



Skate/ray & cat shark (dogfish) eggcase subtidal surveys



Report on the work undertaken in 2009

Subtidal surveys for skate/ray eggcases: 3 year pilot project 2007-10

The Shark Trust's shore-based eggcase hunt is being taken subtidally as part of the Shark Trust's programme of work on skates and rays under their Welsh Skate and Ray project ('Information collation for sustainable management 2007-2010'). The aim of the subtidal survey work is to see if skate/ray eggcases can be seen in situ on the seabed and recorded by divers, and to try to identify the seabed habitat types and the locations used by different skate/ray species to lay their eggcases. Identification and protection of critical habitat for eggcase laying is an essential component of effective conservation of these species. Currently very little is known about the habitat requirements for skate/ray eggcase laying. The subtidal survey is being undertaken in conjunction with Seasearch (the national volunteer diver survey project) as a Seasearch Specialist Project. This report describes the findings of the subtidal surveys undertaken in 2009 (year 3 of a 3-year project) and provides a summary and conclusions on the 3 years of diving survey work.

Background

The idea to extend the eggcase hunt subtidally came after observations of live thornback ray eggcases and common skate eggcases on the seabed in Ireland and Scotland in 2006. These observations and photographic records of the eggcases questioned some of the commonly held views on where and how skates/rays laid their eggcases. Observations in aquaria frequently report skate/ray eggcases being laid in sediment, whereas the observations made in Ireland and Scotland showed thornback ray eggcases attached to the seabed (maerl and a pebble/gravel seabed) by a kind of 'web' of material extending out from the eggcases (not dissimilar to the byssus threads used by mussels in general appearance). Common skate eggcases were recorded as having been 'posted' between boulders on a small reef.

In order to safeguard the nursery areas of skates/rays it is essential to gain an understanding of the types of habitats favoured by the different species for laying their eggcases. It is also necessary to identify specific locations around the coast where eggcases are laid so that measures can be taken to adequately protect these nursery areas. There is a critical lack of specific information about the actual areas and seabed habitats they use.

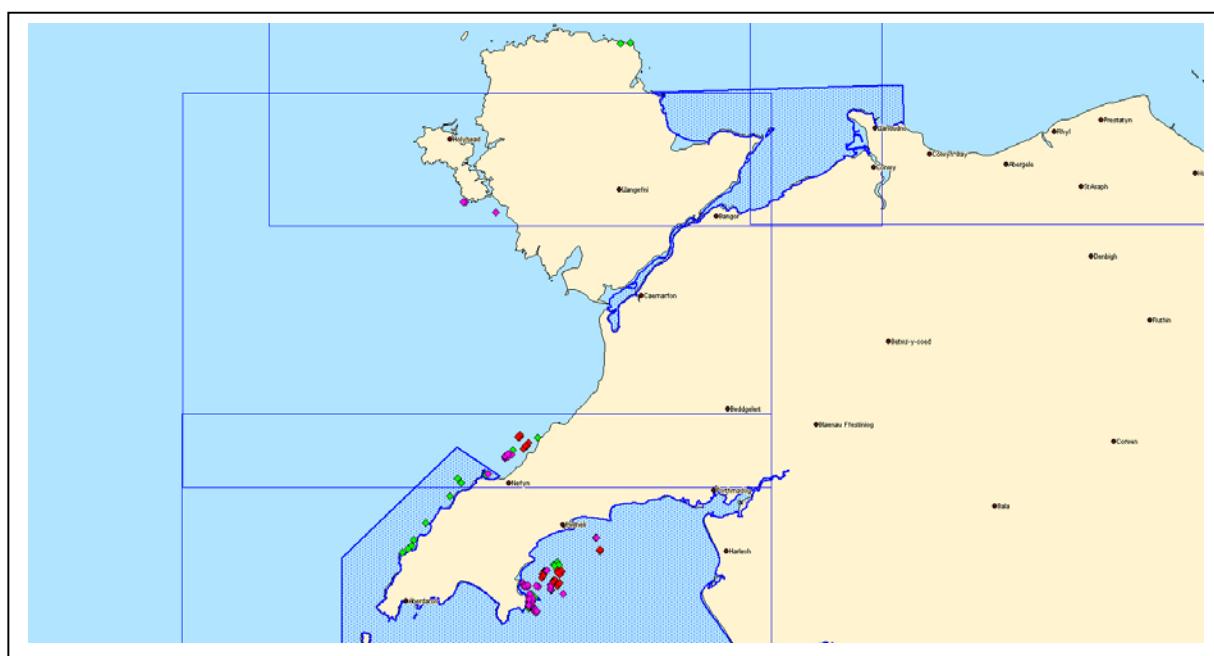
The current project is being run as a pilot project focussing on areas within the Pen Llŷn a'r Sarnau marine Special Area of Conservation (SAC) in northwest Wales, although a few records have also been provided from England and Scotland in 2008. Reports from anglers indicate that

pregnant female skates/rays are caught at certain locations around the coast of the Pen Llŷn a'r Sarnau SAC at specific times of the year. In addition divers have reported very small rays being consistently present in Tremadog Bay within the SAC. Also, the shore-based eggcase hunt surveys have recorded eggcases from a number of beaches around the SAC. Consequently, the Pen Llŷn a'r Sarnau SAC was considered a useful pilot site in which to develop and trial eggcase recording by divers.

Work undertaken in 2009

The focus of the work in 2009 was on undertaking further surveys in new locations within the Pen Llŷn a'r Sarnau SAC. As in years 1 and 2 of the project the main locations targeted for the diving surveys in 2009 included sites offshore from the locations where female pregnant skates/rays have been reported by anglers, but other seabed habitats were also surveyed. The seabed habitats included reef (boulders, cobble, pebble), mixed ground (larger rocks, gravel and sediment), as well as sand and muddy sediment, thereby covering the range of habitat types where skates/rays may be expected to lay their eggcases based on existing information.

Four eggcase survey dives were run in June 2009. Eggcase recording was also promoted on other Seasearch dives in North Wales. A total of 17 eggcase forms were completed for 8 different sites within the SAC and a further 3 forms were submitted for dives in England and Scotland. Fourteen divers took part in the recording, and the total survey effort equates to 25 diver days for North Wales, 2 diver days for England and 4 diver days for Scotland. The eggcase survey dives in North Wales were run using Waterline boat charters.



Map 1. Location of subtidal eggcase recording dives in North Wales 2007-2009 (2007 sites in green, 2008 sites in pink, 2009 sites in red). Blue hatched areas are marine SACs.

Seasearch forms were also completed for most of the eggcase dives, providing additional habitat and species information for the sites surveyed. This data has been entered into Marine Recorder by Seasearch and will become available through the National Biodiversity Network (NBN).

In addition to recording eggcases, divers were also requested to record any observations of juvenile or adult skates/rays on the recording forms.

As in the previous two years of the survey work, records of eggcases of small spotted catshark (*Scyliorhinus canicula*, also known as a lesser spotted dogfish, common dogfish, sandy dog and rough hound) and the nursehound (*Scyliorhinus stellaris*, also known as greater spotted dogfish and bull huss) together with records of the habitat they occur in were also made. Although cat sharks and nursehounds and their eggcases are currently considered to be a relatively common sight underwater in the UK, there may come a time when the observational records made by divers of the habitat and species used by catsharks to attach their eggcases provides information that may help safeguard breeding areas for these species.

The locations where eggcase recording dives were undertaken in northwest Wales in 2007, 2008 and 2009 are shown in Map 1.

Results

The 2009 survey sites in the Pen Llŷn a'r Sarnau SAC were split between the north and south sides of the Llŷn Peninsula. Unfortunately one weekend was lost due to poor weather conditions in August. Six of the survey days were located on the south coast of the Llŷn in the target areas to be surveyed and one survey day investigated sites on the north coast of the Llŷn. The record from England was from Dorset, and the 2 Scottish records were from Loch Hourn north of Mallaig on the west coast of Scotland (Highlands and Islands).

Very excitingly, there was a record of a live thornback ray eggcase from Loch Hourn in Scotland (backed up with a photograph). This eggcase was at about 9m on a rocky reef attached to filamentous algae on the reef. The reef was adjacent to an extensive, steep muddy sand slope. Two other tentative records of live thornback ray eggcases were also recorded from the same loch; these were recorded in the upper reaches of the loch on a muddy/silty reef - the eggcases were not attached but appeared to be weighted down by the sediment in the 'skirt' of material attached to the sides of the eggcase. The colour of these eggcases was very dark (which often equates with empty or dead eggcases) but the divers reported that the eggcases still seemed to have some kind of contents to them.

There were no records of live skate/ray eggcases from any of the sites surveyed in the Pen Llŷn a'r Sarnau SAC in 2009 despite, as in previous years, many of the seabed habitats appearing suitable based on previous field observations. Worryingly a record of illegal scallop dredging in Tremadog Bay was recorded on one of the dives in an area where an empty, but attached thornback ray eggcase was recorded in 2008. The dredging activity has subsequently been the

subject of a complaint to the European Commission for lack of secure safeguards to protect the SAC.

Live thornback rays (*Raja clavata*) were observed on 4 of the eggcase dives in Tremadog Bay, and a spotted ray (*Raja montagui*) was also recorded. All of these were recorded in seabed habitats of fine and muddy sand. Two of the thornback rays were small (one approximately 20cm across the wings and the other approximately 10cm across the wings) and therefore only young. This continues to indicate that the shallow embayment of Tremadog Bay may be acting as a nursery area for species such as this.

As with the previous two years of survey work, observations of small spotted catshark and nursehound eggcases were made on many of the dives in the SAC with the eggcases attached to a variety of plant and animal marine life. The eggcases of these species are readily observed by divers. Live small spotted catsharks and nursehound were also frequently seen on the eggcase dives. Small catshark individuals were recorded from some sites in Tremadog Bay.

Discussion

The confirmed record of a live thornback ray eggcase from Scotland is very exciting as it one of only a handful of records of live eggcases but demonstrates that they can be observed by divers. The lack of records of live skate/ray eggcases from the Pen Llŷn a'r Sarnau SAC is disappointing as the habitat of many of the sites that were dived looked suitable for eggcases, based on the previous observations of them in other locations.

It is clear that divers can observe and record skate/ray eggcases underwater, but the lack of observations raises the question of why they are so rarely encountered. Since catshark eggcases are readily recorded by divers it is possible that the lack of skate/ray eggcase records is due to the far lower abundance of them, making the chances of a diver coming across one far less than for the catsharks. It is possible that dives have not been undertaken in the right type of habitat, but based on previous observations this seems less likely, although there is still a very large gap in our knowledge of the critical habitat requirements for skate/ray for eggcase laying.

Personal observations lead me to think that relatively shallow habitat (up to 20m) with some hard substrate (reef or mixed ground or maerl¹) with a moderate level of tidal flow is appropriate habitat, at least for thornback ray eggcases. Although the observations in 2009 of the eggcases in the upper reaches of Loch Hourn on very silty reef indicate that the 'skirt' of material on thornback ray eggcases could act either to 'stick' the eggcase to the substrate, or could act as a net to collect sediment to weigh the eggcase down on the seabed. The apparent disadvantage of laying eggs on a sediment seabed is the possibility of smothering, but if the location had a low tidal flow and the likelihood of smothering is low, then sediment seabeds may also provide appropriate habitat for egglaying by some species.

Consistent observations of small rays in shallow, sandy areas seems to indicate some sort of a preference for this type of habitat as a nursery area (the example explored most on the

¹ There are records of live eggcases attached to maerl from Ireland

eggcase survey dives has been Tremadog Bay), and it would seem logical that the egg-laying ground would not be that far away.

Summary of eggcase dive surveys 2007-1009, conclusions and recommendations

Summary

- Over the 3 years of the eggcase survey dives a total of 48 dive sites have been surveyed and reported on (38 sites in North Wales, 8 in England and 2 in Scotland). Diver effort equates to 124 diver days (104 diver days in Wales, 16 diver days in England and 4 diver days in Scotland).
- Over the 3 years there has been 1 confirmed report of a live thornback ray eggcase (Scotland 2009), 2 reports of possible live thornback ray eggcases (Scotland 2009). 1 unconfirmed report of a live thornback ray eggcase (North Wales 2007) and a confirmed report of an empty but seemingly recent and attached thornback ray eggcase (North Wales 2008).
- There have been observations of live rays, mainly thornback rays (including individuals as small as 10cm wingspan), and single records of a blonde ray (*Raja brachyura*), a juvenile undulate ray (*Raja undulata*) and a spotted ray (*Raja montagui*).
- There have been many records of catshark eggcases (small spotted catshark and nursehound) and also juvenile and adult catsharks. The eggcases of these two species are commonly seen by divers.
- A recording form and guidance notes have been prepared and trialled as part of the eggcase diving survey work.

Conclusions

- Divers have an important role to play in helping to unravel the mysteries surrounding where skate/ray lay their eggs. Divers are able to observe and record eggcases and also live rays underwater. The very low number of records of live eggcase records is more likely to be due to the low abundance of the eggcases than an inability of divers to see them underwater.
- The low number of records of live eggcases by divers means that trying to target diver surveys to record skate/ray eggcases is not worthwhile. Instead, what is required is as many eyes on the ground as possible at all times. Amateur divers in the UK are a valuable potential resource for gathering information about underwater seabed habitats and marine life. There is considerable scope for a focussed awareness raising campaign with dive associations/clubs and dive operators in the UK to promote more eyes on the ground to record skate/ray eggcases. There is a need for continued promotion of this work amongst the UK diving population, together with continued advice on eggcases and photo ID, as many divers are initially unsure of the differences between catshark and skate/ray eggcase.
- The limited observations of live skate/ray eggcases in situ seems to indicate that shallow seabed habitats with some sort of hard substrate for the eggcases to be attached to and

moderate tidal flow are suitable egg-laying habitat. Sediment seabeds are reportedly used for eggcase laying, and whilst this would seem feasible in areas of low current flow, in areas of more mobile sediment movement, the possibility of the eggcases being smothered seems to be a significant disadvantage of this type of habitat.

- The observations of live rays in shallow areas with sediment habitat indicate a potential preference for this type of habitat for the young and the importance of such areas as potential nursery habitat. It seems reasonable to hypothesise that the egg-laying areas would not be that distant from these sites.
- There is an urgent need to ensure robust protection of potential egg laying habitat around the UK as part of the programme of measures to protect and restore the populations of skate/ray.

Recommendations

- A sustained programme to raise awareness of the status of skates/rays and their conservation and promote skate/ray eggcase recording amongst the UK diving population. This could be linked with existing initiatives such as Seasearch and PADI Aware which are already engaging divers in making records about seabed habitats and marine life, as well as wider promotion to UK divers in general. The existing reporting form and guidance notes could be used.
- Prepare a stand-alone Powerpoint presentation on underwater eggcase recording to be used by initiatives such as Seasearch, PADI Aware, Shark Trust and Marine Conservation Society to promote eggcase recording and explain what different eggcases look like.
- Retain and promote the online reporting facility of the Shark Trust as a repository for eggcase records, and promote the Shark Trust and named contacts to provide assistance to divers to help with identification of eggcase photos.

Thanks

Thank you to the Shark Trust for financial assistance to undertake the subtidal eggcase survey work during 2007-2009.

Thank you to the divers who have taken part in the eggcase recording dives over the 3 years and who have submitted additional records of skate/rays and eggcases.

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Report prepared by Lucy Kay.