

**OTTER (*LUTRA LUTRA*) ACTIVITY AND HABITAT
AVAILABILITY ON THE PEMBROKESHIRE COAST WITHIN
THE PEMBROKESHIRE MARINE SPECIAL AREA OF
CONSERVATION**

2012 - 2017 Follow-up Investigation



Image by J.Barker, Nolton Haven

Geoff Liles

2017

A report for the Pembrokeshire Marine SAC Relevant Authorities Group

**The Otter Consultancy, Llwyneinon Isaf, Capel Iwan, Newcastle Emlyn,
Carmarthenshire, SA38 9LY**

THE OTTER CONSULTANCY

A PEMBROKESHIRE MARINE SAC PROJECT

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Project Manager: Mrs. Sue Burton, Pembrokeshire Marine SAC Officer,
c/o Milford Haven Port Authority, Gorsewood Drive,
Milford Haven, Pembrokeshire, SA73 3EP

1a. INTRODUCTION

Although extensive use of marine environments by the Eurasian otter (*Lutra lutra*) in countries such as Scotland, Portugal, & Norway (e.g. in Kruuk, H., 1995) has been recognised by ecologists since the 1980s and 1990s, little was known about the extent of otter usage of the Pembrokeshire coast until 2003.

From 2002 to 2010 a series of projects to investigate otter usage, diet and habitat availability & quality along the Pembrokeshire coast was established by Sue Burton (Pembrokeshire Marine SAC Officer) and Geoff Liles (The Otter Consultancy) for the Pembrokeshire Marine SAC Relevant Authorities Group. Investigations revealed widespread use by otters of most of the 27 freshwater coastal streams & rivers, the Daugleddau estuary, the open coast and islands (Liles, 2003a, 2005, & 2009). Spraint analyses studies showed that otters are taking a range of marine species (Parry, 2008, 2010; & Parry *et al*, 2010).

Whilst the results of studies provide a much clearer understanding of the extent to which otters are using the Pembrokeshire coast, they also prompt a number of important questions. Are coastal streams (and the coast) used throughout the year by both male and female otters? Although coastal streams are typically short (<5km), most flow through well-defined narrow valleys with extensive, undisturbed cover (e.g. fen, scrub, woodland) that would provide otters with ideal breeding sites. So, are otters breeding on coastal streams? Do otters that use the coastal streams and marine environment live almost exclusively in those habitats (as happens on parts of the Scottish coast), or do they commute between the Western Cleddau catchment and the coast?

Recent developments by researchers at the Waterford Institute of Technology (WIT) in techniques to extract otter DNA from spraints for the identification of gender and genotype of individuals, and the establishment of the Mammals in a Sustainable Environment (MISE) project by the Vincent Wildlife Trust (VWT) and partners, has provided the opportunity to investigate some of these questions.

The present project was set up by Sue Burton in 2012 for the Pembrokeshire Marine SAC Relevant Authorities Group to: re-assess otter activity, habitat availability and threats on coastal streams a decade on from the 2002 survey; and to investigate questions relating to otter breeding and home range on coastal streams through collaboration with the MISE project.

1b. REPORT STRUCTURE

The first part of the report describes work carried out for the 2012 follow-up surveys to assess present levels & distribution of otter activity on the coastal stream sites that were originally surveyed in 2002; define breeding site boundaries; and investigate otter breeding & home range based on DNA analyses of spraints.

The second part deals with additional work carried out in 2017. As a result of problems encountered by researchers at Waterford Institute to extract useable DNA from many of the spraints collected from the Pembrokeshire coast, investigations into otter breeding and home ranges could not be completed. Following discussions with Sue Burton, additional surveys of all coastal sites were carried out in 2017 to monitor otter activity & habitat quality, and to identify sites where trail cameras can be installed (as an alternative method of identifying if, where & when otters are breeding on the coastal streams).

2. PROJECT AIMS

The aims of the project are to:

- 2.1 Identify changes in otter activity, habitat quality & availability, and threats since 2002;
- 2.2 Define the boundaries for each of the potential breeding sites on coastal streams;
- 2.3 Identify gender of otters using coastal streams throughout the year;
- 2.4 Establish whether any coastal streams support breeding otters;
- 2.5 Determine whether otters using coastal streams are predominantly coastal living animals, or whether they commute between the coast & the Western Cleddau catchment.

3. TASKS

Specific tasks were employed to achieve the project aims. These were:

3.1 Otter & habitat surveys (2012 & 2017).

Otter and habitat surveys of the 27 Coastal Stream Sites (CSS).

3.2 Define the boundaries of potential breeding sites.

During the 2002 survey potential breeding site habitats were identified and described at 14 sites. Aerial images (using Google Earth) of the coastal streams, together with information from field surveys, are used to determine the likely upstream & downstream boundaries of the potential breeding sites.

3.3 Identify gender of otters using the coast.

Spraints were collected each month from 6 CSS over a period of 12 months and sent to WIT for DNA analyses to gender.

3.4 Establish whether breeding occurs on coastal stream.

Whilst it is accepted that establishing proof of otter breeding is very difficult, two techniques are used here that might indicate that otter breeding is taking place on coastal streams:

- a) Spraints collected each month from 6 CSS were analysed by WIT for genotype. It may be possible to identify closely related individuals (i.e. mother & cubs);
- b) Trail cameras will be used to monitor known otter travel routes at selected potential breeding sites.

3.5 Determine whether otters using the coast are resident or itinerant.

In tandem with the monthly collection of spraints from the 6 CSS, spraints were also collected from known sprainting sites at two inland, watershed sites (and collected on the same day as the coastal sites) that will be the travel route for otters between the coast and the Western Cleddau. Information on the genotype of individuals from the coastal sites and their corresponding watershed sites will show whether animals are travelling between the coast and main river catchment.

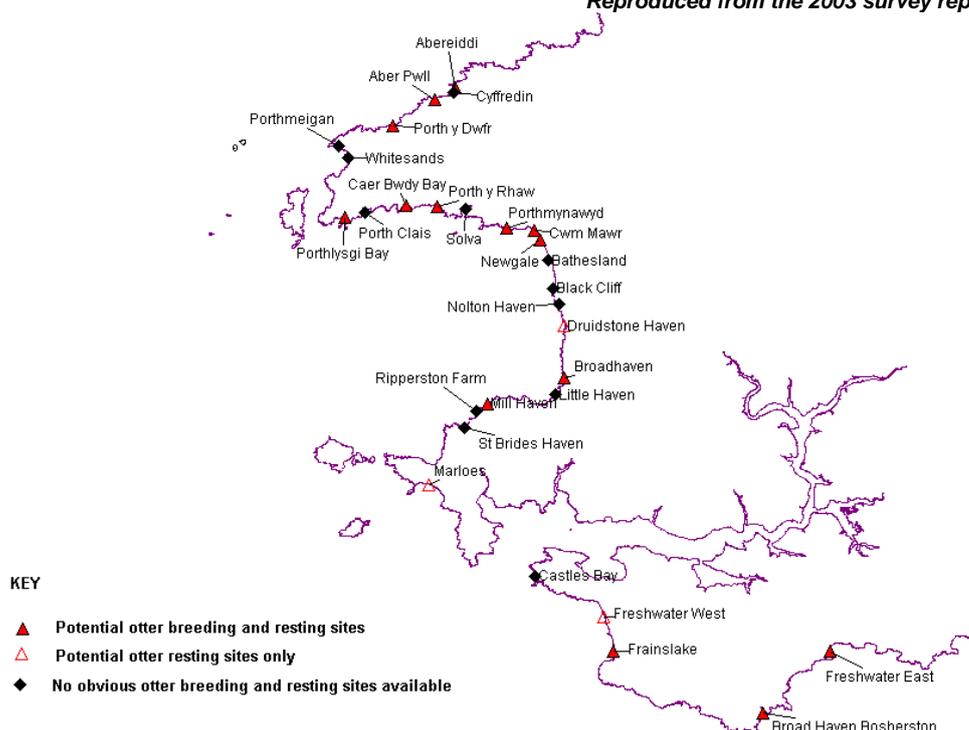
4. METHODOLOGY

The methods used to achieve the tasks outlined above are described below.

4.1 Otter & Habitat Surveys of CSS (2012 & 2017).

4.1.1 Otter & habitat surveys were carried out during October & November 2012 (and again in 2017) at the 27 CSS (identified for the 2002 project & shown in Fig 1) using the survey methodology described in the 2003 report. To provide a comparison of results only those areas of each site surveyed in 2002 were re-surveyed.

Fig 1 Map showing distribution of named coastal survey sites, breeding and resting sites.
Reproduced from the 2003 survey report



4.1.2 At each site a search was made for otter signs, including spraints, prints, paths through vegetation, rolling sites, and food remains.

4.1.3 Spraints at each sprainting site were counted, and their relative “age” recorded as:

- “fresh” – very oily, usually with a strong aroma;
- “recent” – dry, hard and compact, and retaining the strong aroma;
- “old” – no longer compact, but crumbly (when dry), with little aroma.

4.1.4 Each of the 27 sites was searched systematically. Sprainting sites (and potential sprainting sites) recorded & mapped during the 2002 survey were re-visited, and a search made for ‘new’ sprainting sites.

4.1.5 Habitat quality (particularly for otter breeding) & availability was assessed by comparing cover with descriptions of each site from the 2002 survey.

4.1.6 Photographs were taken at selected sites to provide a visual record of typical features, including: sprainting sites; habitats; inaccessible cliffs; otter access routes. (Photographs of all sites are available in the 2002 report).

4.1.7 Information on otter activity was also collated from otter sightings records, past otter surveys and otter mortality records.

4.2 Define the extent of potential breeding sites.

4.2.1 Aerial images from Google Earth, together with habitat descriptions from the 2002 & 2012 surveys, were used to define the boundaries of potential breeding sites.

4.3 Identify gender of otters using the coast.

4.3.1 Spraints were collected (by Ian Meopham) each month from 6 CSS:

- Caer bwdy,
- Porth y Rhaw,
- Solva,
- Cwm Mawr,
- Newgale
- Bathesland.

4.3.2 Spraints were collected and placed in self-seal plastic bags (one spraint per bag). Plastic bags were provided by the MISE project and each was pre-labelled with a unique MISE number. Surveyors were asked to write on the label the month & year of collection, site name, and the relative 'age' of the spraint (i.e. fresh, recent or old). The spraint collection instructions sheet is given in Appendix 1.

4.3.3 Spraints were frozen on the same day and kept in cold storage until analysed.

4.4 Establish whether breeding occurs on coastal streams.

4.4.1 DNA analyses on spraints collected for 4.3.

4.4.2 During surveys in 2002 & 2012 well used otter paths were identified at some of the 14 potential otter breeding sites on coastal streams. Sites such as Aber Pwll and Mill Haven are associated with ponds on private land where a remote camera can be set up safely.

4.5 Determine whether otters using the coast are resident or itinerant.

4.5.1 Inland, watershed sites were identified for monthly surveys at:

- Caerforiog (SM808268);
- Pont y Hafod (SM906261).

Several potential watershed sites were identified (Fig 2) but only two were used.

4.5.2 For Caerforiog the corresponding CSS are: Porth y Rhaw and Solva.

4.5.3 For Pont y Hafod the corresponding CSS are: Cwm Mawr, Newgale and Bathesland.

4.5.4 Spraints were collected at the two watershed sites from known sprainting sites, on the same day as the corresponding CSS and using the same method for recording and collection.

Table 1 Results showing numbers of spraints (Fresh=F, Recent=R & Old=O) & notes for 2012, for each Coastal Stream Site (CSS) and results from the 2002 survey.

No.	SITE Name	Km	2002			2012			NOTES 2012	Otter access etc.
			F	R	O	F	R	O		
1	Abereiddy	3	0	0	0	1	0	0	Spr by footbridge on ds side on grass at side of path.	Good via stream, rocks & sea pool for feeding.
1a	Cyffredin	3	0	0	0	0	2	0	Spr on grass hump with well used otter path	Good via stream & rocks.
2	Aber Pwll	4	0	0	0	0	3	1	No signs at pond. Rob will be volunteer	Good via stream & cliffs to north
3	CarregyrAfr	7	0	0	0	0	0	4	Potential breeding site – large areas of dense scrub bramble/gorse on & betw ponds. Owner is Morgan, Llanferran Farm.	Waterfall – but spr. on stream & access down cliff slope.
4	Porth Meigan	13	0	0	0	1	1	3	Spraint at two original potential spr sites.	Good, only via stream.
5	Whitesands	14	0	2	0	0	1	1	Stream realigned since 2002 – now no large boulder ss	Good via stream, and in bay.
6	Porthlysgi bay	21	0	0	6	1	0	1	Spraint on first boulder by Right bank. Rob Davies, Tregynis Fm saw otter in field in 2010.	Good via stream. Sheer cliffs. 2 islands look accessible.
7	Porth Clais	24	1	11	8	0	1	0	Otter sighting reported by Colin Mills (retired harbourmaster 01437 720437). Also Malcolm Grey (engraver) saw otter in the sea.	Good via stream and rock platforms in long bay.
8	Caer Bwdy Bay	28	0	5	8	0	0	0	Volunteer for site = Ian Bullock, 01437 720065 ibullock@gmail.com	Good via stream. Spraint on beach
9	Porth y Rhaw	30	0	4	6	0	0	1	On well-used spraint site	Good via stream and at south of bay.
10	Solva	32	0	4	7	0	4	13	Blockstone ss now has footbridge over it (still in use).	Good via stream & in harbour
11	Porthmynawyd	36	0	0	1	0	1	0	On well used spraint site	Good via stream & up cliffs. Also 2 caves.
12	Cwm Mawr	38	0	0	0	0	0	0	No signs.	Good via stream & round to Newgale.
13	Newgale	39	0	12	7	1	2	3	V high water in lower river channel.	Good via stream & to cliffs to s.
14	Bathesland	40	0	0	0	0	0	0	High water recently?	Good via stream & to hill to n.
15	Not suitable for surveys.									
16	Nolton Haven	43	0	0	0	1	0	1	On blockstone by right bank	Good only via stream.
17	Druidstone Haven	44	0	0	2	0	0	0	No signs on either of the streams	Good via stream. To south in bay, grass slope to cobbles. No cover.
18	Broad Haven, Haroldston bridge PO bridge	48	0	4	0	0	1	0	PO bridge: Good ss on concreted stones immediately upstr of bridge in garden. Good camera site – owned by Sue Mock + Trish Brittain 01437 781211 also own Seaview mini market. Pot Breeding site in woodland disturbed by well-used FP.	Good via stream.
19	Little Haven	49	0	0	0	0	0	0	No signs.	Good only via stream
20	Mill Haven	53	3	1	5	0	1	3	Lower Broadmoor fm manager now Darren Callan, 01437 781219	Good via stream & both sides of bay. Breeding recorded on lake.
21	Ripperston fm	55	0	0	0	-	-	-	Not surveyed	No access – high sheer waterfall.
21a	St. Brides	56	1	0	3	11	6	2	Mostly old ss, plus one new ss up stream	Good via stream & on north side of bay
22	Marloes	67	0	0	0	2	0	0	SS grass tumps	Good via stream & into caves.
23	Castlebeach Bay	75	0	0	0	1	0	0	Only on spr site 7 (new site from 2002)	No access – waterfall
24	Freshwater west	81	2	5	3	0	0	1	On black plastic garden netting next to elder.	Good via stream and all along bay via dunes.
25	Frains Lake	84	3	2	6	-	-	-		Good via stream and in bay via dunes and up rocks at south end of bay.
26	Broad Haven Bosherton	99	0	0	0	2	0	2	Spraints on bedrock next to stream on beach.	Good via stream and in by into dunes, and up Star Rock.
27	Fresh East	106	0	0	0	0	0	0	No signs of previous use at pot spr sites	Good via stream & into dunes/scrub
	Totals		10	51	61	21	24	39		

5.2 Extent of potential breeding sites on coastal streams.

- 5.2.1 Aerial views of the (now) 11 potential breeding sites showing site boundaries are given in Appendix 2.
- 5.2.2 Most of the potential breeding sites are relatively large and encompass the usually narrow valley (often approx. 40m wide) through which the stream flows (an example is shown in Fig 3). Several sites have well-used footpaths that run parallel to the stream, but usually some distance from it. Cover within the valleys is typically dense and impenetrable to people so that footpaths are unlikely to create disturbance that would prevent otters from breeding. At some of the potential breeding sites (e.g. Sites 3, 9, 20 & 25) the dense cover is associated with large, undisturbed ponds.

Fig 3 Example of potential breeding site boundaries encompassing valley (Porthlysgi Bay, Site 6)



5.3 The gender of otters using the 6 CSS (& 2 watershed sites)

June to November 2013. Please refer to Appendix 3 & Tables 2-4 for results.

- 5.3.1 Fresh, recent and old spraints (n=96) were recorded and collected in each of the survey months (Table 2).
- 5.3.2 Of the 96 spraints collected from the 6 sites from June to November 2013, fewer than half (46%) could be analysed for gender (Appendix 3). Only samples with a high quantity of DNA could be sex typed. Spraints with too little DNA to be selected for sex typing are referred to in Tables as 'N/A'; spraints where sex typing failed are referred to as 'undet'.

Table 2 CSS – Numbers of spraints found in each 'age' class for each month

	June	July	Aug	Sept	Oct	Nov
Fresh	2	4	2	3	1	3
Recent	16	8	8	10	4	9
Old	12	6	3	4	1	3
Totals	30	18	13	17	6	15

- 5.3.3 The lack of sufficient DNA in samples (N/A), and a failure to sex type samples (undet) occurred across the 'ages' of spraints (Appendix 3).
- 5.3.4 Spraints from both females & males were recorded in each of the 6 months and at all 6 CSS (Table 4). Both female & male spraints were recorded in the same month at Porth y Rhaw, Solva, Newgale & Bathesland.

Table 3 CSS – Numbers of spraints recorded as F (Female) & M (Male) at 6 CSS for June to November. ("0" refers to N/A & undet results)

	June		July		Aug		Sept		Oct		Nov	
	F	M	F	M	F	M	F	M	F	M	F	M
Caer Bwdy Bay	1	0	1	0	0	0	0	1	0	0	0	0
Porth y Rhaw	2	0	0	0	0	0	0	0	0	0	1	1
Solva	3	2	2	3	0	0	0	0	1	1	0	1
Cwm Mawr	0	0	0	0	0	0	0	0	0	0	4	0
Newgale	0	6	2	0	1	2	2	2	0	0	0	0
Bathesland	0	1	2	2	0	0	0	3	0	0	0	0

5.3.5 Numbers of spraints recorded as female were highest in July (7 spraints at 4 CSS) and in November (5 spraints at 2 CSS). For males the numbers were highest in June (9 spraints at 3 CSS), July (5 spraints at 2 CSS) and September (6 spraints at 3 CSS) (Table 4).

Table 4 CSS – Numbers of spraints recorded as Female & Male for June to November. (1)=number of CSS at which spraints were found.

	June	July	Aug	Sept	Oct	Nov
Female	3 (1)	7 (4)	1 (1)	2 (1)	1 (1)	5 (2)
Male	9 (3)	5 (2)	2 (1)	6 (3)	1 (1)	2 (2)

Watershed Sites.

Data on spraint 'ages' and sex typing for the two watershed sites over the 6 month period (June to November 2013) are also available and presented here (in Appendix 4), although they do not contribute directly to the investigation into gender of otters using the CSS.

5.3.6 Except for October, fresh, recent &/or old spraints (n=28) were recorded & collected in each month (Table 5).

Table 5 Watershed Sites – Numbers & 'ages' of spraints

	June	July	Aug	Sept	Oct	Nov
Fresh	4	3	2	2	0	2
Recent	5	2	1	2	0	1
Old	1	0	1	1	0	1
Totals	10	5	4	5	0	4

5.3.7 Of the 28 spraints collected, over half (57%) were sex typed. Of the 16 spraints that were sex typed, 14 were female and 2 were male (Table 6).

5.3.8 At the Caerforiog site all of the 13 spraints that were sex typed were female. At the Pont y Hafod site, 1 spraint was sex typed as female, whilst two were male (Table 6).

Table 6 Watershed Sites – Numbers of spraints recorded as F (Female) & M (Male) for each site.

	June		July		Aug		Sept		Oct		Nov	
	F	M	F	M	F	M	F	M	F	M	F	M
Caerforiog	7	0	3	0	3	0	0	0	0	0	0	0
Pont y Hafod	0	0	0	1	1	0	0	0	0	0	0	1

6. RESULTS - 2017

6.1 Changes in otter activity, habitat quality & availability (Table 7).

- 6.1.1 There was a small decline in the number of CSS with otter signs, from 19 in 2012 to 17 in 2017. The total number of spraints found also declined, from 84 in 2012 to 54 in 2017, with the largest decline in fresh spraints (21 compared to 7 in 2017).
- 6.1.2 The specific sprainting sites used at each site were mainly the same as those found during earlier surveys, although some sprainting sites appear to have been abandoned.
- 6.1.3 Resting and breeding site habitats (extensive fen, bracken/gorse/bramble scrub, woodland, reed beds and boulder piles) remain intact with no evidence of human disturbance or damage.
- An increase in the number of badger signs (mainly paths, prints & latrines) was noted. At several sites badger signs were seen in the 2017 survey that were not present in 2012.

6.2 Potential Trail Camera sites (Table 7)

- 6.2.1 Ideal locations at which trail cameras can be installed in order to monitor for breeding activity were found at 7 sites. Four sites are under bridges [Solva, Newgale (Fig 4), Broad Haven (a camera has already been installed as part of a separate project. Please see results below), and Little Haven (Fig 5)]. Two sites are at lakes where breeding is known or suspected (Porth y Rhaw & Mill Haven), and one is at a well-used otter path (Cyffredin).

Fig 4 Newgale Camera site

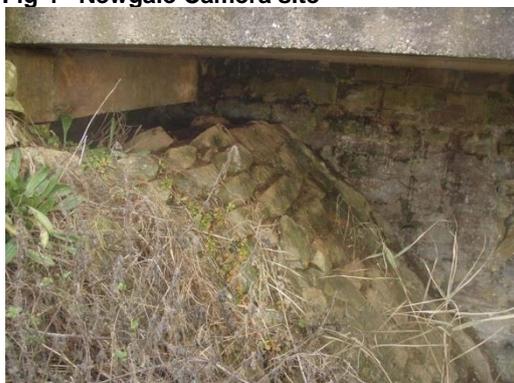
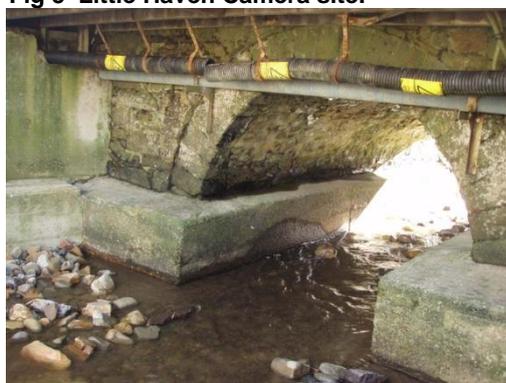


Fig 5 Little Haven Camera site.



6.2.2 Broad Haven Trail Camera Results.

A trail camera installed under a small bridge 138m from the coastal stream outflow to the beach recorded two otters together (assumed to be male & female) on December 31st 2018 (see video clip below).

On June 25th 2019 the camera recorded female with two cubs (estimated to be 4 months old).

Table 7 Results showing numbers of spraints (Fresh=F, Recent=R & Old=O) for each Coastal Stream Site in 2012 & 2017

No.	SITE Name	Km	2012			2017			NOTES 2017	Otter access etc.
			F	R	O	F	R	O		
1	Abereiddy	3	1	0	0	0	0	0	Stream choked with reeds. Mammal path, may be otter. Otter sighting on stream May 2017.	Good via stream, rocks & sea pool for feeding.
1a	Cyffredin	3	0	2	0	0	5	0	Otter path up to coast path. Camera site.	Good via stream & rocks.
2	Aber Pwll	4	0	3	1	1	0	0	No spraint at pond, but mammal path probably otter.	Good via stream & cliffs to north
3	CarregyrAfr	7	0	0	4	0	0	0	Potential breeding site – large areas of dense scrub bramble/gorse on & betw ponds. Owner is Morgan, Llanferran Farm.	Waterfall – but spr. on stream & access down cliff slope.
4	Porth Meigan	13	1	1	3	0	2	0	Crab remains.	Good, only via stream.
5	Whitesands	14	0	1	1	1	0	0	SS on smallstone next to culvert outflow.	Good via stream, and in bay.
6	Porthlysgi bay	21	1	0	1	1	0	1	Spraint on grass platform near outflow onto beach. Upstream = Dwr Cymru WTW – good site for art holt.	Good via stream. Sheer cliffs. 2 islands look accessible.
7	Porth Clais	24	0	1	0	0	0	0	No signs, but many good ss.	Good via stream and rock platforms in long bay.
8	Caer Bwdy Bay	28	0	0	0	0	0	0	Volunteer for site = Ian Bullock, 01437 720065 ibullock@gmail.com	Good via stream. Spraint on beach
9	Porth y Rhaw	30	0	0	1	0	0	2	Large pond is pot resting site & Camera site	Good via stream and at south of bay.
10	Solva	32	0	4	13	2	6	2	All spraint under FB. Camera site.	Good via stream & in harbour
11	Porthmynewyd	36	0	1	0	0	0	0	Farmer at Pointz castle says otter prints seen 2015. Pond has many eels, some very large.	Good via stream & up cliffs. Also 2 caves.
12	Cwm Mawr	38	0	0	0	0	0	1	Spraint on grass mound near outflow.	Good via stream & round to Newgale.
13	Newgale	39	1	2	3	1	4	5	Spraints up & dstream from bridge. Camera site at brdg.	Good via stream & to cliffs to s.
14	Bathesland	40	0	0	0	0	1	0	Spraint on large stone on beach next to wing wall of brdg	Good via stream & to hill to n.
15	Not suitable for surveys.									
16	Nolton Haven	43	1	0	1	0	0	0	Good ss, no signs	Good only via stream.
17	Druidstone Haven	44	0	0	0	0	0	3	2 spr sites, one on each stream near confluence.	Good via stream. To south in bay, grass slope to cobbles. No cover.
18	BroadHaven, Haroldston bridge PO bridge	48	0	1	0	0	1	0		Good via stream.
			0	1	3	0	2	0	Camera site – installed.	Good via stream.
19	Little Haven	49	0	0	0	0	0	0	Otter sighting Aug 2016 – otter went from stream onto beach. Camera site under bridge.	Good only via stream
20	Mill Haven	53	0	1	3	0	0	2	Lake nr farmhouse – pot breeding site. No signs. Camera site at lake.	Good via stream & both sides of bay. Breeding recorded on lake.
21	Ripperston fm	55	-	-	-	0	0	0	Poor habitat at lakes, but carp released recently.	No access – high sheer waterfall.
21a	St. Brides	56	11	6	2	0	2	2	Mostly old ss, plus one new ss up stream	Good via stream & on north side of bay
22	Marloes	67	2	0	0	0	0	0	Ss on coast & under FB.	Good via stream & into caves.
23	Castlebeach Bay	75	1	0	0	0	0	0	Only on spr site 7 (new site from 2002)	No access – waterfall
24	Freshwater west	81	0	0	1	0	1	0	On black plastic garden netting next to elder.	Outflow pipe full. Access through dunes.
25	Frains Lake	84	-	-	-	-	-	-	No surveyed.	Good via stream and in bay via dunes and up rocks at south end of bay.
26	Broad Haven Bosherton	99	2	0	2	1	4	2	Spraints on bedrock next to stream on beach.	Good via stream and in by into dunes, and up Star Rock.
27	Fresh East	106	0	0	0	0	0	0	No signs of previous use at pot spr sites	Good via stream & into dunes/scrub
	Totals		21	24	39	7	28	19		

7. DISCUSSION/CONCLUSION

7.1a Changes in otter activity, habitat quality & availability 2002 - 2017

7.1.1 During the survey period otter activity was found at 26 sites, with only 3 sites negative on each survey (Little Haven, Ripperstone Farm & Freshwater Water East).

Table 8 Sprint results for CSS 2002, 2012 & 2017.

No.	Name	Km	2002			2012			2017		
			F	R	O	F	R	O	F	R	O
1	Abereiddy	3	0	0	0	1	0	0	0	0	0
1a	Cyffredin	3	0	0	0	0	2	0	0	5	0
2	Aber Pwll	4	0	0	0	0	3	1	1	0	0
3	CarregyrAfr	7	0	0	0	0	0	4	0	0	0
4	Porth Meigan	13	0	0	0	1	1	3	0	2	0
5	Whitesands	14	0	2	0	0	1	1	1	0	0
6	Porthlysgi bay	21	0	0	6	1	0	1	1	0	1
7	Porth Clais	24	1	11	8	0	1	0	0	0	0
8	Caer Bwdy Bay	28	0	5	8	0	0	0	0	0	0
9	Porth y Rhaw	30	0	4	6	0	0	1	0	0	2
10	Solva	32	0	4	7	0	4	13	2	6	2
11	Porthmynawyd	36	0	0	1	0	1	0	0	0	0
12	Cwm Mawr	38	0	0	0	0	0	0	0	0	1
13	Newgale	39	0	12	7	1	2	3	1	4	5
14	Bathesland	40	0	0	0	0	0	0	0	1	0
15	Not suitable for surveys.										
16	Nolton Haven	43	0	0	0	1	0	1	0	0	0
17	Druidstone Haven	44	0	0	2	0	0	0	0	0	3
18	BroadHaven, Haroldston bridge PO bridge	48	0	4	0	0	1	0	0	1	0
			0	1	1	0	1	3	0	2	0
19	Little Haven	49	0	0	0	0	0	0	0	0	0
20	Mill Haven	53	3	1	5	0	1	3	0	0	2
21	Ripperston fm	55	0	0	0	-	-	-	0	0	0
21a	St. Brides	56	1	0	3	11	6	2	0	2	2
22	Marloes	67	0	0	0	2	0	0	0	0	0
23	Castlebeach Bay	75	0	0	0	1	0	0	0	0	0
24	Freshwater west	81	2	5	3	0	0	1	0	1	0
25	Frains Lake	84	3	2	6	-	-	-	-	-	-
26	Broad Haven Bosherton	99	0	0	0	2	0	2	1	4	2
27	Fresh East	106	0	0	0	0	0	0	0	0	0
	Totals		10	51	61	21	24	39	7	28	19

7.1.2 The decline in the total number of sprints recorded between 2002 & 2017 appears to be high but may be partly explained by weather conditions leading up to the 2012 & 2017 surveys. Whereas late summer / early autumn in 2002 was mainly dry so that sprints are likely to have survived longer, in 2012 there was heavy rain at the end of September, and rain continued to dominate the weather during October, and in 2017 surveys were interrupted by major storms – many sprints may have been washed off exposed sprinting sites. This is supported by the differences in numbers of recent & old sprints: 24 & 39 in 2012 compared to 51 & 67 in 2002. However, more fresh sprints were found in 2012 (n=21) compared to 2002 (n=10).

- 7.1.3 Results from the 3 surveys covering a 15 year span suggest that otter use of the coastal streams is regular and frequent at some streams (e.g. Solva, Newgale, St. Brides, Broadhaven/Bosherston).
- 7.1.4 Two of the 3 negative sites (Little Haven & Freshwater East) are likely to be visited / used by otters. At Little Haven an otter was seen in August 2016 leaving the stream and travelling onto the beach to hunt in rock pools. At Freshwater East the available sprainting site (a grass mound where the stream meets the beach) is regularly trampled by dogs & people.
- 7.1.5 There appears to have been very little change in the quality and availability of cover in which otters can lie up and breed. Several stream valleys have footpaths along them, but for much of their length they are far enough from the watercourse so unlikely to create significant disturbance; habitats between path and stream are dense & impenetrable; and paths run down only one side of the valley.
- 7.1.6 Ponds or small lakes occur at 7 CSS – up to 4 ponds at some sites. Water bodies are likely to provide good foraging sites, and important habitats for a breeding female (see 6.2.2 below).

7.2 Extent of potential breeding sites on coastal streams.

- 7.2.1 Evidence (from sightings of cubs) suggests that otters breed on some CSS. The Potential Breeding Sites on the CSS occupy relatively large areas of land (as seen in Appendix 2). A large area of suitable cover for otter breeding is important because it helps to provide security for the female and cubs (Liles, 2003b). This, together with other features that are important to support otter breeding (away from flood risk & close to a good food supply) certainly suggests that all of the sites identified would be suitable for otter breeding.
- 7.2.2 The combination of ponds with dense cover at some CSS is likely to be of particular importance to sustaining otter breeding (because they provide not only secure cover but also a good food supply). At present there is little evidence of significant human use and management of these ponds. However, ponds and surrounding cover should be considered as especially vulnerable through possible change of use (e.g. for fishing) that could result in loss of important breeding / lying up cover and disturbance.
- 7.2.3 There are two potential concerns linked to the fact that all potential breeding sites are above ground and provide little protection for female & cubs, especially when cubs are left unattended whilst the female is away foraging. The potential concerns are from incursion by dogs into dense scrub & woodland, and the apparent increase in badger activity within coastal stream habitats.

7.3 The gender of otters using the 6 CSS (& 2 watershed sites) June to November 2013.

- 7.3.1 With only 46% of the 96 spraints collected providing useable DNA for sex typing, reaching firm conclusions on gender use of CSS, using just results from sex typing, is not possible.
- 7.3.2 The present results do suggest that both sexes use the coast throughout the year. For 4 sites at least, females & males used the site during the same month, suggesting that there is no exclusivity in use of the coast by the sexes.
- 7.3.3 Unfortunately the failure to extract useable DNA from spraints has meant that genotyping studies could not be undertaken.

Watershed Sites.

- 7.3.4 It is noticeable that a higher percentage of spraints collected at the two watershed (57%) could be sex typed. It is possible that a difference in diet between coastal & inland sites may account for the difference. At inland sites otter consumption of mainly bony fish could result in more otter epithelial cells being passed out in spraints.
- 7.3.5 The most striking result is at the Caerforiog site, where all of the 13 spraints sex typed were female.

8. RECOMMENDATIONS

- 8.1 The 11 Potential Breeding Sites are all associated with scrub &/or fen habitats that are potentially vulnerable to disturbance. Mechanisms to protect these habitats, e.g. formerly through the Planning system and informally through routine monitoring by National Park staff, should be established. Potential threats include changes to land use & management that lead to a reduction in habitats, and incursions into the habitats by dogs (& people) from public footpaths. In addition the apparent increase in badger activity and distribution may pose a threat to otters breeding in above-ground sites.
- 8.2 In order to provide natal den sites that provide more secure protection for breeding females and cubs, artificial holts (using the plastic holts now available through Filcris) should be installed in Potential Breeding Sites.
- 8.3 Establishing if, when & on which coastal streams otters are breeding remains an important aim for our understanding of how otters use the coastal streams, and the conservation measures needed to protect them. It is suggested that a programme of camera surveillance should be set up, using Trail cameras, at all or some of the camera sites identified in this report so that the presence of females with cubs at a site can be established.

ACKNOWLEDGEMENTS

Funding for this project (as with previous otter investigations within the Pembrokeshire Marine SAC) has been provided by the Pembrokeshire Marine SAC Relevant Authorities Group. Sue Burton (Pembrokeshire Marine SAC Officer) managed the project, and I'm particularly grateful for all her support and advice.

We were very fortunate to be able to collaborate with the MISE project (Mammals in a Sustainable Environment) run by the Vincent Wildlife Trust & partners. As part of the MISE project, spraints from the Pembrokeshire coast were sent to the Waterford Institute of Technology for genetic analyses, and we are very grateful to Dr. Jenny MacPherson (VWT) for all her help.

Spraints for genetic analyses were collected by Ian Meopham (Pembrokeshire Coast National Park Ranger) and I'd like to pass on my great thanks to Ian for his efforts.

I'd also like to thank the many local people who have given access permission to their land, and provided information on otter sightings.

9. REFERENCES

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APPENDIX 1 SPRRAINT COLLECTION INSTRUCTIONS.

PEMBROKESHIRE MARINE SAC: OTTER SPRRAINT DNA PROJECT INSTRUCTIONS FOR COLLECTING & RECORDING SPRRAINTS

Thanks very much for collecting spraints for this DNA project. In order for the DNA analyses to be carried out, and for us to be able to analyse the results, it's vital that the following instructions are followed.

Spraint collection.

Please survey **once** a month, and at around the same time of the month. *So, it's possible that, in some months, you will find no spraints.*

The map of your site(s) shows known well-used spraint sites. Please search these but be aware that otters may have left spraints a few metres away.

All spraints should be collected, where possible.

Decide whether the spraint(s) is fresh, recent or old (see below for descriptions).

If you find a pile of spraints, or one spraint on or touching another, please separate the spraints as carefully as possible.

One spraint should go into **one bag**.

It's easier with most spraint to use your fingers to pick them up, but oily flat spraints can be collected by scraping with sticks. Please clean your fingers between spraints – in the stream or on moss etc.

Labelling the bag.

Each bag has a unique MISE number that will be the unique number for that individual spraint.

In addition, we need information on date of survey, location and the relative "age" of the spraint (fresh, recent or old) so that we can analyse the results. So:

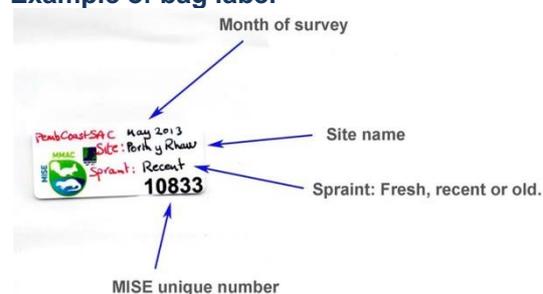
Please write on each bag, as shown below:

- the month/year when the survey is carried out;
- the site name; and
- whether the spraint is fresh, recent or old.

Please use a fine pen and write very clearly – there's not much space!!

As we will be collating information from (we hope) hundreds of bags it's very important that the information on the bag is written as shown in the example, and as clearly as possible.

Example of bag label



“Aging” spraints.

The following descriptions will help to decide the “age” of each spraint.

Fresh = Wet and oily (or soft if spraint composed mainly of crustacean bits).
Usually strong smell. May or may not have small bones in it.

Recent = Compact, dry and may be stuck well to the spraint site (e.g. a stone or rock, or grass tussock). Smell is usually still noticeable.

Old = Disintegrated or crumbles very easily, so not compact. Smell is usually very faint.

Storing Spraints.

Spraints must be **frozen on the day of collection** (otherwise they deteriorate and cannot be used for DNA extraction), so we’d be grateful if you can put them into your freezer. I store spraints in my freezer in a small plastic sandwich box.

Your spraints will be collected at intervals so that they can be sent off to the University in Ireland for DNA analyses, and we’ll be in touch about how we can collect them from you.

Initial DNA analyses of our spraints will identify whether it’s from a male or female otter. DNA analyses will also identify individual animals (from their genetic fingerprint) but technique takes longer.

If you have any problems / queries, please ring Sue Burton.

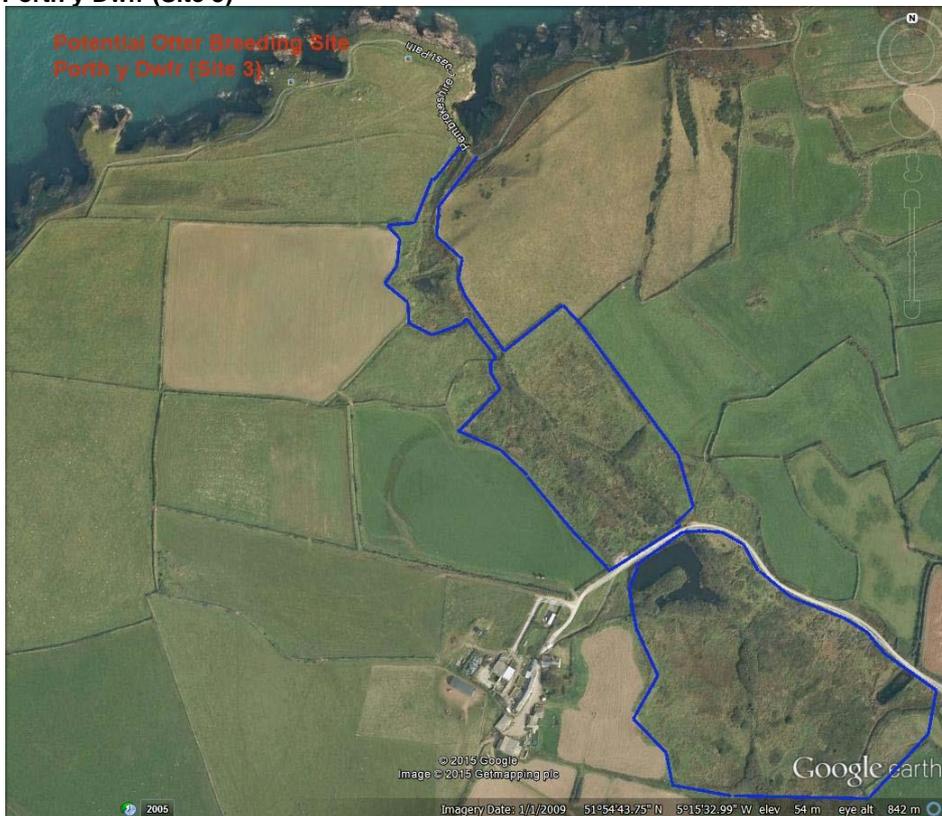
Thanks very much.
Geoff Liles & Sue Burton.

APPENDIX 2 POTENTIAL OTTER BREEDING SITE BOUNDARIES.

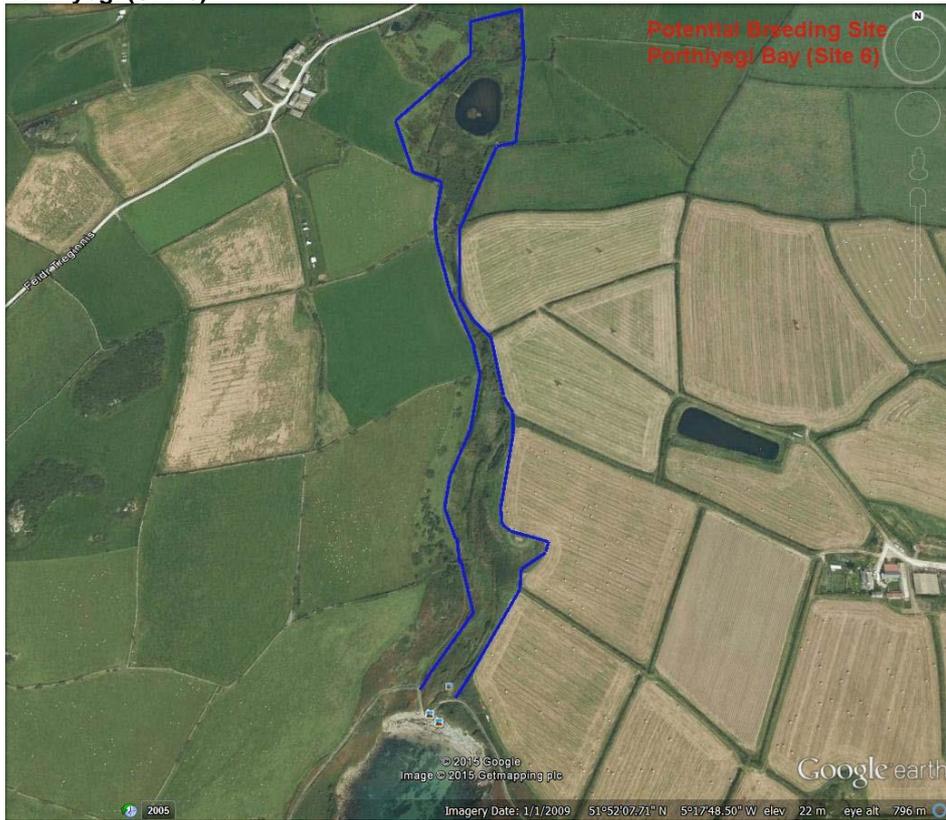
Aber Pwll (Site 2)



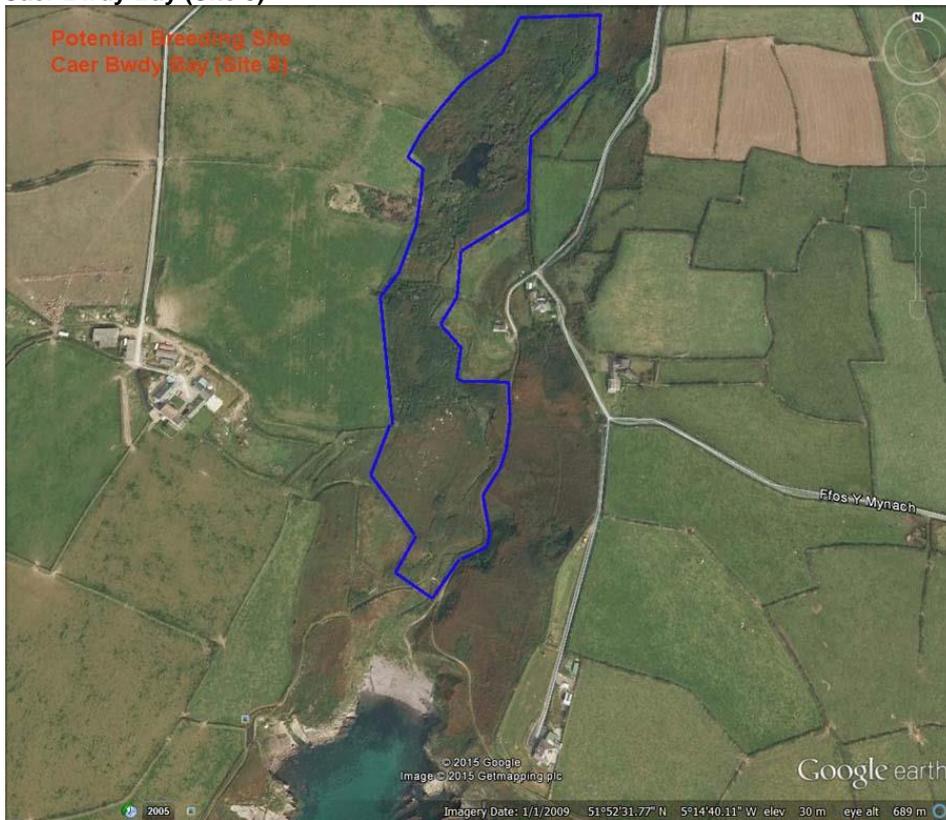
Porth y Dwfr (Site 3)



Porthlysgi (Site 6)



Caer Bwdy Bay (Site 8)



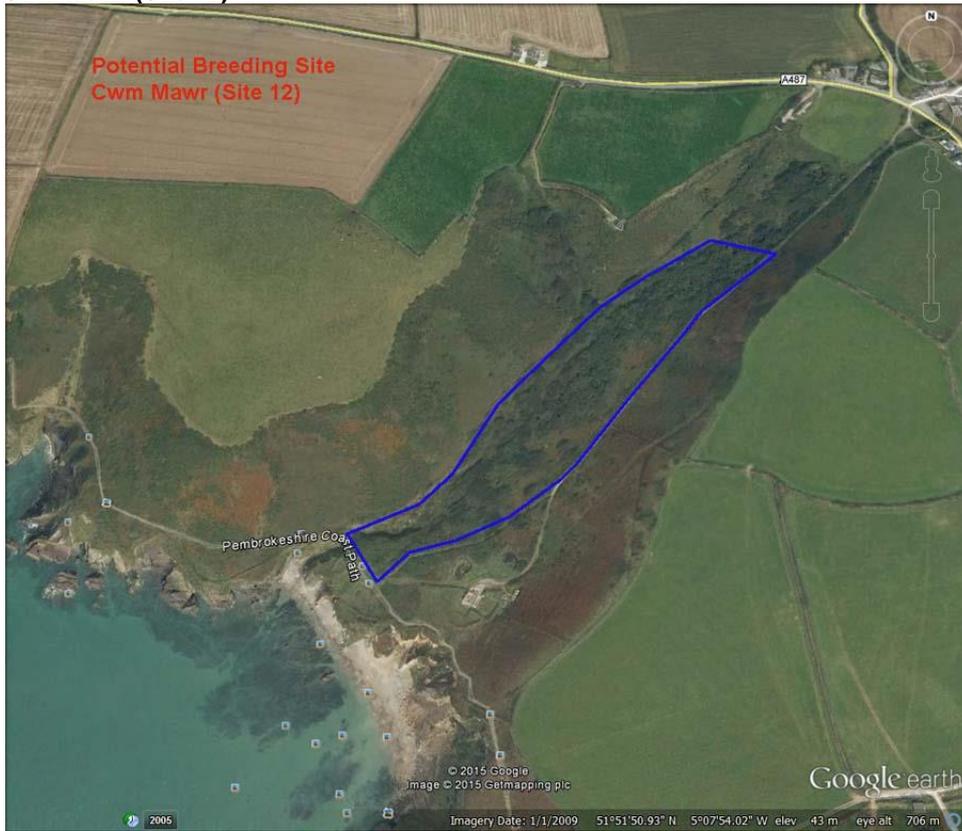
Porth y Rhaw (Site 9)



Porthmynawyd (Site 11)



Cwm Mawr (Site 12)



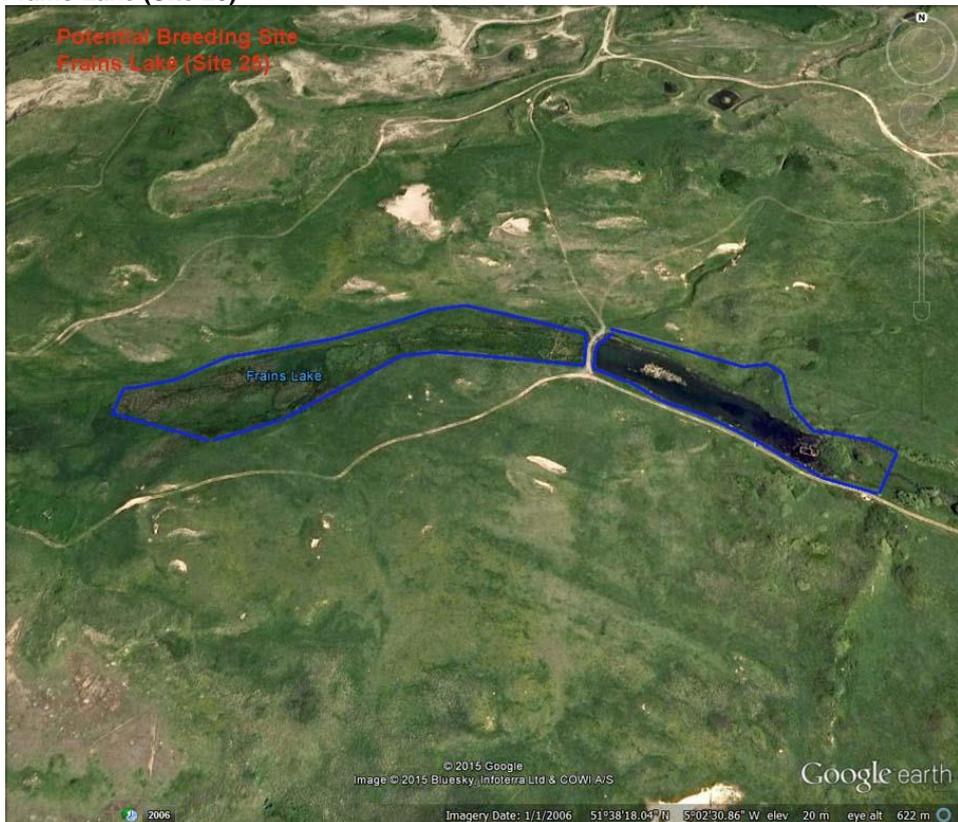
Newgale (Site 13)



Mill Haven (Site 20)



Frains Lake (Site 25)



Freshwater East (Site 27)



APPENDIX 3 COASTAL SURVEY SITES: RESULTS OF GENDER IDENTIFICATION FOR SPRAINT "AGES" IN EACH SURVEY MONTH .

F = female M = male (please see text for 'undet' & 'N/A')

SITE	GRID REF				
Caer Bwdy Bay (8)	SM766244				
Porth y Rhaw (9)	SM786244				
Solva (10)	SM807245				
Cwm Mawr (12)	SM843228				
Newgale (13)	SM847224				
Bathesland (14)	SM852210				
June 2013	SITE	Fresh	Recent	Old	IDENTITY
10758	Bathesland			M	
09145	Newgale		M		
09141	Newgale		M		
09173	Newgale		M		
09169	Newgale			M	
09157	Newgale			M	
09153	Newgale			UNDET	
09161	Newgale		N/A		
09165	Newgale			M	
09149	Newgale		N/A		
09215	Solva		N/A		
09186	Solva		F		
09190	Solva		M		
09182	Solva		F		
09227	Solva		UNDET		
09219	Solva			M	
09211	Solva		N/A		
09223	Solva		UNDET		
09235	Solva		UNDET		
09231	Solva		F		
10829	Porth y Rhaw			F	
10857	Porth y Rhaw		UNDET		
10845	Porth y Rhaw			UNDET	
10856	Porth y Rhaw			N/A	
10852	Porth y Rhaw	N/A			
10849	Porth y Rhaw	N/A			
10853	Porth y Rhaw			F	
10841	Porth y Rhaw			UNDET	
10837	Caer bwdi			F	
09189	Caer bwdi		UNDET		

July 2013	SITE	Fresh	Recent	Old	IDENTITY
11074	Bathesland			F	
11078	Bathesland	M			
11075	Bathesland			M	
11080	Bathesland			F	
10827	Caerbwdi	F			
10830	Newgale		F		
10850	Newgale	UNDET			
10846	Newgale		F		
10834	Newgale			UNDET	
11083	Solva		M		
10790	Solva		M		
10786	Solva	M			
10778	Solva		N/A		
10782	Solva		F		
02964	Solva		F		
10843	Porth y Rhaw			N/A	
11084	Porth y Rhaw		UNDET		
11079	Porth y Rhaw			UNDET	

August 2013	SITE	Fresh	Recent	Old	IDENTITY
08847	Caerbwdi		N/A		
08835	Solva			N/A	
08831	Solva			N/A	
08827	Solva		N/A		
08824	Solva	UNDET			
08870	Newgale		N/A		
08862	Newgale		UNDET		
08863	Newgale	N/A			
08858	Newgale		F		
08875	Newgale			M	
08871	Newgale		M		
08866	Newgale		N/A		
08850	Newgale		UNDET		

September 2013	SITE	Fresh	Recent	Old	IDENTITY
07552	Newgale		UNDET		
00760	Newgale		F		
07897	Newgale		N/A		
10785	Newgale		UNDET		
07920	Newgale		F		
07889	Newgale			M	
07589	Newgale		M		
07428	Bathesland			M	
07489	Bathesland	M			
07461	Bathesland			M	
00772	Caerbwdi			M	
10730	Caer Bwdi	N/A			
10722	Caer Bwdi	N/A			
7431	Caer Bwdi		N/A		
00776	Solva		UNDET		
08828	Solva		N/A		
653	Solva		N/A		

October 2013	SITE	Fresh	Recent	Old	IDENTITY
07560	Solva			M	
07542	Solva		UNDET		
07457	Solva		N/A		
07706	Solva		UNDET		
00780	Solva		N/A		
07582	Solva	F			

November 2013	SITE	Fresh	Recent	Old	IDENTITY
08881	Newgale		N/A		
09102	Newgale	N/A			
07568	Newgale	UNDET			
07427	Bathesland		UNDET		
08990	Cwm Mawr		F		
09038	Cwm Mawr		F		
09043	Cwm Mawr		N/A		
09034	Cwm Mawr			F	
09030	Cwm Mawr		F		
09014	Porth y Rhaw			M	
09018	Porth y Rhaw			F	
09022	Solfa	M			
09026	Solva		N/A		
10690	Solva		N/A		
09036	Solva		N/A		

APPENDIX 4 WATERSHED SURVEY SITES: RESULTS OF GENDER IDENTIFICATION FOR SPRRAINT "AGES" IN EACH SURVEY MONTH .

F = female M = male (please see text for 'undet' & 'N/A')

June 2013	SITE	Fresh	Recent	Old	IDENTITY
09183	Caerforiog	F			
09203	Caerforiog		F		
09187	Caerforiog	N/A			
09232	Caerforiog	F			
09236	Caerforiog		F		
09195	Caerforiog		F		
09228	Caerforiog		UNDET		
09207	Caerforiog			F	
09191	Caerforiog		UNDET		
09199	Caerforiog	F			

July 2013	SITE	Fresh	Recent	Old	IDENTITY
11082	Pont y Hafod		N/A		
11076	Pont y Hafod	M			
10831	Caerforiog		F		
10826	Caerforiog	F			
10835	Caerforiog	F			

August 2013	SITE	Fresh	Recent	Old	IDENTITY
08923	Pont y Hafod	F			
08907	Caerforiog		F		
08903	Caerforiog	F			
08931	Caerforiog			F	

September 2013	SITE	Fresh	Recent	Old	IDENTITY
07578	Caerforiog			UNDET	
10793	Caerforiog		N/A		
00768	Caerforiog		N/A		
7493	Caerforiog	N/A			
764	Caerforiog	UNDET			

November 2013	SITE	Fresh	Recent	Old	IDENTITY
07564	Pont y Hafod			M	
10718	Caerforiog	UNDET			
08994	Caerforiog		UNDET		
09001	Caerforiog	UNDET			