



**Distribution and abundance of
Palinurus elephas
in
Pembrokeshire
by
Jennifer Jones & Kate Lock**



Introduction

Palinurus elephas (crawfish, crayfish, spiny lobster) are large marine crustaceans similar in size to *Hommarus gamurus* (European lobster). They are found in the sub-tidal on rugged rocky reefs throughout Europe, and in Britain and Ireland they are found along western coasts from Shetland southwards towards the Isles of Scilly. In Wales they are found mainly off the west and north west Pembrokeshire coast in the south, and around the Llyn Peninsula in the north.

There has been a dramatic decline in the number of crawfish seen by divers since the late 1970's due to extensive commercial fishing by potting, scuba diving and later tangle netting, particularly around Wales (Lock, 2010) and it is identified as a species that needs protection and is on the UK Biodiversity Action Plan species list. BAP species are now Species of Principal Importance/Priority Species under the Natural Environment and Rural Communities Act 2006.

Funding was obtained in 2011 from Environment Wales Biodiversity Grant Fund to survey reefs in North Pembrokeshire and record the number of crawfish seen with the help of 'Seasearch' volunteer divers. Seasearch is a national volunteer diving project run by the Marine Conservation Society. It trains recreational divers to undertake habitat and species surveys and organises diving surveys all around the coastline of the British Isles.

The Biodiversity grant fund was awarded to achieve the following aims:

- To establish baseline monitoring of crawfish in north Pembrokeshire, and collect data to help determine their current distribution and population.
- To determine a suitable method for searching for and recording crawfish that can be adopted for any future monitoring programme.
- To determine which sites would be most suitable for a possible re-population programme in the future.

In 2013 further funding was obtained from the Pembrokeshire Biodiversity Partnership with the aim of conducting a repeat monitoring survey of crawfish at the same sites visited in 2011. Unfortunately, due to adverse weather conditions on each of the planned survey dates, no diving was possible. Funding was re-allocated for 2014, but again the weather intervened to prevent diving at the targeted sites. The decision was therefore taken to carry out two days of diving where it was sheltered at four sites in north St. Brides Bay to record the frequency and abundance of crawfish and draw a comparison with the original sites surveyed.

Search methods

Methods were the same as those used in the original survey. Shot lines were placed on the seabed and their positions recorded on a GPS. Divers descended in pairs and swam on pre-determined compass bearings looking for crawfish. At the end of the dive, before commencing their ascent, divers deployed a delayed surface marker buoy (SMB) to enable the support boat crew to record their end of search position. Assuming a reasonably constant direction of swim, accurate start and finish positions allowed an estimate of the area surveyed.

Recording

Each time a crawfish was seen the diver made a note of the depth, the time elapsed on the dive, and the size of the animal in order to determine whether they were adult or juvenile. Crawfish are measured along the carapace from behind the eye socket to the beginning of the first segment, which can prove difficult if they are occupying a crevice. For the purpose of this survey individuals smaller than 100 mm were classed as juvenile, and larger than 100 mm were adult.

The number of European lobsters (*Homarus gammarus*), edible or brown crabs (*Cancer pagurus*) and spiny spider crabs (*Maja squinado*) encountered on each dive were also recorded in order to make a comparison between the numbers of other commercially fished crustacea with the number of crawfish. Velvet swimming crabs (*Necora puber*) are not currently fished commercially around Pembrokeshire but were also recorded to ascertain the population of an unfished species to provide a further comparison.

Sites

Four sites were surveyed in total over the weekend with two dives being carried out at each site. Due to crawfish being on the NRW species sensitive data list access to data is restricted and exact positions for the sites cannot be given in this report.

Results

	Adult Crawfish	Juvenile crawfish	Lobsters	Edible crabs	Spider crabs	Velvet crabs
Site StB a	0	1	0	2	1	40+
Site StB b	0	0	9	7	16	50+
Site StB c	0	1	2	3	13	3
Site StB d	0	0	8	7	18	12

Total number of crustaceans recorded from each site in North St Brides Bay 2014

	Crawfish per 100 m ²	Lobsters per 100 m ²	Edible crabs per 100 m ²	Spider crabs per 100 m ²	Velvet crabs per 100 m ²
Site StB a	.1	0	.2	.1	4.5+
Site StB b	0	2.4	1.9	4.3	13+
Site StB c	.1	.4	.6	2.6	.6
Site StB d	0	.5	.5	1.2	.8

Density of crustaceans at each site in North St Brides Bay 2014

Only two crawfish were found during the weekend, both juvenile, compared to a much larger number of other commercially fished crustaceans. This highlights how drastically numbers have fallen in recent years and how much they are in need of protection. It also emphasises the fact that the North Pembrokeshire reefs surveyed in 2011 have a higher population of crawfish and are their favoured habitat, as can be seen in the table below.

	Crawfish per 100 m²	Lobsters per 100 m²	Edible crabs per 100 m²	Spider crabs per 100 m²	Velvet crabs per 100 m²
Site NP a	.54	.46	1.54	3.7	2.3
Site NP b	.42	.32	.88	1.3	3
Site NP c	.13	.22	.19	.3	1.22
Site NP d	.1	1.3	1.2	.85	3.5
Site NP e	.13	.52	.39	.59	8.9
Site NP f	0	.3	.81	1.22	4.6
Site NP g	0	.37	.7	.27	2.7

Density of crustaceans at each site in North Pembrokeshire 2011

Additional records

During 2014, there were occasional sightings of crawfish by divers in the Skomer Marine Nature Reserve (now Skomer Marine Conservation Zone), see below:

Date	No. Crawfish seen	Size
2/6/14	1	Large
17/6/14	1	Large
24/6/14	3	2 juvenile, 1 large
25/6/14	1	Small
26/6/14	1	Medium
29/6/14	1	Small
14/9/14	1	Small
18/9/14	2	Small

Conclusions and recommendations

This survey would seem to confirm the fact that the North Pembrokeshire reefs surveyed in 2011 have a much higher population of crawfish than other areas in Pembrokeshire and are their favoured habitat. However, the numbers are still critically low and in sharp contrast to the high numbers that were recorded by divers during the 1970's and into the 1980's (Lock 2010). If a re-population programme should be undertaken in the future North Pembrokeshire would appear to be the best location.

During the 5th quinquennial review of the Wildlife & Countryside Act crawfish were proposed by the Countryside Council for Wales as a candidate species for inclusion on Schedule 5 of the Wildlife & Countryside Act, to provide it with full protection. The proposal was rejected as there was doubt as to the current stocks of the species in Welsh water. This survey contributes to the evidence that the population is significantly smaller than historically, and it is strongly recommended that the species is put forward for inclusion

on Schedule 5 of the Wildlife & Countryside Act once more when the next review takes place.

Further monitoring still needs to be carried out at the original sites surveyed in 2011 to observe any change in population, age and distribution.

Acknowledgments

Thanks to Kerry Lewis, Andrew Everett, Richard West, Emily Williams, Emma Kenyon and Jim Bull, the Seasearch diving volunteers without whom the survey would not have been possible. Thanks to Pembrokeshire Biodiversity Partnership for supporting the project.

References

Lock, K (2010) Seasearch Wales Crawfish (*Palinurus elephas*) historical diver records.

Jones, J (2012) Distribution and abundance of *Palinurus elephas* in North Pembrokeshire.