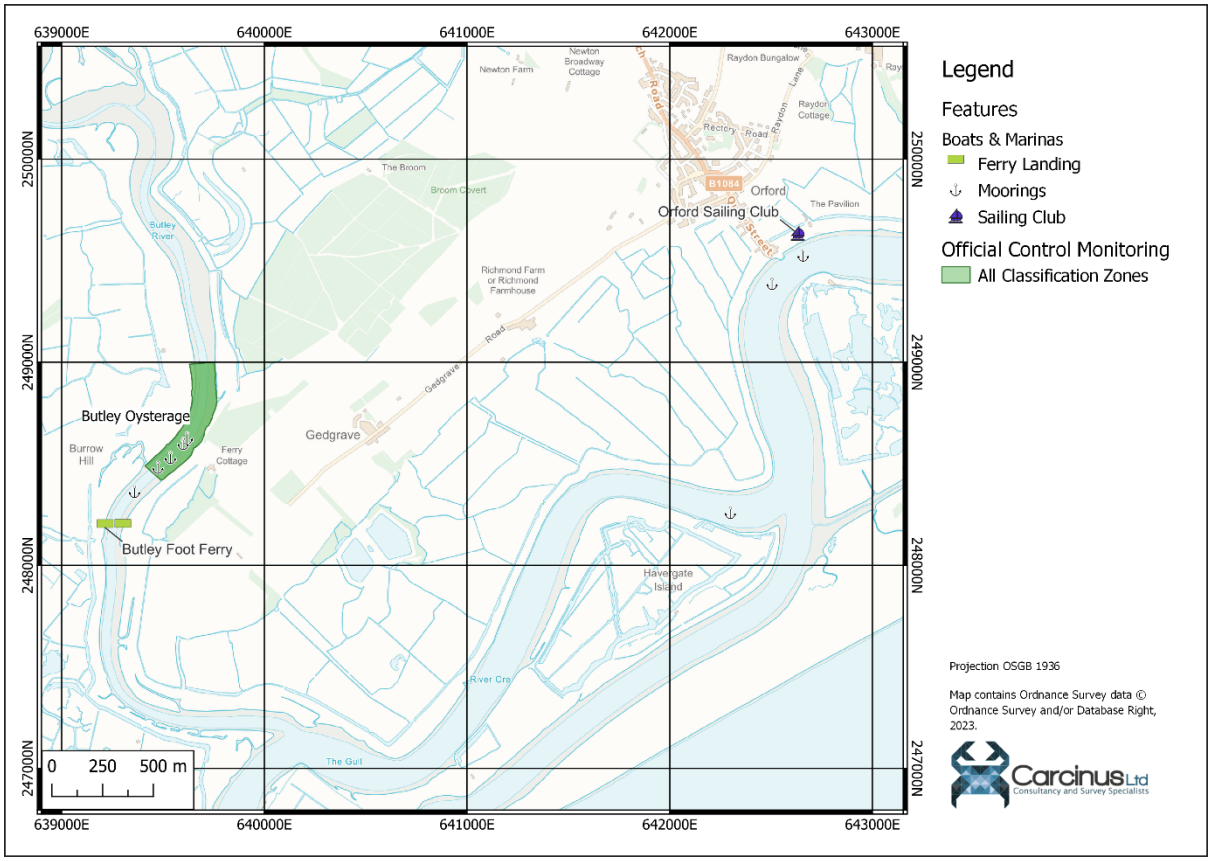


Figure 3.5 Locations of boats, marinas and other boating activities in the vicinity of the Butley BMPA.

The 2014 Sanitary Survey describes that there would be no merchant shipping within the area due to the lack of commercial ports and shallow nature of the estuary. There is a small fishing fleet in the area, with five fishing vessels under 10 m listing Orford as their home port (gov.uk, 2023). There are some moorings within the estuary and the adjacent Alde/Ore channel, evidence that pleasure craft do visit the area on occasion. There continue to be no

marinas with pump out facilities in the area, and so pleasure craft of a sufficient size to contain on board toilets may make overboard discharges from time to time, particularly when moving through the main navigational channels or moored overnight. Satellite imagery suggests that there are some moorings within the *Butley Oysterage* CZ. The greatest risk of this source of contamination will occur in the summer months when vessel usage is at its highest. During initial consultations, the FBO confirmed that there is no recreational boat activity in winter months, and whilst there is some activity in summer months, vessels rarely progress farther up the estuary than the Butley Ferry.

Comparison with the situation described in the 2014 Sanitary Survey suggests that overall, the level of recreational boating activity in the area remains similar, and there is a chance that the main navigational channels and areas of moorings will receive some contamination, particularly in the summer. However, the recommendations made in the 2014 report remain valid as the areas at risk have not changed.

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. The Shellfish Water Action Plan for this area describes that due to the remote nature of the shellfish water, no impacts from utility misconnections are expected.

There are footpaths adjacent to the Butley estuary, dog walking is likely to take place. Areas of saltmarsh will reduce the level of dog walking in these areas. Overall, the risk of this source of contamination is considered to be like that described in the 2014 Sanitary Survey and no update to the sampling plan is required on this basis.

4 Hydrodynamics/Water Circulation

The river Butley joins the Alde/Ore estuary approximately 4 km from that estuary's mouth, where it runs parallel with the coast behind a shingle bar. The Butley is a relatively narrow channel, 100 – 150 m wide along most of its length, flanked by areas of saltmarsh. Freshwater inputs will arise from the farther up the river Butley, as well as two pumping stations, managed by East Suffolk Drainage Board for flood defence purposes. These pumping stations are Butley, at the downstream extent of the CZ, and Chillesford, 1.5 km upstream of the CZ (Figure 3.2). Tidal circulation will be the dominant force driving water circulation, with the flooding tide bringing water up the Butley from the Alde/Ore channel. There lies the potential for shoreline contamination sources to be carried up and downstream of the discharge location.

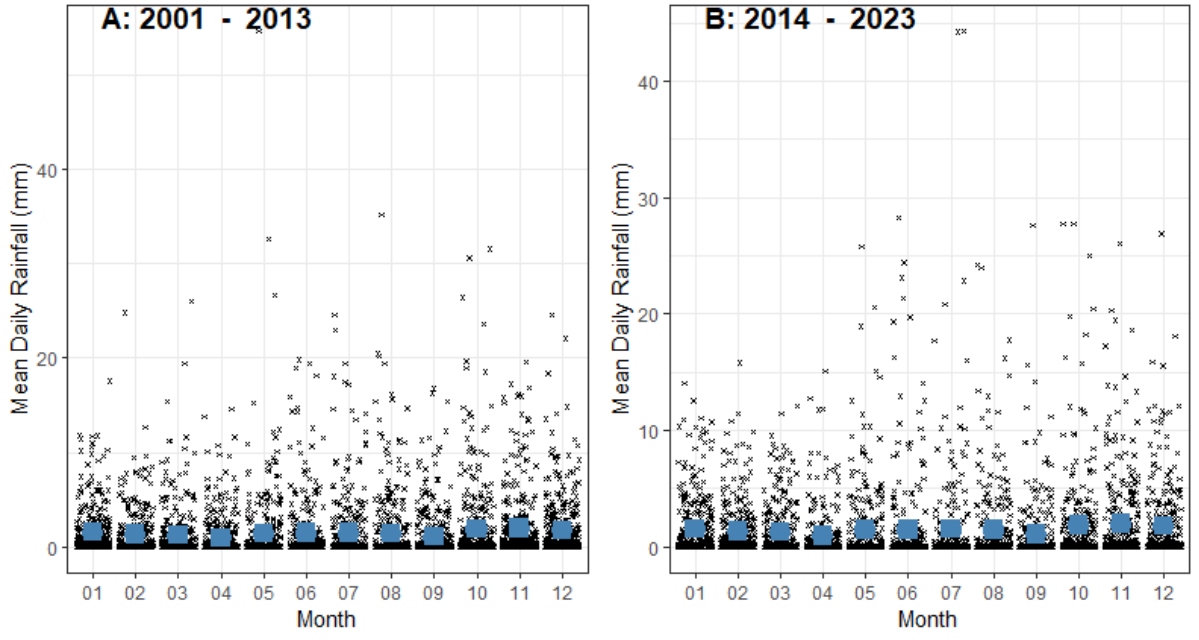
There is no evidence that the patterns of water movement within the Butley estuary will have changed significantly since the 2014 Sanitary Survey was published. No update to the sampling plan is necessary, as the recommendations made in the 2014 Sanitary Survey to account for the impact of water circulation within the Harbour continue to be valid.

5 Rainfall

A complete record of rainfall data for the Woodbridge rain gauge at TM 25920 47545 at ID: 220974) was downloaded from the Environment Agency's hydrology data explorer[5]. This station was chosen as it is the closest monitoring station to the river Butley, 13 km away. The data were subdivided into 2003 – 2012 (pre-sanitary survey) and 2013 – 2023 (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 rainfall levels per month are shown in Figure 5.1.

Table 5.1 Summary statistics for the period preceding and following the 2014 sanitary survey, from the Woodbridge rain gauge.

Period	Mean Annual Rainfall	Percentage Dry Days	Percentage Days Exceeding 10 mm	Percentage Days Exceeding 20 mm
2001 - 2013	484.8923	52.227	20.529	12.752
2014 - 2023	523.24	50.871	22.038	14.547



Archive Daily Rainfall from the Woodbridge (#220974) at NGR TM2592047545
Data accessed from the Environment Agency's Hydrology Data Explorer, licenced under the Open Government Licence v3.0.

Figure 5.1 Mean daily rainfall per month at the Woodbridge (NGR: TM 25920 47545) for the period (A) 2001 – 2013 and (B) 2024 – 2023.

[5] Environment Agency's Hydrology Data Explorer. Available at: https://environment.data.gov.uk/hydrology/explore#/landing.

The data show that the annual rainfall levels in the catchment have increased by approximately more than 35 mm per year, with the percentage of dry days decreasing and the percentage of days with heavy (>10 mm/day) rainfall increasing. However, approximately half of the days had no rainfall at all, suggesting that the area is notably 'drier' than other areas of the country. Two sample t-tests indicated that there was no significant difference ($p > 0.05$) in the mean daily rainfall per month for the 2003 – 2012 and 2013 – 2023 periods.

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 etc. would be expected to be greatest during this time. However, as the rainfall patterns have remained (statistically) similar across the two time periods, significantly altered bacterial loading due to these factors is unlikely 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 Butley BMPA since 2010 are presented spatially in Figure 6.1 and summary statistics are presented in Table 6.1. This data was obtained through a request to Cefas, but is freely available on the datahub[1].

A total of three RMPs have been sampled within the BMPA since 2010. One of these, Butley Creek B009A was sampled prior to the publication of the 2014 Sanitary Survey, and sampling stopped at this RMP in February 2015, following the recommendations of the 2014 report. The Pumping Station outfall B009E RMP has replaced it and has been sampled from March 2015 to Present. The Pumping Station Outfall B009F RMP has been sampled since March 2022, following an application to classify the *Butley Oysterage* CZ for mussel harvesting.

All three RMPs have returned at least one result above the 4,600 *E. coli* MPN/100 g threshold, but none have returned a result above the 46,000 *E. coli* MPN/100 g threshold. Results from the two Pacific oyster RMPs have been broadly similar, despite the fact the RMPs are positioned 300 m from one another and there is no temporal overlap. The results from the mussel RMP have been notably higher than results from the co-located Pacific oyster RMP. The data provided by Cefas indicates that mussel samples have frequently been hand-picked rather than dredged (in accordance with IFCA byelaws). Hand-picked samples are generally collected at low water, whereas dredged samples are more likely to have been collected at high water, which may explain the differences in *E. coli* results.

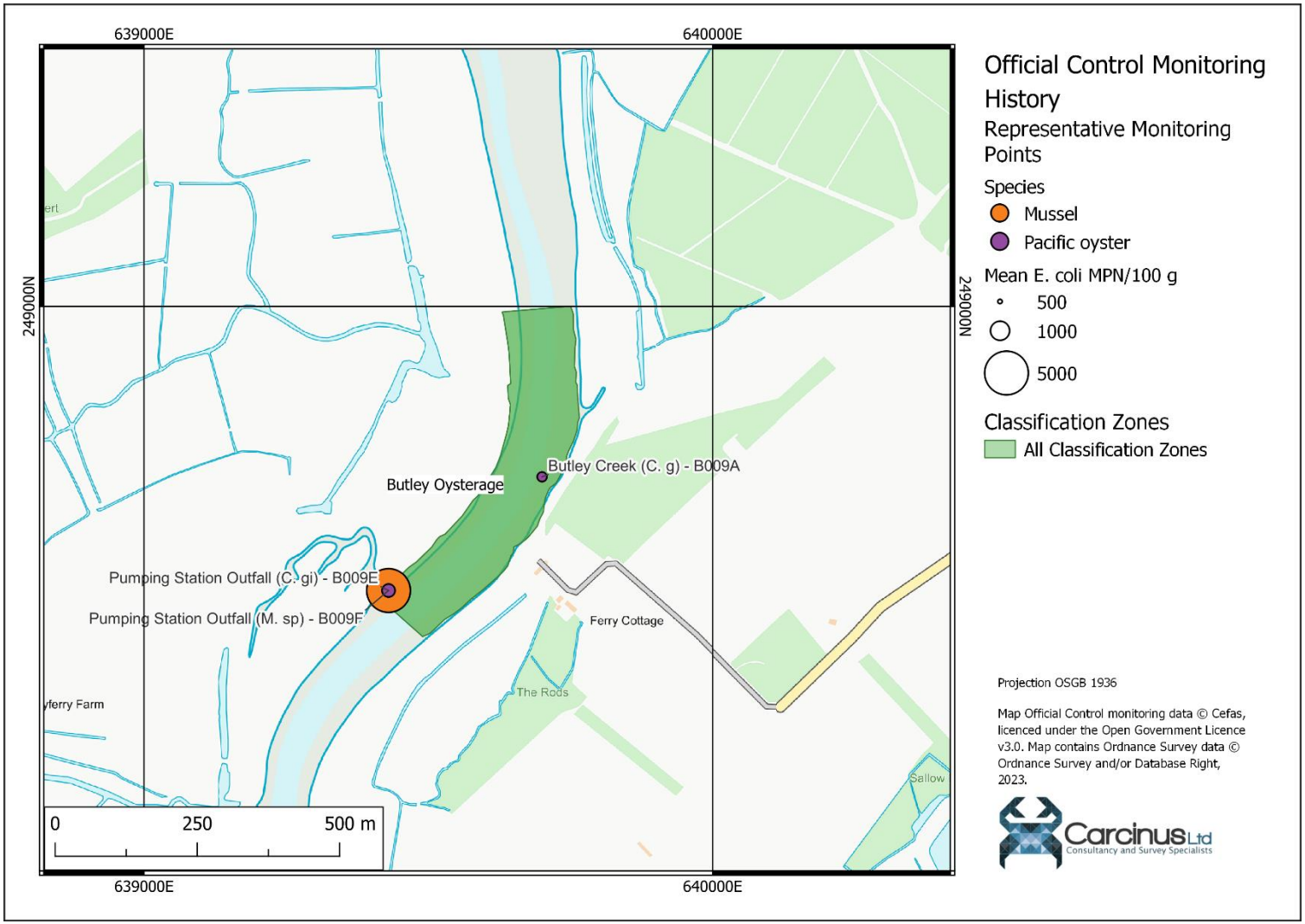


Figure 6.1 Mean E. coli results from Official Control Monitoring at bivalve RMPs in the Butley BMPA.

Table 6.1 Summary statistics of Official Control monitoring at bivalve RMPs in the Butley RMP.

RMP (Species)	NGR	Species	No.	First Sample	Last Sample	Mean	Min Value	Max Value	% > 230	% > 4,600	% > 46,000
Butley Creek (C. g) - B009A	TM39704870	Pacific oyster	66	26/01/2010	11/02/2015	583.00	20	11000	40.91	1.52	0.00
Pumping Station Outfall (C. gi) - B009E	TM39434850	Pacific oyster	102	10/03/2015	17/04/2023	698.29	18	7900	43.14	1.96	0.00
Pumping Station Outfall (M. sp) - B009F	TM39434850	Mussel	16	08/03/2022	17/04/2023	3301.13	78	35000	75.00	12.50	0.00

Figure 6.2 and Figure 6.3 present box and violin plots of *E. coli* monitoring at RMPs within the Butley 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 shows that the monitoring data from the two Pacific oyster RMPs are similar. The median result at Pumping Station Outfall B009E is slightly higher than at Butley Creek B009A, but both are below the 230 *E. coli* MPN/100 g threshold and there are no significant differences between them.

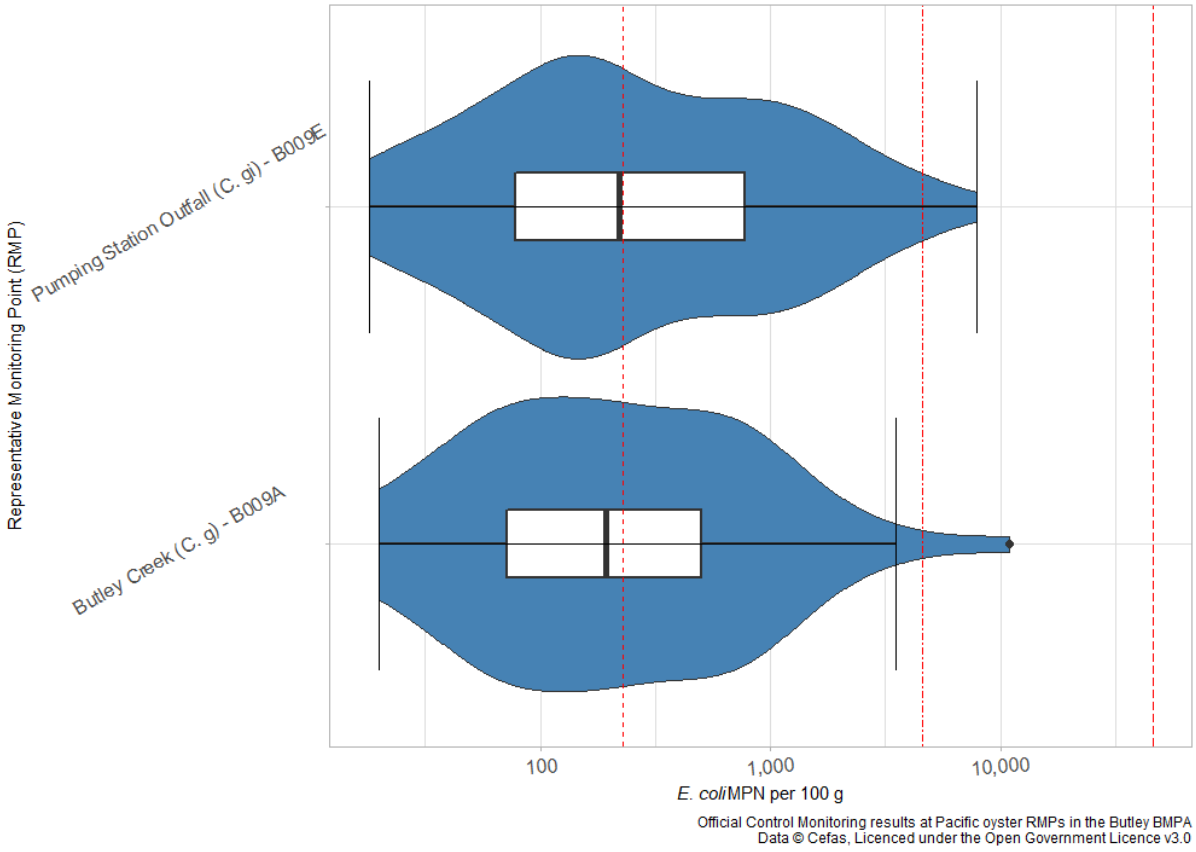


Figure 6.2 Box and violin plots of E. coli concentrations at Pacific oyster RMPs sampled in the Butley BMPA since 2010. Central line indicates median value, box indicates lower-upper quartile range and whisker indicates minimum/maximum values, excluding outliers. Boxplots are overlaid on the distribution of the monitoring data. Horizontal dashed lines indicate classification thresholds at 230, 4,600 and 46,000 E. coli MPN/100 g.

Figure 6.3 shows the monitoring data from the mussel RMP, Pumping Station Outfall B009F. The median result at this RMP is higher than either Pacific oyster RMP. No statistical comparisons are possible due to the differences in the rates of *E. coli* uptake between different species.

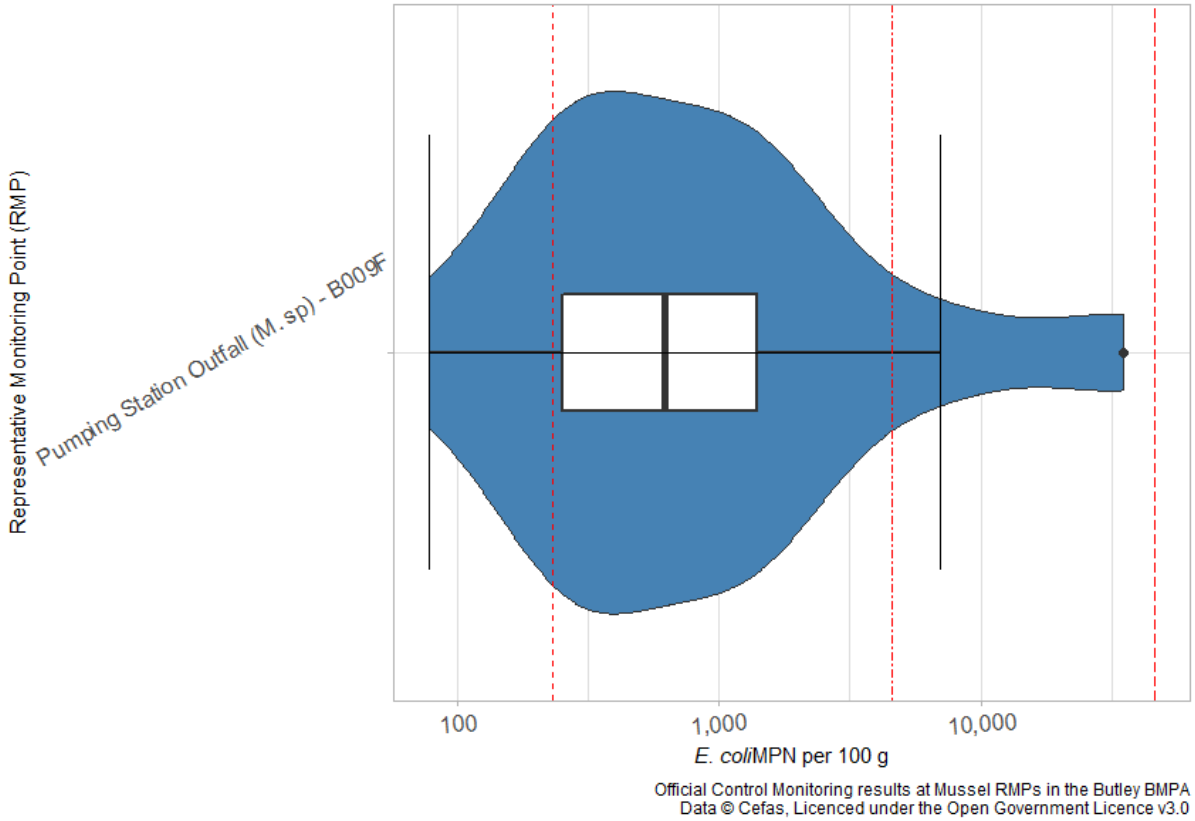


Figure 6.3 Box and violin plots of E. coli concentrations at mussel RMPs sampled in the Butley BMPA since 2010. Central line indicates median value, box indicates lower-upper quartile range and whisker indicates minimum/maximum values, excluding outliers. Boxplots are overlaid on the distribution of 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 for Pacific oysters and mussels are presented in Figure 6.4 and Figure 6.5.

The plotted monitoring data from the Pacific oyster RMPs (Figure 6.4) shows how the concentrations of *E. coli* between the two RMPs has been broadly similar. The loess model from the Butley Creek B009A data indicates that shellfish flesh hygiene was declining gradually between 2010 – 2015, but the trend in shellfish flesh hygiene from the Pumping Station Outfall B009E has been very stable, hovering around the 230 *E. coli* MPN/100 g threshold.

As there is only one year of monitoring data from the mussel RMP (Figure 6.5) no long-term patterns can be made out at this stage, though it is clear to see that the loess model sits consistently above the 230 *E. coli* MPN/100 g threshold.

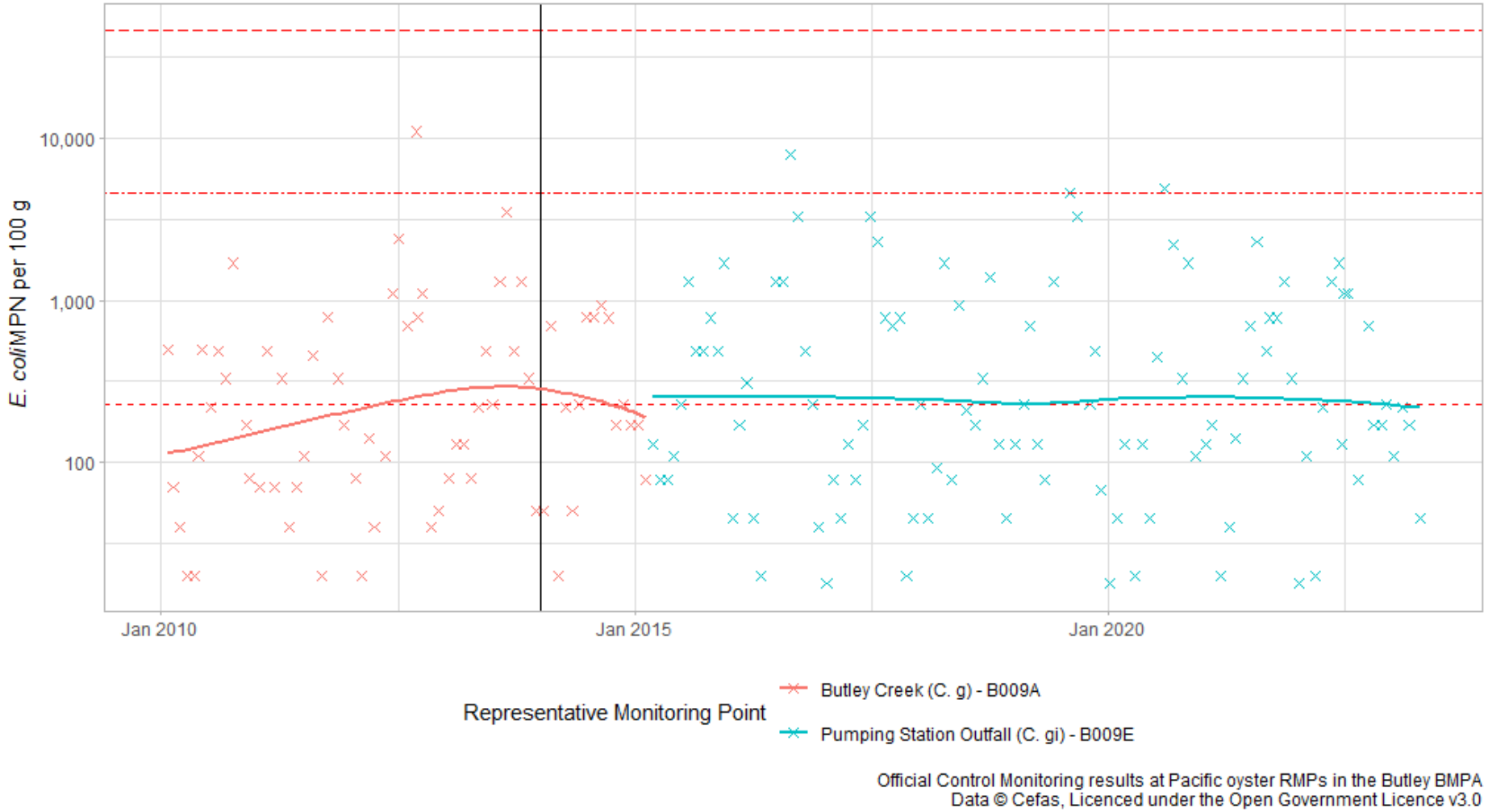


Figure 6.4 Timeseries of E. coli levels at Pacific oyster RMPs sampled in the Butley BMPA since 2010. Scatter plots are overlaid with a loess model fitted to the data. Horizontal lines indicate classification thresholds at 230, 4,600 and 46,000 E. coli MPN/100 g respectively.

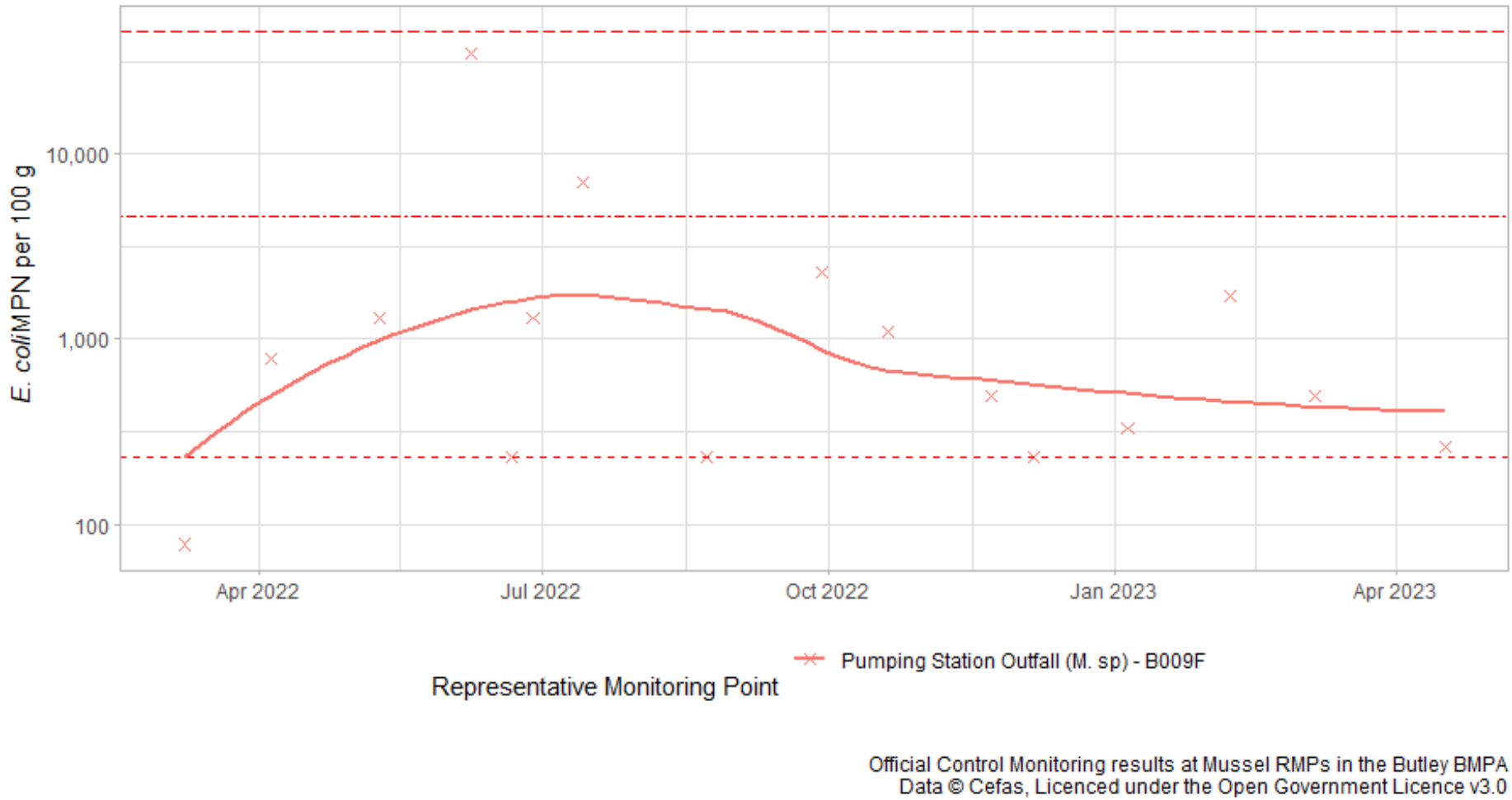


Figure 6.5 Timeseries of E. coli levels at mussel RMPs sampled in the Butley BMPA since 2010. Scatter plots are overlaid with a loess model fitted to the data. Horizontal lines indicate classification thresholds at 230, 4,600 and 46,000 E. coli MPN/100 g respectively.

6.1.3 Seasonal patterns of results

Seasonal patterns of *E. coli* levels at RMPs in the Butley BMPA were investigated and are shown for Pacific oysters in Figure 6.6 and for mussels in Figure 6.7. 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.

When the Pacific oyster data is pooled across the two RMPs, results in summer and autumn were significantly higher than results in spring and winter. This pattern suggests that discharge sources prevalent in summer and autumn, such as those from pleasure craft and livestock pollution, should be given greater consideration in any updated sampling plan.

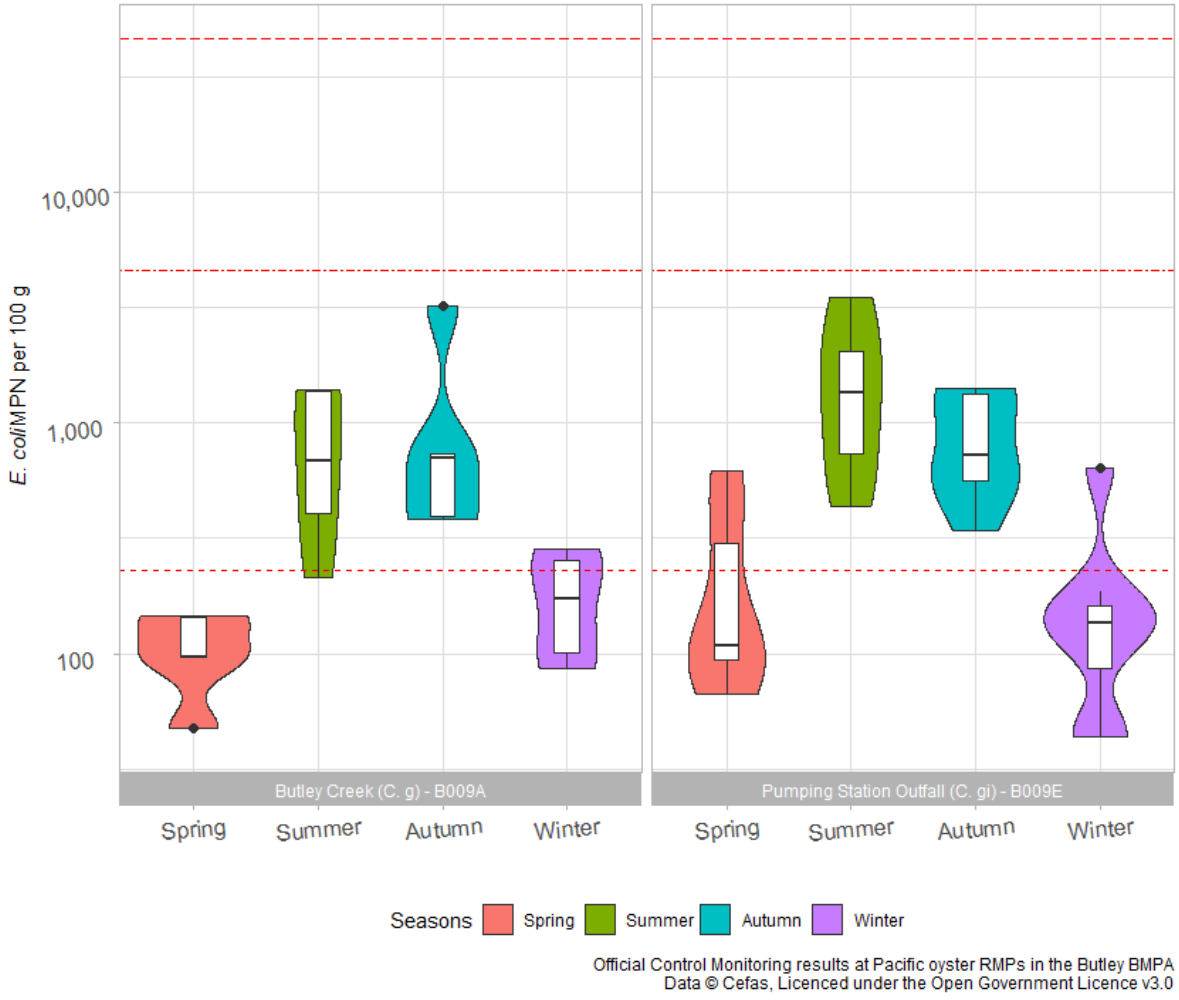


Figure 6.6 Box and violin plots of E. coli levels per season at Pacific oyster RMPs sampled within the Butley BMPA since 2010. Horizontal lines indicate classification thresholds at 230, 4,600 and 46,000 E. coli MPN/100 g.

No seasonal comparison of the mussel data is possible due to the short time the RMP has been sampled for, but the data presented in Figure 6.7 does suggest that a similar increase in summer months is occurring.

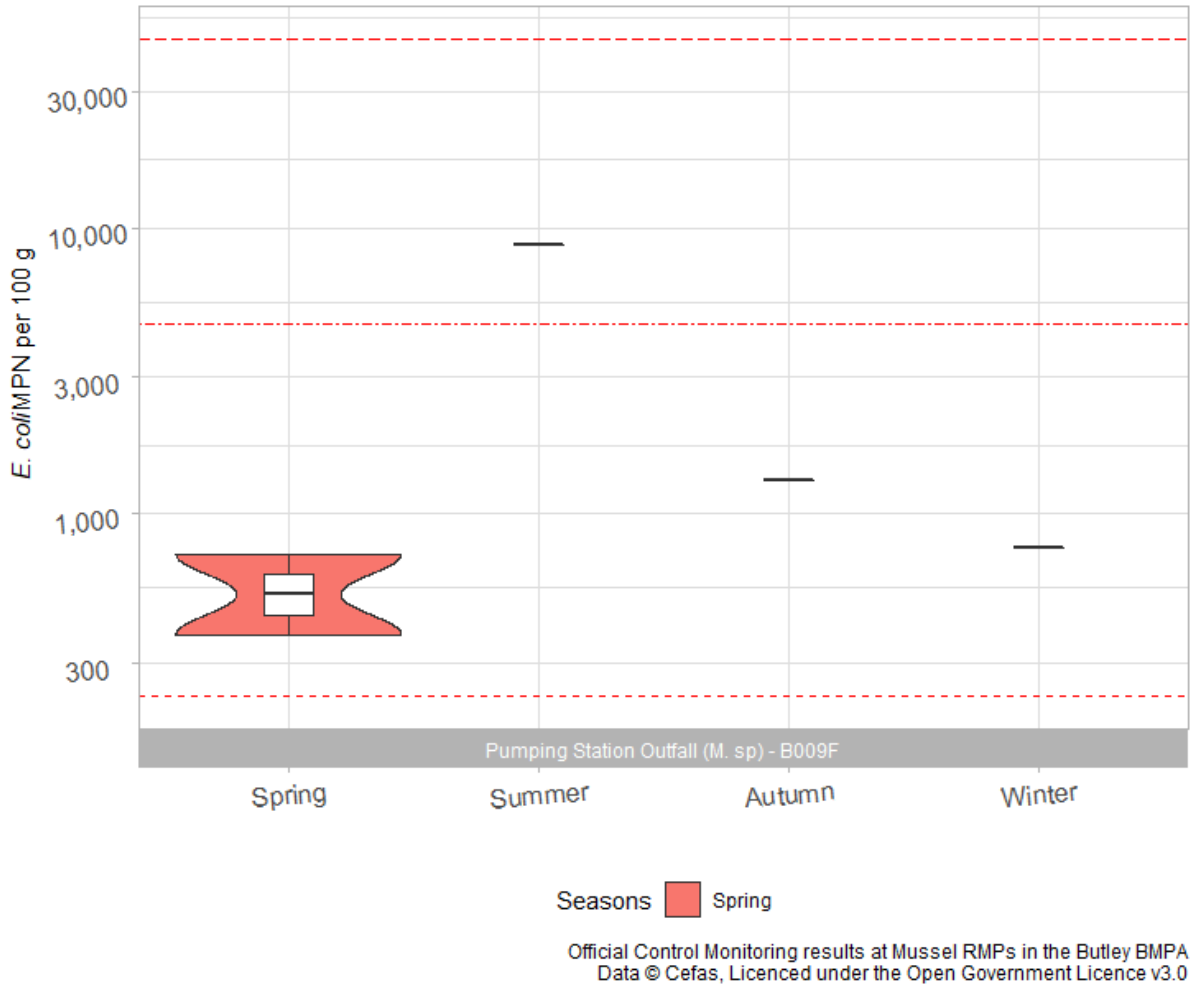


Figure 6.7 Box and violin plots of E. coli levels per season at mussel RMPs sampled within the Butley BMPA since 2010. Horizontal lines indicate classification thresholds at 230, 4,600 and 46,000 E. coli MPN/100 g.

6.2 Bathing Water Quality Monitoring

The status of EC bathing waters near to and within the BMPA is also of relevance to this review. The closest bathing water monitoring point to the Butley BMPA is Felixtowe North, which is more than 18 km from the BMPA. Monitoring data from this point has no bearing on the sampling plan for the Butley BMPA.

6.3 Action States

No Action States have been triggered within the Butley BMPA since the 2014 Sanitary Survey was published.

7 Conclusion and overall assessment

The river Butley is a small estuary that drains to the Alde/Ore Channel, the part of that estuary that runs parallel to the Suffolk coast behind a shingle bar. The BMPA is currently classified for both Pacific oysters and mussels, although mussels have only been classified for harvest since November 2022. There are some E-IFCA byelaws that apply to the harvest of shellfish in this area, which specify that all fishing must be by hand or rake, minimum sizes for mussels, and give E-IFCA the right to close the fishery on conservation grounds.

The results of the 2021 Census were compared to that of the 2011 Census to give an indication of population changes in the catchment since the 2014 Sanitary Survey was published. These data show that the population is still small, at approximately 10,000 people, but increased by 7.18% between 2011 and 2021. There are no urban conurbations in the immediate vicinity of the shellfishery. The area is likely to receive some seasonal influx of tourists, but no information has been received to date to suggest that the existing sewerage network is insufficient to handle this increase.

The wastewater treatment network in the area is sparse, with no intermittent discharges and no continuous discharges directly to the river Butley. There are some private discharges in the area but all are small, with consented discharge volumes of less than 15 m^3/day. During initial consultations, Anglian Water stated that they would be undertaking an investigation into the impact of AW assets on the Butley shellfishery during AMP8 (2025 – 2030). The impact of sewage discharges in the area is considered to be minimal, and no update to the sampling plan is necessary on this basis.

No livestock data could be provided by Defra to prevent disclosure of information about individual farms, as there are fewer than five holdings in the catchment. Land cover data does show that most of the land surrounding the estuary is agricultural, both arable and pasture. There have been occasional pollution incidents relating to agricultural pollution, and this is considered to be one of the most significant causes of microbiological contamination within the Butley BMPA.

No waterbird counts were available for the Butley estuary itself, but data for the nearby Deben and Alde estuaries shows that waterbird populations have been declining, but the area continues to support nationally and internationally significant populations of several species. It remains hard to reliably account for this source of pollution however as the aggregations of birds will shift from year to year based on the distributions of their prey.

There is considered to be no impact from merchant shipping as there are no commercial ports within the river Butley and the channel is narrow. There is a small fishing fleet that operates out of the nearby Orford, but the main pollution risk from boating activities will continue to come from pleasure craft. There are no marinas in the area, but there are several patches of moorings, including within the *Butley Oysterage* CZ. Comparison with the situation described in the 2013 Sanitary Survey suggests that overall, the level of recreational boating activity in the area remains high, and there is a chance that the main

navigational channels and areas of moorings will receive some contamination, particularly in the summer. However, the recommendations made in the 2014 report remain valid as the areas at risk have not changed.

Official Control monitoring at the two currently sampled RMPs shows that results from the mussel RMP have been notably higher than those from the co-located Pacific oyster RMP. Monitoring results at the Pumping Station Outfall B009E RMP have been very stable since sampling started in March 2015. No significant differences between the two Pacific oyster RMPs were identified. No statistical comparison between different species is possible due to the different rates of *E. coli* uptake, but it is recommended that Pacific oyster are not used as an indicator for mussels within this BMPA.

Monitoring results collected in summer and autumn months were significantly higher than those from spring and winter, suggesting that sources known to be more prevalent at these times (discharges from pleasure craft and agricultural runoff) should be taken into account in any updated sampling plan.

Based on the information available, there do not appear be any significant knowledge gaps that would justify a shoreline survey. There have been no notable changes to sources of pollution since the 2014 Sanitary Survey was published.

Having reviewed and compared the desk-based study with the findings of the original sanitary survey in 2014, the FSA is content that a shoreline assessment is not required.

8 Recommendations

Recommendations for the various classification zones within the Butley BMPA are described below and are summarised in Table 9.1.

8.1 Pacific oyster

Butley oysterage

This CZ covers an area of 0.07 km² within the river Butley. The current zone boundaries were defined in the 2014 Sanitary Survey to cover the entirety of the oyster growing and nursey area. That report did not identify any point sources of contamination within the zone, and recommended placing the RMP on the west bank at the downstream end of the CZ to capture contamination delivered by the River Tang and Butley Pumping Station. The main sources of contamination to this CZ are not considered to have changed significantly since the 2014 Sanitary Survey was published, and so the current RMP can be retained as it is still representative of the main sources of contamination.

8.2 Native oyster

Butley oysterage

This CZ covers the same section of the river as the Pacific oyster CZ of the same name. A classification for native oysters is not currently listed on the sampling plan or classification

list published by the FSA[6]. However, during secondary consultation the LEA and FBO confirmed that there is a desire for classification of this species. A Cefas report into the use of indicator species (Cefas, 2014) found that the rate of *E. coli* uptake between Pacific and native oysters is similar, and so it is recommended that the results from the Pumping Station Outfall B009E Pacific oyster RMP be used to classify this native oyster CZ.

8.3 Mussels

Butley oysterage

This CZ has been classified since 2022, covers the same area and is classified based on samples from an RMP in the same location as the Pacific oyster CZ of the same name. Currently, the CZ is classified based on mussel samples, and it is recommended that this continues as the recent monitoring history indicates that the mussel samples are returning higher concentrations of *E. coli*. Should the LEA require, it may be appropriate to classify the Pacific oyster CZ based on the mussel samples, although this may result in a downgrade to the classification status of the Pacific oyster CZ.

9 General Information

9.1 Location Reference

Production Area	**Butley**
Cefas Main Site Reference	M009
Ordnance survey 1:25,000	Explorer 212
Admiralty Chart	2693

9.2 Shellfishery

Species	Culture Method	Seasonality of Harvest
Pacific oysters (*Crassostrea gigas*)	Cultured	Year Round
Native oysters (*Ostrea edulis*)	Cultured	Year Round
Mussels (*Mytilus* spp.)	Cultured	Year Round

9.2.1 Local Enforcement Authority(s)

Name	**East Suffolk Council**
Website	https://www.eastsuffolk.gov.uk
Telephone number	0333 016 2000
E-mail address	environment@eastsuffolk.gov.uk

[6] Current Classification List and Sampling Plans. Available at: https://www.food.gov.uk/business-guidance/shellfish-classification#current-classification-list-and-sampling-plans.

9.3 Sampling Plan

*Table 9.1 Proposed sampling plan for the Butley 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
Butley Oysterage (Pacific and native oysters)	B009E	Pumping Station Outfall	TM 3943 4850	52° 04.982'N 01° 29.589'E	Pacific oysters; **Native oysters**	Dredge	Dredge or Hand	Pacific oysters (*C. gigas*)	50 m or 10 m	Monthly
Butley Oysterage (Mussels)	B009F	Pumping Station Outfall	TM 3943 4850	52° 04.982'N 01° 29.589'E	Mussels	Dredge	Dredge or Hand	Mussels (*Mytilus* spp.)	50 m or 10 m	Monthly

10 References

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Jarques, S. (2021) *Economic Impact of Tourism: Suffolk Coast & Heaths 2021*. Destination Research. Available at: https://www.suffolkcoastandheaths.org/wp-content/uploads/2022/11/Coast-Heaths-AONB-Report-2021-1.pdf.

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Appendices

Appendix I. Butley Sanitary Survey Report 2014

Centre for Environment Fisheries & Aquaculture Science

www.cefas.defra.gov.uk

EC Regulation 854/2004

CLASSIFICATION OF BIVALVE MOLLUSC PRODUCTION AREAS IN ENGLAND AND WALES

SANITARY SURVEY REPORT

Butley

March 2014

Food Standards Agency

Follow hyperlink in image to view full report.

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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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