



Centre for Environment  
Fisheries & Aquaculture  
Science



**C6278**

# **Lower Fal Estuary, Restronguet Creek Provisional RMP Assessment**

## Cefas Document Control

|                                |  |
|--------------------------------|--|
| <b>Report Title</b>            | Lower Fal Estuary, Restronguet Creek   |
| <b>Project Name</b>            | Provisional RMP and boundary assessment for new shellfish harvesting areas – England & Wales |
| <b>Client/Customer</b>         | Food Standards Agency  |
| <b>Cefas Project Reference</b> | C6728  |
| <b>Document Number</b>         | C6728-2015-E1  |
| <b>Revision</b>                | V1.0   |
| <b>Date</b>                    | 06/10/2015   |

### Revision History

| Revision number | Date       | Pages revised | Reason for revision               |
|-----------------|------------|---------------|-----------------------------------|
| V0.2            | 05/10/2015 | -             | Draft for internal review         |
| V1.0            | 06/10/2015 | all           | Report for submission to customer |
|                 |            |               |                                   |
|                 |            |               |                                   |
|                 |            |               |                                   |

### Approvals

|                 | Name                     | Position                              | Date       |
|-----------------|--------------------------|---------------------------------------|------------|
| <b>Author</b>   | David Walker, Fiona Vogt | Provisional RMP Assessment team       | 05/10/2015 |
| <b>Checked</b>  | Michelle Price-Hayward   | Group Manager Food Safety             | 06/10/2015 |
| <b>Approved</b> | Ron Lee                  | Principal Shellfish Hygiene Scientist | 06/10/2015 |

This report was produced by Cefas for its Customer, FSA, for the specific purpose of providing a provisional RMP assessment as per the Customer's requirements. Although every effort has been made to ensure the information contained herein is as complete as possible, there may be additional information that was either not available or not discovered during the assessment. Cefas accepts no liability for any costs, liabilities or losses arising as a result of the use of or reliance upon the contents of this report by any person other than its Customer.

Centre for Environment, Fisheries & Aquaculture Science, Weymouth Laboratory, Barrack Road, The Nothe, Weymouth DT4 8UB. Tel 01305 206 600 [www.cefas.defra.gov.uk](http://www.cefas.defra.gov.uk)

## Contents

|  |          |
|--|----------|
| <b>Fishery.....</b>                                | <b>1</b> |
| <b>Sources of Contamination .....</b>              | <b>1</b> |
| <b>Classification and monitoring history .....</b> | <b>3</b> |
| <b>Water circulation .....</b>                     | <b>4</b> |
| <b>Provisional RMP(s) and production area.....</b> | <b>5</b> |
| <b>References .....</b>                            | <b>7</b> |

## Fishery

An application was received for shellfish hygiene classification of wild mussels (*Mytilus spp.*) at the outer reaches of Restronguet Creek in the Lower Fal Estuary near Penryn, Cornwall. This area falls within what will be the Fal Fishery Order 2015. The entire extent of the area identified for harvesting is currently classified for native oysters (*Ostrea edulis*) and is within lines bounded by 50°11.688'N 05°3.842'W to 50°11.634'N 05°3.595'W, 50°11.676'N 05°3.404'W to 50°11.418'N 05°3.404'W and mean high water. The method of harvest is to be hand picking, with harvest predicted to occur year-round.

The application estimated the annual yield to be approximately 5 tonnes. An Internet search was undertaken for information on mussel stocks in the area however none was found. Harvesting is intended to be conducted by hand picking year round.

## Sources of Faecal Contamination

Figure 1 shows the location of potentially significant sources of contamination to Restronguet Creek, including all sewage discharges within 2 km of the application area. Table 1 lists the continuous sewage discharges within this area which have permitted flow rates of at least 5 m<sup>3</sup>/day.

**Table 1: Continuous sewage discharges of over 5 m<sup>3</sup>/day to watercourses within 2 km of the area requiring classification**

| Name                                | Dry weather flow m <sup>3</sup> /day | Treatment type          | NGR          | Receiving environment                           |
|-------------------------------------|--------------------------------------|-------------------------|--------------|---|
| Carnon Downs STW                    | 1,010                                | Biological Filtration   | SW7868040000 | River Carnon                                    |
| Mylor Bridge STW                    | 280                                  | UV Disinfection         | SW7993036380 | Trib Of Mylor Creek                             |
| Ponsanooth STW                      | 720                                  | Biological Filtration   | SW7643037830 | River Kennal                                    |
| Ringwell Valley Holiday Park        | 48*                                  | Package Treatment Plant | SW7905040970 | Trib. Of River Carnon                           |
| Abattoir At Rietfontein             | 40*                                  | Package Treatment Plant | SW7645039320 | Groundwater                                     |
| Mylor Yacht Harbour                 | 32*                                  | Package Treatment Plant | SW8221035300 | Carrick Roads                                   |
| Carnon Downs Caravan & Camping Park | 24*                                  | Septic Tank And Filter  | SW8047040780 | Soakaway<br>Unnamed Trib<br>Restronget<br>Creek |
| Pandora Inn                         | 15*                                  | Unknown                 | SW8141037270 |   |
| Govel Goth                          | 5*                                   | Unknown                 | SW8221035280 | Mylor Creek                                     |
| Cliffe Cottage                      | 5*                                   | Unknown                 | SW8140037240 | Tidal Water                                     |

| Name                       | Dry weather flow m <sup>3</sup> /day | Treatment type          | NGR          | Receiving environment |
|----------------------------|--------------------------------------|-------------------------|--------------|-----------------------|
| Carnon Downs Garden Centre | 5*                                   | Package Treatment Plant | SW7976040930 | Soakaway              |

\*Maximum daily flow m<sup>3</sup>/day Data from Environment Agency

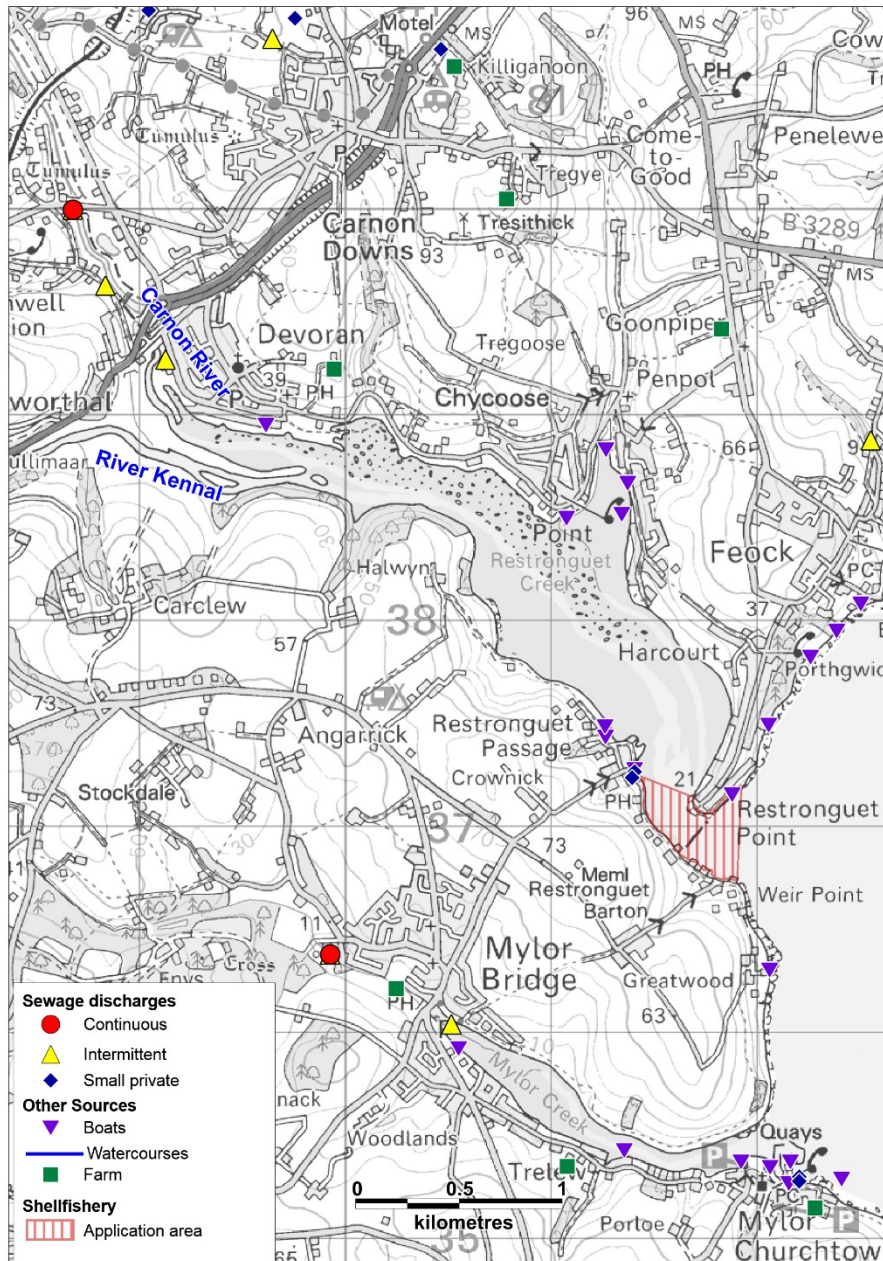


Figure 1: Potential sources of contamination to the Restronguet Creek

Figure 1 shows the location of potentially significant sources of contamination to the application area, including all nearby sewage discharges taken from the Environment Agency permit database (June 2015).

Carnon Downs STW is the largest continuous sewage discharge in proximity to the application area, with a consented Dry Weather Flow of 1,010 m<sup>3</sup>/day of secondary treated effluent. Ponsanooth STW is also large, with a consented DWF of 720 m<sup>3</sup>/day, undergoing

secondary treatment before discharging to the River Kennal, approximately 6 km upstream of the application area.

The closest consented discharges to the application area are two private discharges, Pandora Inn and Cliffe Cottage, with consented Dry Weather Flows of 15 and 5 m<sup>3</sup>/day respectively. The effluent from Cliffe Cottage is treated using a package treatment plant (usually this would be secondary treated) but the treatment for the Pandora Inn effluent is unspecified.

Various intermittent storm overflows are located throughout the area and will be of significance to water quality when in operation, as at these times they will be discharging untreated sewage.

There are further sewage discharges, both community and private, to Pill Creek and Mylor Creek, as well as the main rivers outwith the buffer area considered in this report. Effluents discharged further afield could influence water quality in the area of application, depending on water movement within the Fal estuary system.

Sources of fresh water to the estuary include River Kennal, Carnon River and several smaller water courses. The flows from River Kennal and Carnon River converge approximately 6.5 km upstream of the requested classification area.

Much of the land surrounding Restronguet Creek is farmland, especially on the southern side. Investigation of aerial photographs (Google Earth, 2015) shows that most of the fields adjacent to the creek and the rivers are mainly used for crop production and only a few appeared to contain livestock at the time of imaging. Run-off from these fields could potentially contribute faecal contamination to the harvesting area if sewage sludge or agricultural slurry is applied to fields as fertiliser or if livestock are grazed in rotation on the fields.

At low tide, much of Restronguet Creek dries to expose mud flats. This supports large populations of birds including dunlin and curlew (Banks et al, 2006), which would be likely to present a diffuse source of contamination to the shellfish.

Approximately 100 moorings (Google Earth, 2015) at the north western end of the proposed harvesting area and approximately 50 moorings at the eastern end of the proposed harvesting area may also be a source of contamination if sewage is discharged overboard.

## Classification and monitoring history

The Restronguet Creek area is currently classified for native oysters, and was also classified for mussels until declassification in 2007. The classification history for native oysters and mussels in Restronguet Creek is shown in Table 2.

**Table 2: Classification history of the area from 2005 to present**

| Bed name          | Species | Classification |      |      |      |      |      |      |      |      |      |      |
|-------------------|---------|----------------|------|------|------|------|------|------|------|------|------|------|
|                   |         | 2005           | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|                   | Native  |                |      |      |      |      |      |      |      |      |      |      |
| Restronguet Creek | Oysters | -              | -    | -    | B    | B    | B    | B    | B    | B-LT | B-LT | B-LT |
| Restronguet Creek | Mussels | B              | B    | dc   | -    | -    | -    | -    | -    | -    | -    | -    |

dc denotes area was declassified this year

The proposed harvesting area currently has a long term B classification for native oysters. A summary of historical *E. coli* monitoring results for the past 5 classification years (April to March) for the area is shown in Table 3. Fourteen mussel samples were taken between 2005 and 2007. Results ranged from 70 to 5400 MPN/100g.

**Table 3: Summary statistics for *E. coli* monitoring results (MPN/100g) by RMP – 2011 to 2015**

| Sampling Site     | Species       | No. | Date of    | Date of last | Geometric | Min. | Max.   | %      | %    | % over |
|-------------------|---------------|-----|------------|--------------|-----------|------|--------|--------|------|--------|
|                   |               |     | first      | sample       |           |      |        | sample | mean |        |
| Restronguet Creek | Native oyster | 49  | 12/04/2011 | 07/09/2015   | 660.5     | <20  | 16,000 | 77.6   | 10.2 | 0.0    |

## Chemical contaminants

Mining has been historically an important activity within the Fal catchment, particularly within the Carnon Valley. Tailings have been deposited in Restronguet Creek, resulting in high levels of heavy metals in its sediments. Metals likely to be present include As, Cd, Cu, Fe, Mn and Zn. There was some evidence to suggest possible re-release of As from sediments in brackish water, such as might be found Restronguet Creek.

Clemows Valley Tailings Dam and Wheal Jane Mine mineral workings discharges are located in the upper reaches of the River Carnon. Wheal Jane Mine is now closed, but contaminated water from the abandoned mine is treated, operating to discharge consent conditions. The dam is permitted to discharge treated minewater intermittently to Clemows Stream, a tributary of the River Carnon.

## Water circulation

The Fal estuary is a drowned river valley, or ria, which faces south and drains into Falmouth Bay.

A study on water circulation within the wider Fal Estuary was commissioned by South West Water, and this identified that tidal currents were generally low within the estuary, and that complete vertical mixing of the water column was likely within a short time (1-3 hours) of contaminant release.

Currents in coastal waters are predominantly driven by a combination of tide, wind and freshwater inputs. The Fal estuary is macrotidal with a mean spring tidal range of above 4.7 m on spring tides (South West Water Services Ltd. 1992).

No specific information was found on water circulation in Restronguet Creek, however it is expected to behave similarly to the estuary in microcosm, with water moving out of the creek and into the Fal estuary on the ebb tide. There is likely to be some stratification due to influence of freshwater coming from the rivers and smaller watercourses feeding into the creek. Contaminants arising upstream of the harvesting area are likely to be carried across the fishery on the ebb tide.

## Provisional RMP(s) and production area

The production area for mussels should cover the entire area requested for classification, which is the same area currently classified for native oysters. The most significant sources of contamination for this area are likely to be from the ebb plume of River Kennal and Carnon River which carry the effluent from Ponsanooth STW and Carnon Downs STW respectively. The highest levels of contamination are therefore likely to be found at the north-western end of the proposed production area. Additionally, the Pandora Inn and Cliffe Cottage also discharge at the north western end of the proposed production area and are likely to increase the level of contamination in this area.

It is therefore recommended that the RMP for this area should be in the same location as the current native oyster RMP, which is at the most suitable position to account for these contamination sources.

The species sampled should be mussels of a harvestable size. A total of 10 samples taken not less than one week apart will be required for the issue of a provisional classification. Following this, sampling should be monthly, assuming a continued classification is required. A standard tolerance of 50 m applies. Samples should be collected by hand.

**Table 4: Provisional Sampling Plan**

|                          |  |
|--------------------------|--|
| Production Area          | Restronguet Creek  |
| RMP name                 | Restronguet Creek Mussels  |
| NGR                      | SW 8147 3719   |
| Latitude                 | 50°11.659'N  |
| Longitude                | 05°3.787'W   |
| Species                  | Mussels  |
| Collection Method        | Hand   |
| Sampling tolerance       | 50 m   |
| Sampling frequency       | 10 samples at least one week apart for provisional classification.<br><br>Monthly sampling thereafter if continued classification is required.                               |
| Production area boundary | Area contained within lines bounded by<br>50°11.688'N 05°3.842'W to<br>50°11.634'N 05°3.595'W and<br>50°11.676'N 05°3.404'W to<br>50°11.418'N 05°3.404'W<br>extending to MHW |

*(Lat/Long datum WGS84)*



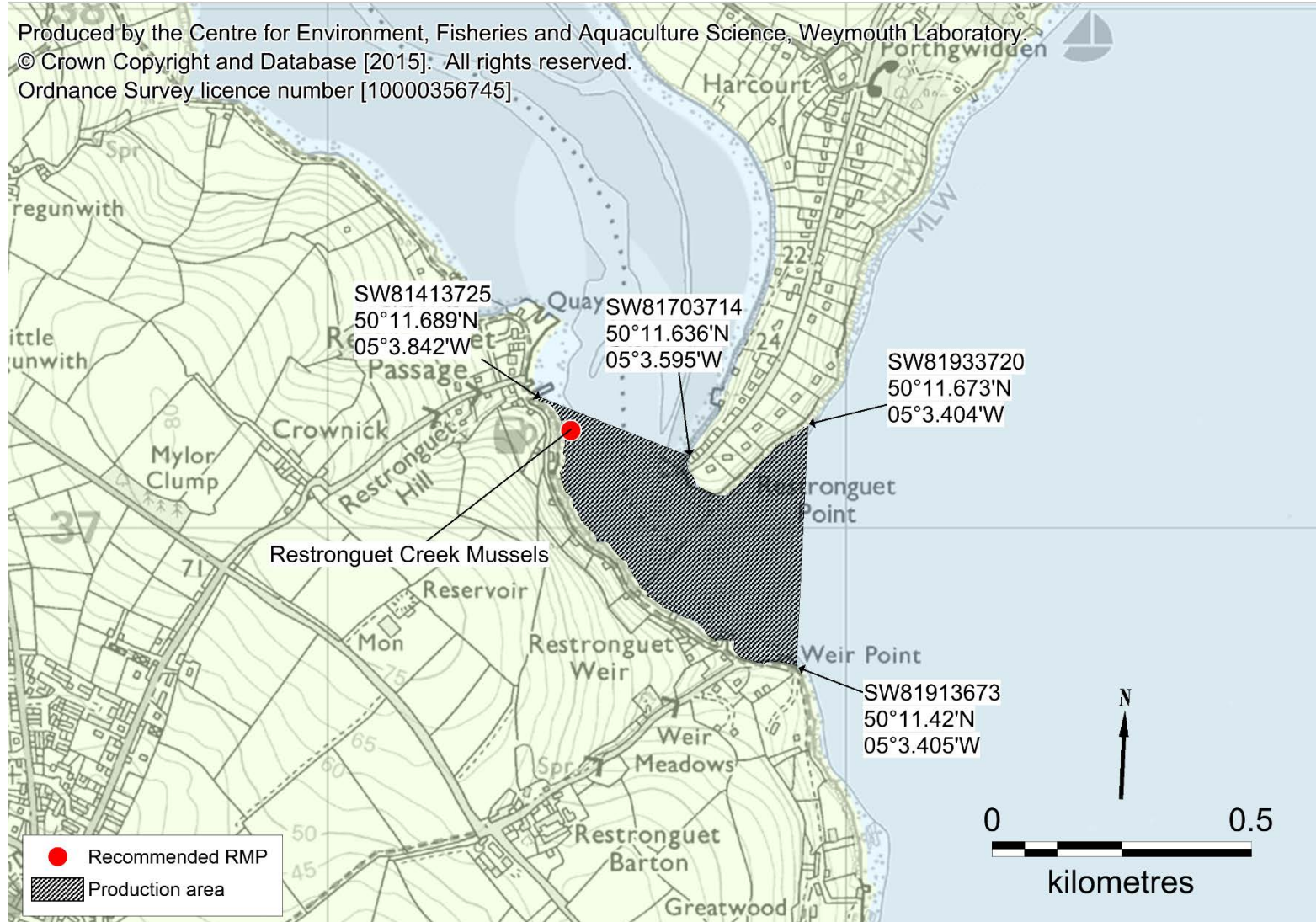


Figure 2: Recommended interim classification zones and RMP

## References

- Banks, A., Collier, M., Austin, G., Hearn, R., Musgrove, A., 2006. Waterbirds in the UK 2004/5. The Wetland Bird Survey. Published by British Trust for Ornithology, Wildfowl & Wetlands Trust, Royal Society for the Protection of Birds and Joint Nature Conservation Committee
- South West Water Services, Ltd.1992. Falmouth sewage treatment scheme NR: 4127, consent support document number 1, oceanography. Plymouth
- Google Earth. 2015. Google.



# Centre for Environment Fisheries & Aquaculture Science



# Centre for Environment Fisheries & Aquaculture Science



## About us

The Centre for Environment, Fisheries and Aquaculture Science is the UK's leading and most diverse centre for applied marine and freshwater science.

We advise UK government and private sector customers on the environmental impact of their policies, programmes and activities through our scientific evidence and impartial expert advice.

Our environmental monitoring and assessment programmes are fundamental to the sustainable development of marine and freshwater industries.

Through the application of our science and technology, we play a major role in growing the marine and freshwater economy, creating jobs, and safeguarding public health and the health of our seas and aquatic resources

### Head office

Centre for Environment, Fisheries & Aquaculture  
Science  
Pakefield Road  
Lowestoft  
Suffolk  
NR33 0HT  
Tel: +44 (0) 1502 56 2244  
Fax: +44 (0) 1502 51 3865

### Weymouth office

Barrack Road  
The Nothe  
Weymouth  
DT4 8UB

Tel: +44 (0) 1305 206600  
Fax: +44 (0) 1305 206601

## Customer focus

We offer a range of multidisciplinary bespoke scientific programmes covering a range of sectors, both public and private. Our broad capability covers shelf sea dynamics, climate effects on the aquatic environment, ecosystems and food security. We are growing our business in overseas markets, with a particular emphasis on Kuwait and the Middle East.

Our customer base and partnerships are broad, spanning Government, public and private sectors, academia, non-governmental organisations (NGOs), at home and internationally.

We work with:

- a wide range of UK Government departments and agencies, including Department for the Environment Food and Rural Affairs (Defra) and Department for Energy and Climate and Change (DECC), Natural Resources Wales, Scotland, Northern Ireland and governments overseas.
- industries across a range of sectors including offshore renewable energy, oil and gas emergency response, marine surveying, fishing and aquaculture.
- other scientists from research councils, universities and EU research programmes.
- NGOs interested in marine and freshwater.
- local communities and voluntary groups, active in protecting the coastal, marine and freshwater environments.



[www.cefas.co.uk](http://www.cefas.co.uk)

