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**C6728**

# **Fal Estuary, Tolverne Provisional RMP Assessment**

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## Cefas Document Control

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### Approvals

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## Fishery

An application was received for shellfish hygiene classification of a wild mussels (*Mytilus* spp.) production area at the confluence of the Truro River, River Fal, Cowlands Creek and Lamouth Creek. This area falls within the Fal Fishery Order 2016. The area requested for mussel production is currently classified for native oysters (*Ostrea edulis*). The proposed method of harvest is hand picking and dredging, with harvest predicted to occur year-round .

The application did not estimate an annual yield, but indicated that mussels of marketable size (>50 mm) were present.

## Sources of Faecal Contamination

Figure 1 shows the location of potentially significant sources of contamination to the proposed production area, including all sewage discharges within 5 km of the application area. Table 1 lists the continuous sewage discharges within this area.

**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
St Just In Roseland STW	27	Biological Filtration	SW8561035810	Trib Of River Percuil
Truro (Newham) STW	7,020	UV Disinfection	SW8341043290	Truro River Estuary

Data from Environment Agency

The main sewage sources to the Upper Fal are from the Truro STW, which receives UV disinfection. The sanitary survey undertaken in 2010 identified that under dry weather conditions, discharges from smaller properties not connected to the mains sewerage system may constitute a more significant source of faecal contamination than the main sewerage works. Small, private septic tanks discharge to water near the King Harry Ferry slipway, on the west side of the estuary and to the north of the point near another ferry slipway. There are numerous Combined Sewer Overflows (CSOs) in the catchment, mainly around Truro which is approximately 4 km upstream of the northern extent of the production area.

The sanitary survey identified a dairy farm at Tolverne, east of the southern classification area boundary. This had been the source of an unauthorised discharge of silage liquors and dairy washings in 2008. Between 2009 and 2011, Southwest Water and the Environment Agency undertook a water quality investigation into sources of faecal contamination in the Fal in response to concerns from shellfish harvesters over declining water quality. A 'hot catchments map' was developed based on their investigations, which showed high bacterial loadings coming from catchments on either side of the Fal at Trelissick and Tolverne. Their investigation report identified poor slurry management, land runoff, and CSO discharges contributing to elevated bacterial levels in the upper Fal and noted that improvements were being made to land and farm waste management as well as to a pumping station discharge.

Information received from FSA suggests that there had been issues with slurry management at a farm along Ruan Creek in early 2015 but the issue had been resolved later in the year. This should have resulted in an improvement in water quality in the creek, depending on the size of discharge.

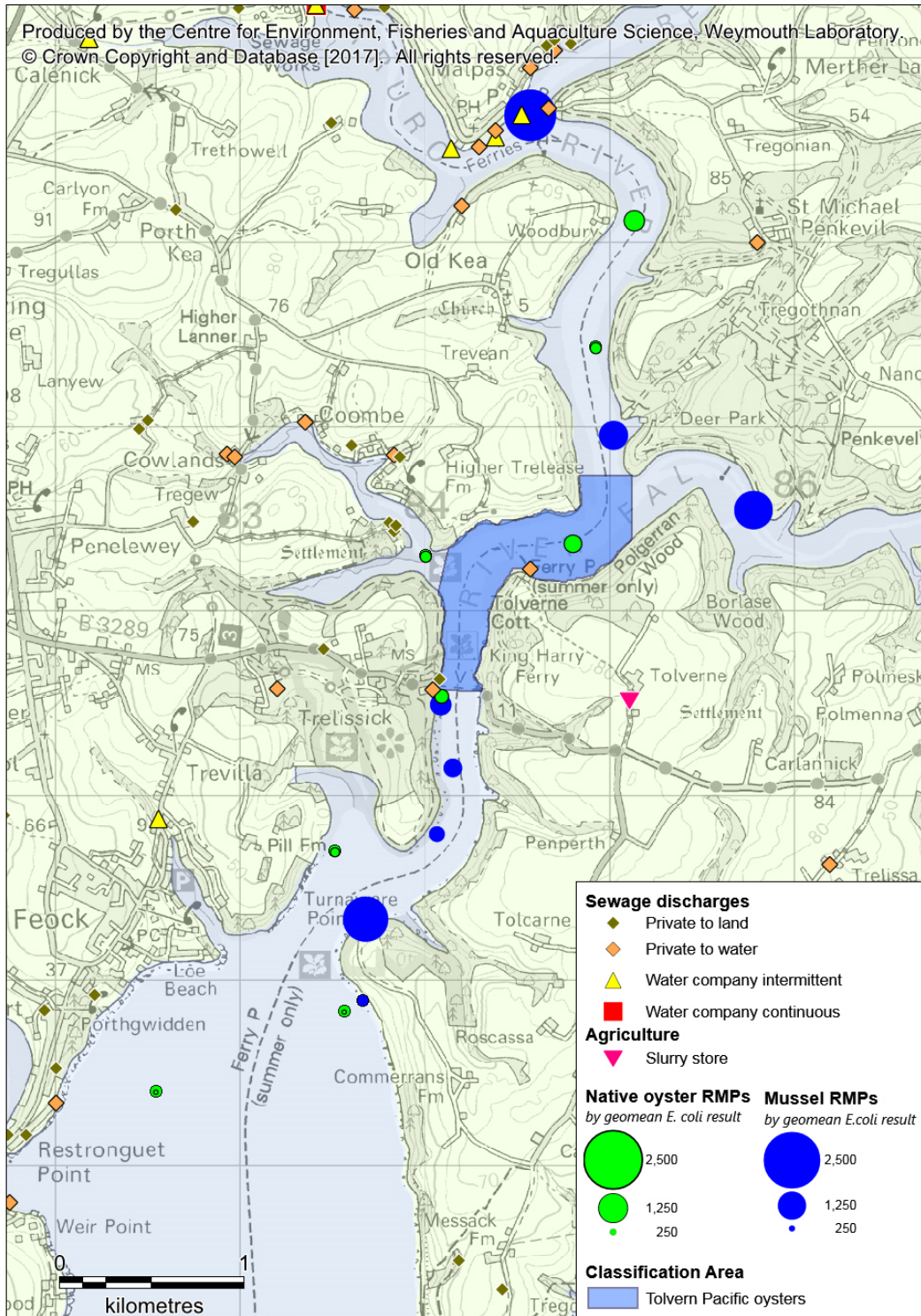


Figure 1: Potential sources of contamination to the production area

## Classification and monitoring history

The classification history for the area around Tolverne is summarised in Table 2. Only those classifications nearest the application area have been considered. The application area is currently classified for native oysters only, however adjacent areas are currently classified for common mussels. Ruan Pontoon/Tregothnan is located further up the Truro River north of the Tolverne classification area, Ruan Creek is located up the Fal River to the east, and Trelissick Pontoon (also referred to as King Harry Reach) is located immediately south of Tolverne.

**Table 2: Classification history of the area from 2007 to present**

Bed name	Species	Classification									
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Tolverne	Native oyster	B-LT	B-LT	B-LT	B-LT	B-LT	B-LT	B-LT	-	B-LT	B-LT
R Pontoon/ Tregothnan	Mussel	B*	C	C	C	C	C	C	C	C	B
Ruan Creek	Mussel	B-LT	B-LT	B-LT	B-LT	B-LT	B-LT	C	P	P	P
King Harry Reach (Trelissick Pontoon)	Mussel	B*	B*	B*	B	B	B	B	B	B	B

P = prohibited, LT= long term, \* seasonal classification applies, - not classified

Historical hygiene monitoring results for all of the above RMPs are summarised in Table 3.

**Table 3: Summary statistics for *E. coli* monitoring results (MPN/100g) by RMP – 2012 to 2017**

Sampling Site	Species	No.	Date of first sample	Date of last sample	Geometric mean	Min.	Max.	% over		
								230	4,600	46,000
Tolverne	Native oyster	56	13/02/2012	18/01/2017	670	40	11000	77	4	0
R Pontoon/Tregothnan	Mussel	57	13/02/2012	15/11/2016	1270	20	92000	84	16	2
Ruan Creek	Mussel	50	13/02/2012	14/02/2017	1670	130	1700000	88	24	4
Trelissick Pontoon	Mussel	65	13/02/2012	18/01/2017	970	80	35000	68	15	0

The highest geometric mean results were found at the two monitoring points north of the Tolverne production area, whilst lower results were found at immediately south of the area. Prohibited level results (>46000 *E.coli* MPN/100 g) were found on occasion in samples from the two northern RMPs but not from Trelissick. This suggests that faecal contamination is greater to the north of the production area, which is consistent with sewage sources upstream. There has been some improvement in results over the period. There are small local sources directly to the production area, however monitoring near the small discharge near the ferry slipway at Trelissick suggests that these may have a lower impact than other sources further upriver.

## Chemical contaminants

Mining has historically been an important activity within the Fal catchment, particularly within the Carnon Valley, downstream of Tolverne. China clay quarrying occurs in the upper Fal



river catchment (Langston *et al* 2006). Although discharge of waste from this activity to watercourses has been banned since the late 1960's, some of the intertidal sediments of the upper Fal are made up of this waste. Therefore, areas with these sediments may contain relatively abundant concentrations of zirconium, cesium, lanthanum, and yttrium. Although these compounds are generally found in very low concentrations and are not generally acutely toxic, there is some evidence to suggest that lanthanum is bioaccumulated in shellfish and can have negative effects on reproduction and nervous system function in aquatic animals (Chassard-Bouchad and Hallegot 1984, Huang and Wang 2016, Oosterhout *et al* 2014, Kulaksiz and Bau 2013).

A review of chemical contaminants to the Fal catchment was conducted in 2006 as part of a characterisation study for the Fal and Helford candidate SAC (Langston, *et al* 2006). The review identified that sediments in the lower Fal, including Mylor Creek, were contaminated by pollution from a variety of substances including metals (As, Cu, Zn, Cd, and Fe), TBT, and hydrocarbon oils. Although much of this contamination persists as a legacy of previous mining and shipyard activities, it still affects the biota in the estuary (Pirrie, *et al* 2003). Native oysters from the area were found to have adaptations consistent with exposure to relatively high levels of metals (Langston, *et al* 1998). The review identified that TBT concentrations in parts of the Fal were high and had not decreased following regulation of its use on small vessels in 1987. All contaminants present in sediments will be remobilised by dredging activities, propeller scour from boat traffic, and any tidal or weather conditions that would disturb the sediment and increase contaminant availability for uptake in shellfish.

The above is a brief summary of the potentially significant sources of chemical contaminants and is not an exhaustive or expert assessment of chemical impacts on the proposed shellfishery.

## 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).

There is likely to be some stratification due to influence of freshwater coming from the Truro River and Tresillian River. Contaminants arising upstream of the harvesting area are likely to be carried across the fishery on the ebb tide. The sanitary survey of the upper Fal estuary assessed that contamination arising from discharges in the Lower Fal would be unlikely to significantly impact the Upper Fal, although there was some evidence of connectivity between the two under certain tidal conditions (Cefas 2010).

## Provisional RMP(s) and production area

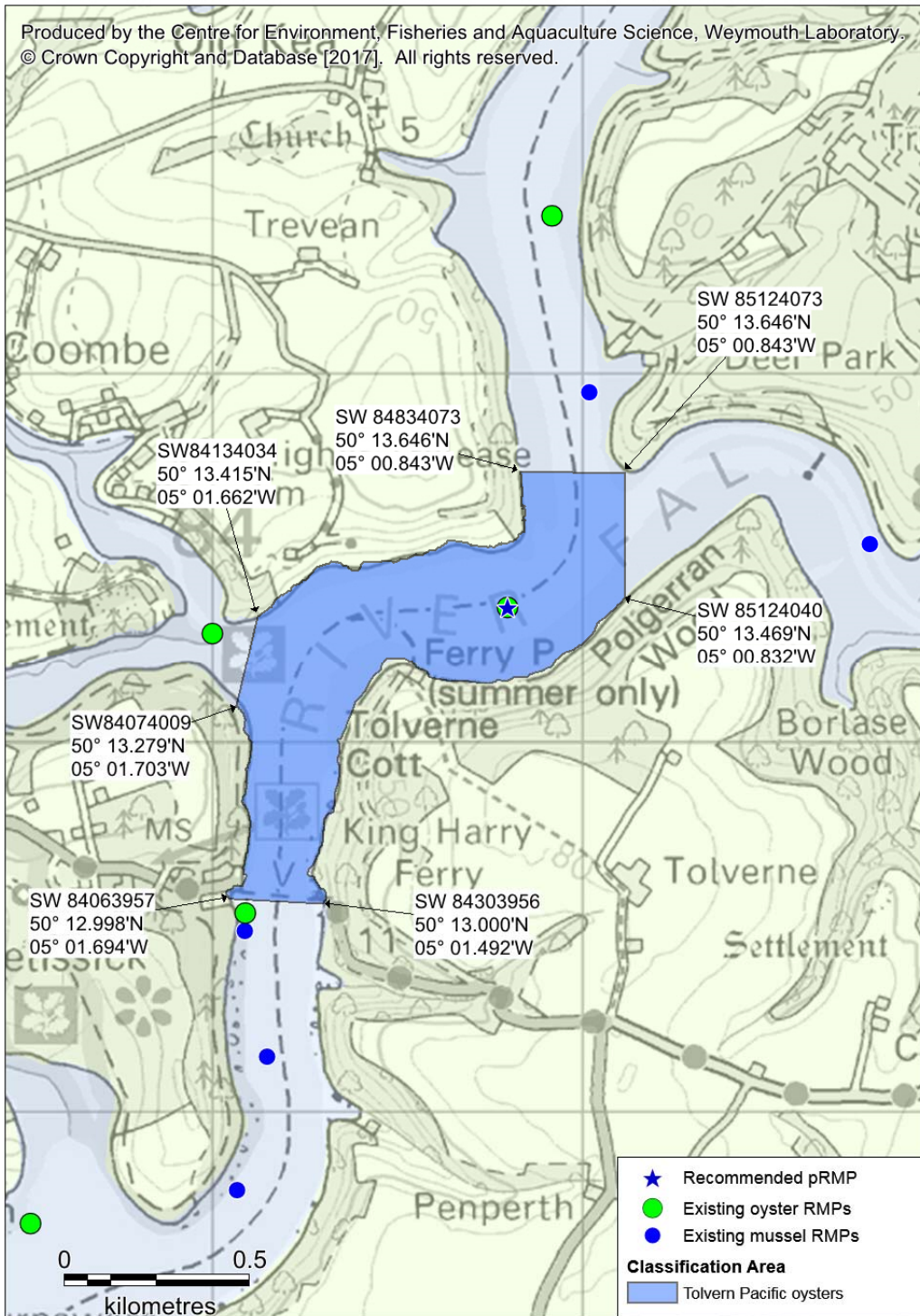
It is recommended that a monitoring point for mussels be established at the same location as that currently used for native oysters. This location will reflect contamination arising from upstream along both the River Fal and the Truro River. Stock should be placed at the sampling location at least two weeks prior to sampling. The recommended provisional sampling plan is given in Table 4. The locations of the classified area boundaries and provisional RMP are shown in Figure 2.

**Table 4: Provisional Sampling Plan**

Production Area	Tolverne
RMP name	Tolverne mussels
NGR	SW 8480 4037
Latitude	50° 13.44543'N
Longitude	5° 1.09988'W
Species	<i>Mytilus</i> spp
Collection Method	Hand (bagged)
Sampling tolerance	10m
Sampling frequency	Monthly
Production area boundary	50°13.646'N 05°00.843'W, 50°13.646'N 05°00.843'W, 50°13.000'N 05°01.492'W, 50°12.998'N 05°01.694'W, 50°13.279'N 05°01.703'W, 50°13.415'N 05°01.662'W

(Lat/Long datum WGS84)





**Figure 2: Recommended interim classification zones and RMP**

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