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St. Austell Bay - Ropehaven Extension

Provisional RMP Assessment

Cefas Document Control

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Fishery

An application was received for shellfish hygiene classification of common mussels (*Mytilis* spp) on a farm consented for up to 32 x 225 m double-header longlines in outer St. Austell Bay, to the south of an existing farm at Ropehaven. The mussels are to be grown in suspended culture on a long-line system and harvested mechanically. Although the application for classification pertained only to the new site, the Crown Estate lease and MMO licence for the farm also identified an expansion to the existing long-line mussel farm at Ropehaven from 12 to 36 x 225m double-header longlines. It was therefore proposed that this assessment consider both the new site and the enlargement of the existing site.

The coordinates for the new site boundary, as given in the application, are:

50°17.4250'N 04°44.1620'W

50°16.9290'N 04°44.1620'W

50°16.9290'N 04°43.7620'W

50°17.4250'N 04°43.7620'W

The new coordinates for the expanded site at Ropehaven, as given on the map accompanying the application, are:

50°18.7900'N 04°45.1680'W

50°18.3990'N 04°44.8080'W

50°18.4840'N 04°44.5150'W

50°18.8700'N 04°44.9560'W

The anticipated annual production for the new site is approximately 500 tonnes. No specific information was provided for production at the existing farm, though given that they are the same size it is presumed they will each produce roughly the same amount of mussels/year. The locations of the two areas is shown in Figure 1.

Sources of Contamination

Figure 1 shows the location of potentially significant sources of contamination to St. Austell Bay, including all sewage discharges within 2 km of estuarine waters. Table 1 lists the continuous sewage discharges within this area which have permitted flow rates exceeding 5 m³/day.

Table 1: Continuous sewage discharges of over 5 m³/day to watercourses within 5 km of the area requiring classification

Name	Dry weather flow m ³ /day	Treatment type	NGR	Receiving environment
Par STW	8414	Activated sludge	SX 0662 5088	St. Austell Bay
St. Austell Menagwins STW	6067	UV disinfection	SX 0113 5086	St. Austell River

*Maximum daily flow m³/day
Data from Environment Agency

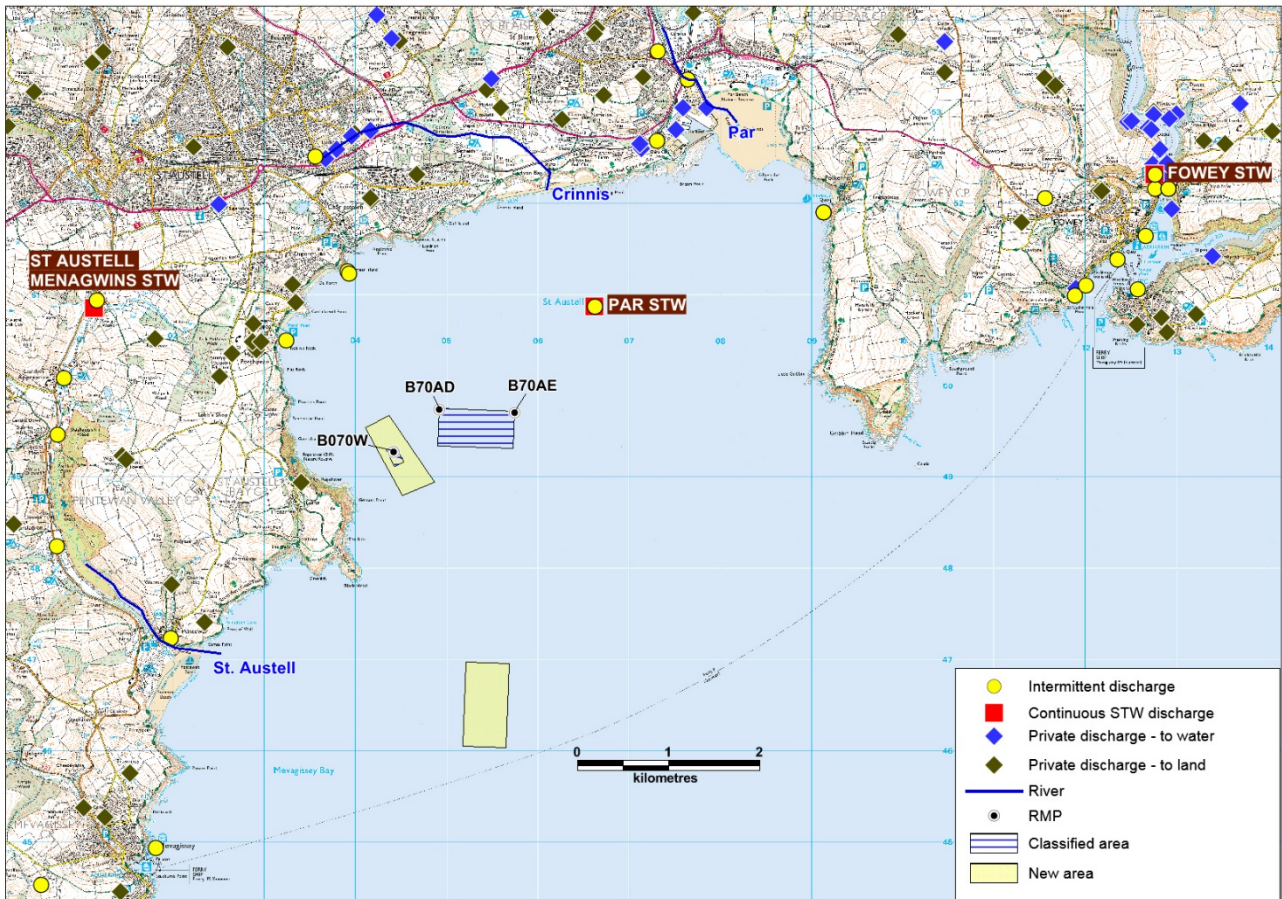


Figure 1: Potential sources of contamination to Ropehaven Extension

Figure 1 shows the location of potential sources of contamination to the mussel farms in St. Austell Bay, including all nearby sewage discharges taken from the Environment Agency permit database (July 2016). The nearest sources of sewage contamination are from the sewage treatment plants at Par and St Austell. In addition, there are intermittent discharges from the Par STW outfall and from pumping stations along the shore of the bay north of the Ropehaven mussel farms and directly west of the new site.

The St. Austell River carries effluent from St. Austell Menagwins STW as well as intermittent discharges from a CSO at Pentewen Pumping Station near the mouth of the river. The river discharges to the sea approximately 3 km west of the new site and might be expected to have some influence on water quality at the site. Contamination carried via other watercourses in the area are more likely to circulate in the main part of St. Austell Bay and affect the Ropehaven and Ropehaven Outer mussel farms.

Land use in the area is largely agricultural. Both grazing of animals and the application of animal droppings/slurry to arable land are likely to contribute to faecal contaminant loadings carried in watercourses and rainfall runoff to the bay.

Classification and monitoring history

The classification history for Ropehaven and Ropehaven Outer is given below in Table 2.

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

Classification zone	Species	Classification									
		2008	2009	2010	2011	2012	2013	2014	2015	2016	
Ropehaven (B070W)	<i>Mytilis</i> spp	-	Provisional B	B	B ₁	B	B-LT	B-LT ₁	B-LT	B-LT	
Ropehaven Outer (B70AE)	<i>Mytilis</i> spp	-	Provisional B	B	-	B	B-LT	B-LT	B-LT	B-LT	

1- Classification is provisional due to insufficient sample results, either in number or period of time covered.

Both Ropehaven and Ropehaven Outer were initially classified in 2009. Since 2013, they have received B-LT classifications (though in 2014 the classification was provisional at Ropehaven due to insufficient sample results).

The sanitary survey undertaken in 2010 recommended that Ropehaven Outer be monitored at its northeast corner in order to best reflect contamination arising from sources to the northeast of the site. Due to high results obtained in 2011, a second monitoring point was established at the northwest corner and this has been monitored in parallel with the RMP since 2012. Table 3 shows a summary of the results from the three locations sampled for mussels.

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

Sampling Site	Species	No.	Date of first sample	Date of last sample	Geometric mean	Min.	Max.	% over		
								230	4,600	46,000
Ropehaven Outer (B70AD)	<i>Mytilis</i> spp	49	01/09/2012	24/08/2016	85.2	<18	35000	18%	2%	0
Ropehaven Outer (B70AE)	<i>Mytilis</i> spp	51	19/09/2011	24/08/2016	96.6	<18	24000	20%	4%	0
Ropehaven (B070W)	<i>Mytilis</i> spp	46	09/01/2012	24/08/2016	138.8	<18	13000	26%	2%	0

The two monitoring points at Ropehaven Outer were sampled on the same date on 45 occasions. A paired T-test on those 45 results showed no significant difference between results at the two locations.

Water circulation

The sanitary survey noted that water circulation in St. Austell Bay is minimal and that it is driven mainly by wind-driven currents and water density. During the summer, there are two main circulation regimes which depend primarily on wind strength: when winds exceed 3 m/s, surface waters (top 5–8 m) become mixed and generally follow a mean eastward circulation through the bay at about 0.5 m/s; when winds are weak, the surface waters tend to stratify and the circulation patterns become more complex (Sherwin and Jonas, 1994; Sherwin et al. 1997). As a general rule, the top 2 m are advected at approximately 1% of the local wind speed. If stratification is sufficiently strong, the movement of the waters will be decoupled from the flow below. The tendency to stratify is enhanced near the coast, where salinities are lower, by a density current which runs westward from the mouth of the River Par and Polmear Stream and extends up to Carlyon Bay. This will cause the near

shore surface waters, including those at Ropehaven, to be warmer. Concentrations of faecal coliforms in waters from these rivers are typical of tertiary-treated effluents (Environment Agency, unpublished data). In inshore stratified waters, the risk of bacteriological contamination would decrease as a result of higher bacterial die off rates caused by exposure to solar radiation near the surface. The prevailing winds are southwesterly, and strong flows from this direction may reinforce the clockwise circulation and also possibly increase the importance of sources to the southwest of the lease area such as the St. Austell river although this remains to be studied.

At any other times, the effluent from Par STW long sea outfall (LSO) released into mixed waters generally follows the mean eastward flows around the bay and is advected out of the bay (Sherwin, 1992). Dye tracing studies conducted under light winds have shown that effluent from the Par STW LSO follow the clockwise circulation pattern and are carried toward the southwest side of the bay, in the vicinity of the mussel farms (Cefas, unpublished data). Although there would be significant dilution of the effluent plume at that point, it is still likely to have some impact on the microbiological quality of the shellfish there. This impact would increase in the event of a storm overflow spill from Par STW.

Provisional RMP(s) and production area

In light of more recent understanding of the circulation of contaminants in St. Austell Bay, it is recommended that the current sampling plan be amended as follows:

Ropehaven

It is recommended that the RMP at Ropehaven (B070W) be moved from its current location to a point near the southeast extent of the expanded area of lines in order to reflect any contamination circulating in the bay from the Par outfall. The new location should be as close as possible, depending on the actual location of the farm, to 50°18.49147N 4°44.58078W.

The boundaries of the classified area should be expanded to encompass the larger area identified for cultivation and to provide a buffer that will allow for some variation in the location. It is recommended that the revised boundaries be identified as the area bounded by lines drawn from

50°18.79392N 4°45.25560W to
50°18.90430N 4°44.92483W to
50°18.46348N 4°44.39375W to
50°18.33498N 4°44.80772W to
50°18.79392N 4°45.25560W

Ropehaven Outer

RMP B70AD at Ropehaven Outer should be discontinued and B70AE used for monitoring at this site as there was no significant difference between results at the two monitoring points over the last four years. No change is recommended to the boundary of the classified area.

New Site - Outer St. Austell/Mevagissey Bay

It is recommended that the new site be monitored separately to the other two sites as it is likely to be affected differently by the identified contaminating sources than the other two sites. The recommended boundaries are the area bounded by lines drawn from:

50°16.84655N 4°44.30083W to
50°16.86632N 4°43.45970W to
50°17.45922N 4°43.49357W to
50°17.43943N 4°44.33488W to
50°16.84655N 4°44.30083W

The RMP should be set near the northwest end of the lines at 50°17.39147N 4°44.07940W to reflect contamination arising from sources to the north and west of the area. As there is no information available on variation in contamination levels with depth at this site, it is recommended that initially samples be taken at 2 and 10 metres until there is sufficient data on which to assess any variation.

Table 4: Provisional Sampling Plan

Production Area	St. Austell South
RMP name	St. Austell South Mevagissey
NGR	SX 0530 4690
Latitude	50°17.39147N
Longitude	4°44.07940W
Species	Common mussels
Collection Method	Hand
Sampling tolerance	20 m
Sampling frequency	Monthly
Sampling depth	2 and 10 metres
Production area boundary	50°16.84655N 4°44.30083W to 50°16.86632N 4°43.45970W to 50°17.45922N 4°43.49357W to 50°17.43943N 4°44.33488W to 50°16.84655N 4°44.30083W

(Lat/Long datum WGS84)

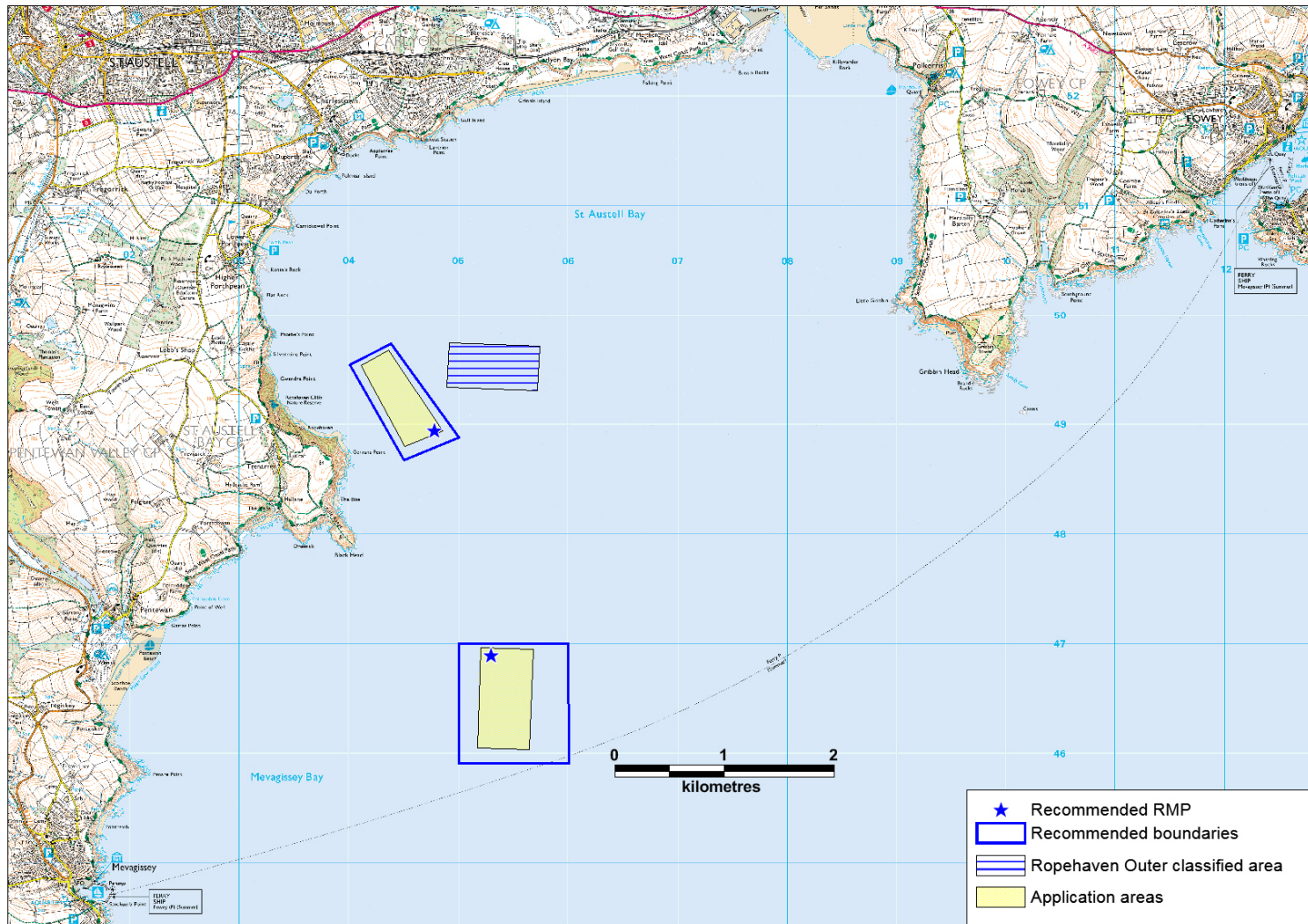


Figure 2: Recommended interim classification zones and RMP

References

Cefas, 2010. Sanitary survey of the St. Austell Bay. Cefas report on behalf of the Food Standards Agency.

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