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Ferryside Cockles

Provisional RMP Assessment

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Fishery

An application was received to classify a cockle (*Cerastoderma edule*) bed at Ferryside, within the Three Rivers estuary. The requested classification area is bounded by lines drawn from 51°45.945'N 4°23.255'W to 51°45.948'N 4°22.307'W to mean high water, then 51°44.231'N 4°21.852'W to 51°43.989'N 4°23.404'W to 51°45.821'N 4°23.501'W and mean high water. This area had previously been classified and a sanitary survey was completed for this area in 2014.

All cockle zones within Three Rivers are currently listed as having been temporarily declassified for reasons of stock conservation. Quarterly sampling has continued at Gwendraeth and Wharley Point, but Ginst Point and Ferryside have not been sampled since 2012. Cockle fisheries in the district are currently regulated under a series of byelaws which include a minimum size (must not pass through a 19 mm square aperture), restriction to hand gathering only, and a permit scheme managed by Welsh government specific to the Three Rivers estuary.

Harvesting is to be undertaken by hand-picking from wild beds on the intertidal shore and the application identified this would occur seasonally, from 1st April to 30th September inclusive. The annual harvested yield is estimated to be between 2000 and 3000 tonnes. Welsh Government Fisheries may close any wild fishery at any time for reasons of stock preservation.

Sources of Faecal Contamination

Continuous sewage discharges

Figure 1 shows the location of potentially significant sources of contamination to the application area, including all sewage discharges within 2 km of the application area and other significant discharges located within the wider catchment taken from the Natural Resources Wales permit database (August 2015). Those discharges greater than 5 m³/day to watercourses within 2 km of the application area are listed in Table 1.

Table 1: Significant continuous sewage discharges of over 5 m³/day to watercourses within 2km of the area requiring classification

Name	Dry weather flow m ³ /day	Treatment type	NGR	Receiving environment
Ferryside STW	713	Biological	SN3706011270	Ferryside stream
Llansaint WWTW	96	Biological	SN3739507690	Llansaint stream
Llanstephan WWTW	158	Biological	SN3556010980	Trib Of Afon Tow
Carmarthen Bay Holiday Park	320*	Unknown	SN3670006800	Tidal Gwendraeth Fach

Data from Natural Resources Wales

*Maximum daily volume permitted

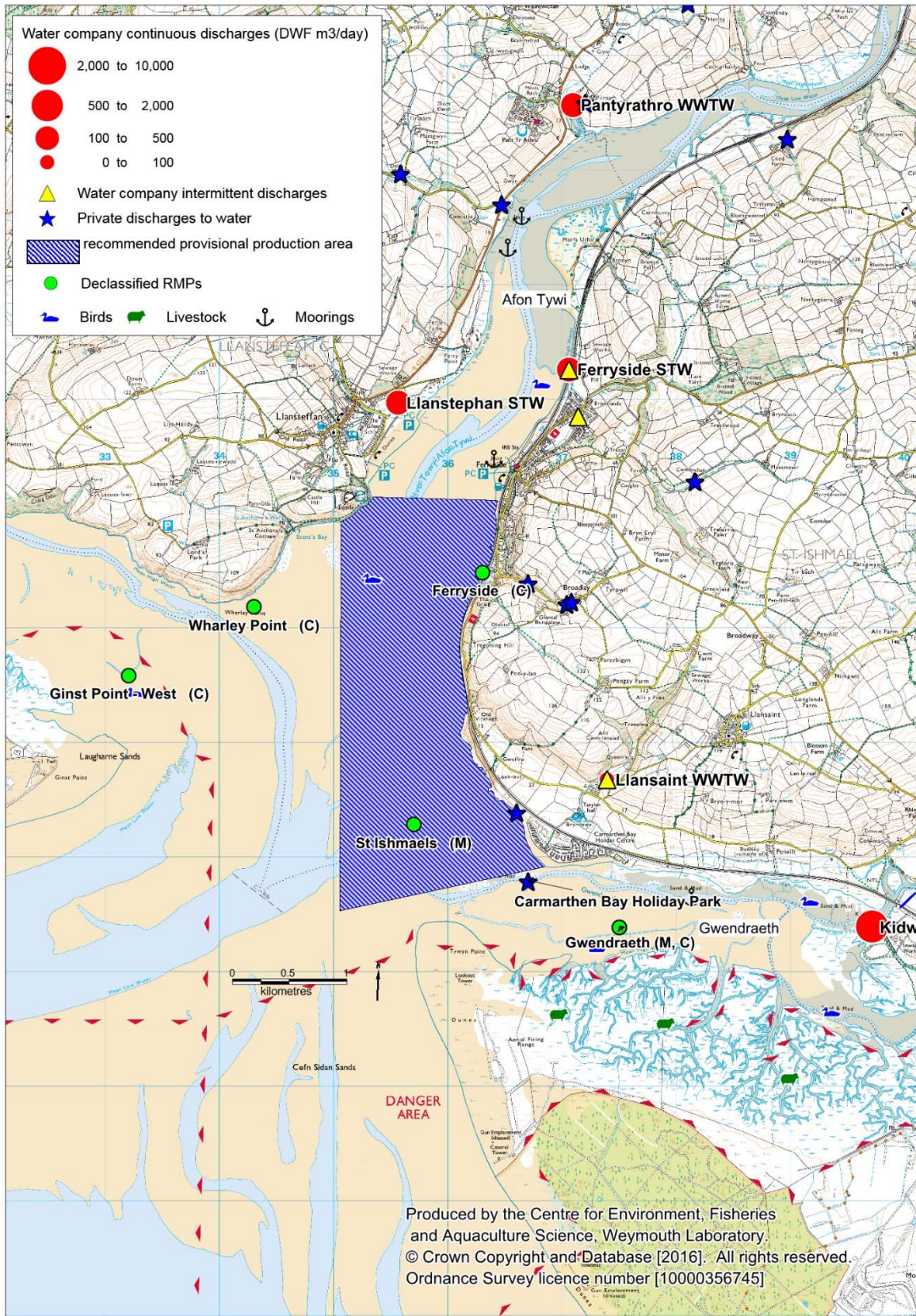


Figure 1: Potential sources of contamination to the application area

The largest sewage works discharging to the Afon Tywi is Parc Y Splotts STW, which provides secondary treatment for a consented dry weather flow of 7,000 m³/day. Although the discharge is located approximately 9 km upstream of the application area, due to its large size it is likely to have an impact further downstream. Other sewage discharges to the Tywi include Ferryside STW, Llanstephan STW, and Pantyrathro WWTW, all of which are much smaller with DWFs of <320 m³/day, and all undergo secondary biological filtration.

In the Gwendraeth arm of the estuary, Llansaint WWTW discharges to a smaller watercourse approximately 1 km inland and to the northeast of the application area, and Kidwelly WWTW discharges directly to the Gwendraeth Fach, approximately 3 km upstream of the application area. These discharges both receive biological treatment, and have consented DWFs of 96 m³/day and 1,642 m³/day respectively.

Further continuous sewage discharges are located to watercourses draining to the head of each arm of the Three Rivers estuary and will contribute to microbiological loadings at the application area to varying degrees, depending on their volume and dilution.

There are several private sewage discharges within the area. The most significant of these is that from the Carmarthen Bay Holiday Park which is permitted to discharge a maximum of 320 m³/day. Although the level of treatment type was not specified, it is considered likely to receive secondary treatment. The volume of this discharge will be greater during the summer holiday season, which coincides with the seasonal harvesting of cockles. Treatment efficiency of the system may also be lower at the beginning of the season, when flows through the system increase markedly.

Intermittent sewage discharges

Intermittent discharges can create issues in management of shellfish hygiene however infrequently they spill (Kay *et al*, 2008). There are three intermittent discharges to the Tywi within 2 km of the application area: Ferryside PS, Ferryside STW and Llansaint WWTW. There is also a cluster of intermittent discharges at the upper end of the Gwendraeth arm of the estuary, and others further upstream at Carmarthen in the Afon Tywi. Event duration monitoring that has previously been analysed and reported in the Three Rivers Sanitary Survey report (Cefas, 2013) revealed that some of the storm overflows in the Three Rivers estuary do spill frequently. These are likely to contribute to the overall level of faecal contamination that enters the estuary following heavy rainfall. A modelling study (Metoc, 2008) also predicted high volumes of storm overflow discharges from various assets within the Three Rivers estuary.

During the sanitary survey shoreline survey (Cefas, 2014) flocks of birds were observed throughout, in particular large numbers, around 500, oystercatchers were recorded on a sand bank off Wharley Point where the Taf and Tywi converge. Waders feeding on intertidal invertebrates will defecate directly on the intertidal areas in which the shellfish beds are located and as such will represent a diffuse input. During the sanitary survey shoreline survey

(Cefas, 2014) about 100 cattle were observed grazing on the saltmarshes on the southern shore of the Gwendraeth estuary channel. Faecal matter deposited here will be washed into the watercourse by tidal inundation and may be a source of pollution relevant to the southern extent of the application area.

Boats may make overboard sewage discharges from time to time. There are no ports or marinas within the survey area, but there are areas of moorings for small yachts in the Tywi channel opposite Llanstefan, and about 2 km north of Llanstefan. Occasional discharges are likely from boats with on-board toilets (heads), but the timings and locations of these discharges will be unpredictable.

Classification and monitoring history

The classification history for cockles in the Three Rivers is shown in Table 1.

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

Bed name	Species	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Ginst Point - West	Cockles	DC	B	B	B	DC	DC	B	B	C	DC	DC
Gwendraeth	Cockles	B	B	DC	DC	DC	C	B	B	C	DC	DC
Wharley Point	Cockles	B-LT	B-LT	B-LT	B-LT	DC	C	B	B	C	DC	DC
Ferryside	Cockles	B-LT	B-LT	B-LT	B-LT	DC	DC	DC	DC	-	-	-
St Ishmaels	Mussels	B-LT	B-LT	B-LT	B-LT	B-LT	B-LT	B-LT	B-LT	B-LT	DC	DC

The proposed application area lies between the currently declassified cockle production areas to the west, in the Afon Taf arm of the estuary, and to the east in the Gwendraeth arm. It also overlaps much of the declassified mussel area. The cockle areas to the west and east of the application area previously fluctuated between B and C classifications, and the previous Ferryside cockles bed held a B classification between 2005 and 2008, from which time it was declassified for reasons of stock preservation.

Table 3 shows the summary statistics for the shellfish flesh monitoring results for Three Rivers for the last 5 years, and Figure 1 shows the locations of the sampling sites.

Table 3: Summary statistics for *E. coli* classification monitoring results (MPN/100g) by RMP – 2010 to 2015

Sampling Site	Species	No.	Date of first sample	Date of last sample	Geometric mean	Min.	Max.	% over 230	% over 4,600	% over 46,000
Ferryside	Cockle	14	06/12/2010	11/12/2012	461	20	3,500	79	0.0	0.0
Wharley Point	Cockle	38	06/12/2010	13/10/2015	351	20	>18,000	55	8	0.0
Ginst Point - West	Cockle	23	06/12/2010	22/07/2014	333	<20	16,000	57	9	0.0
Gwendraeth	Cockle	38	24/01/2011	08/12/2015	1,135	20	160,000	79	24	5
St Ishmaels	Mussel	43	06/12/2010	07/07/2014	637	<20	9,200	79	7	0.0

These summary statistics show that the concentration of *E. coli* found in shellfish flesh are highest in the Gwendraeth arm of the Three Rivers estuary.

Chemical contaminants

There are no immediately apparent potential sources of chemical contaminants according to the discharges database available at the time of writing.

Water circulation

The Three Rivers estuary is macrotidal with a tidal range of 6.6 m at Ferryside on spring tides. The tidal amplitude decreases further inland, and high water springs at Carmarthen are 2.6 m. There are no tidal diamonds within the Three Rivers estuary complex. The estuarine system is flood dominant (Futurecoast, 2002), with a shorter duration faster moving flood tide in the outer estuary. There are no tidal diamonds within the survey area. Current velocities are reported to exceed 1 m/s on spring tides in places, but are considerably lower away from the main channels (May, 2003; Metoc, 2008).

Movement of pollutants by tidal currents is the main mode of contaminant transport in the Three Rivers estuary. The flood tide will convey relatively clean water originating from Carmarthen Bay into and up the estuary, whereas the ebb tide will carry contamination from pollution sources, including sewage discharges, surface water outfalls and boats out through the estuary. On a flood tide the principal tidal stream flows in a north easterly direction into the estuary and progresses up the three main channels with the opposite occurring on the ebb. As these channels fill, the tidal flow will fill the creeks and spread over the intertidal areas. Shoreline sources of contamination will therefore primarily impact up and down tide of their locations along the bank to which they discharge. Their impacts will decrease with distance travelled, as the plume becomes progressively more diluted. At lower states of the tide contamination from some shoreline sources such as watercourses will be carried through the intertidal drainage channels where the dilution potential is low. Relatively high concentrations of indicator bacteria may arise in these channels at such times.

River flows are high, especially from the River Twyi but due to the size of the estuary and volumes exchanged tidally the flow ratio (freshwater input: tidal exchange) is low (Futurecoast, 2002). This suggests that the system as a whole is well mixed, and that density effects are unlikely to significantly modify circulation in the outer reaches of the estuary where the shellfish are located. As such, it is primarily the tidal movement that will be of significance in movement of pollution.

Recommendations regarding provisional RMP and production area

Provisional production area

It is recommended that the provisional production area (classification zone) boundaries be set as the area within lines drawn from 51°45.945'N 4°23.255'W to 51°45.948'N 4°22.307'W to mean high water springs, then from 51°44.231'N 4°21.852'W to 51°43.989'N 4°23.404'W to 51°45.821'N 4°23.501'W and mean high water springs.

Provisional RMP

The most significant local sources of contamination for the application area are likely to be the private discharge from the Caravan Park on the northern shores of the mouth of the Gwendraeth Estuary which discharges immediately adjacent to the southern extremity of the application area. There is also a Dwr Cymru continuous discharge, Kidwelly WWTW, located approximately 3 km upstream in the estuary, several intermittent discharges also upstream in the estuary, and grazing takes place on the saltmarshes on the southern shore. The highest concentrations of faecal indicator organisms in the historical microbiological hygiene data were found in the Gwendraeth arm of the estuary. Within the Afon Tywi there are also several continuous sewage discharges but those located in proximity to the application area are smaller than the caravan park discharge, and the Tywi has greater potential for dilution than the Gwendraeth arm. During an ebb tide, sources of pollution located upstream in both watercourses will be transported across the application area and during a flood tide the cleaner waters from Carmarthen Bay will move upstream over the area. In order to represent pollution sources to the area, it is recommended that the provisional RMP be located at the southeast corner of the application area, and as close to the main channel as possible, to best capture riverine inputs, and the Llansaint and caravan park discharges.

The following sampling criteria should apply at clam/cockle RMPs:

- Individuals of *C. edule* sampled should be of a marketable size.
- Sampling should be via hand digging, and a tolerance of 100 m applies to allow repeated sampling of wild stocks.
- The sampling frequency should be monthly and on a year round basis
- To reinstate a classification, four samples taken not less than a week apart would be required.
- Should the LEA determine that employing a local gatherer to collect samples will be the best practical option, the LEA should consult with the FSA to ensure that all the appropriate requirements can be met. Should such a strategy be pursued, the LEA should contact the FSA to propose gatherer supplied samples. Proposals must comply with the official control sampling protocols, ensure adequate training and supervision is provided, and be documented accordingly.

Table 4: Provisional Sampling Plan

Production Area	Three Rivers
pRMP name	Pastoun Scar
NGR	SN 36568 06894
Latitude	51° 44.212' N
Longitude	04°22.096' W
Species	Wild cockles (<i>Cerasoderma edule</i>)
Collection Method	Hand
Sampling tolerance	100 m
Sampling frequency	Monthly sampling
Provisional production area boundary	Area bounded by lines drawn from 51°45.945'N 4°23.255'W to 51°45.948'N 4°22.307'W extending to mean high water springs, then from 51°44.231'N 4°21.852'W to 51°43.989'N 4°23.404'W to 51°45.821'N 4°23.501'W and extending to mean high water springs.

(Lat/Long datum WGS84)

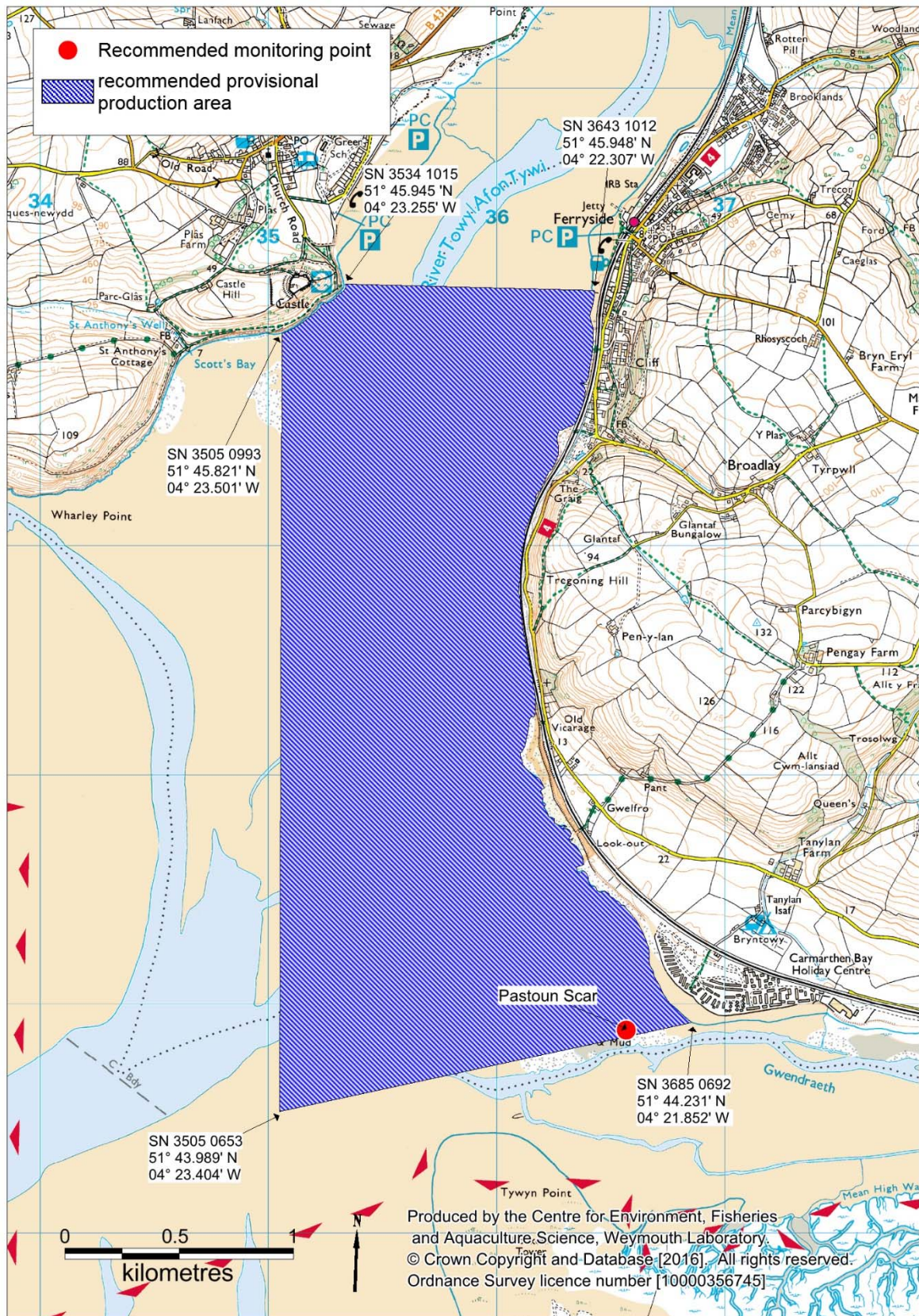


Figure 2: Recommended provisional production area RMP

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