Broadsands Seahorse/Seagrass Survey Report 2024

By Neil Garrick-Maidment FBNA

Founder and Executive Director of The Seahorse Trust

Pregnant Spiny Seahorse by Neil Garrick-Maidment

Kindly funded by BSAC Jubilee Fund

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Index

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Introduction

The British Isles has two species of seahorse, the Short Snouted (***Hippocampus hippocampus***) and the Spiny Seahorse (***Hippocampus guttulatus***), occasionally misnamed as the Long Snouted Seahorse.

Neil Garrick-Maidment, Co-Founder and Executive Director of the Seahorse Trust set up the British Seahorse Survey in 1994, prior to founding The Seahorse Trust in 2000. In 2002 he submitted both British species of seahorse for recognition as indigenous species here in the UK and to acquire full legal protection for them. After 6 years of submitting more data and information about the species, they became protected on the 6th of April 2008, as Schedule 5, section 9 protected species under the Wildlife and Countryside Act 1981 (as amended), **See Appendix 1.**

Through the British Seahorse Survey, we know a great deal about both species and have made some interesting discoveries over the years and through our work at Studland Bay we have come to understand seasonal migration, male and female related territories, we have proven they breed on a regular basis here in the British Isles, there is a subtle difference in summer depth between the two species and that both species have habitat preferences, amongst so many other things.

Following on from the success of our Studland Bay Seahorse survey which led to Studland Bay becoming a Marine Conservation Zone in 2019, the installation of just under 100 ecomoorings by 2024 to protect the seahorses through habitat protection and restoration, and our greater understanding of seahorse's behaviour and biology, we wondered if Studland Bay was unique in its layout and species make up.

Crucially, were seahorses there? because of the seagrass and geographical position and were the seahorses affected by anthropomorphic interference such as the large number of leisure craft (up to 350 to 450 per day) that use the site.

To understand Studland better we looked for a site elsewhere to use as a compare and contrast site to Studland Bay.

We decided to look at and explore Broadsands in Torbay as it has the same east facing aspect as Studland, is a similar depth and historically had a large seagrass meadow, we

have also had a few seahorses recorded from the area through our National Seahorse Database, set up in 1994.

The project started in 2024, and we have conducted 3 boat dives and a number of dives from the shore during this dive season and the results have been far above what we had hoped for, in terms of the size and complexity of the seagrass meadow, variety of species found within the area and the presence of both species of British Seahorse.

As a result of the surveys we have conducted during 2024, we have decided to survey the site for 5 years to start with and hopefully much longer.

Seahorses in the British Isles

The British Isles are home to two species of seahorse, the Spiny (***Hippocampus guttulatus****)* and the Short Snouted (***Hippocampus hippocampus***) both widely distributed and both specialising in differing habitats due to subtle differences in the shape of the snout and body and their dietary needs, although they can also be occasionally found in the same habitat together as we saw at Broadsands.

The Spiny (***Hippocampus guttulatus***) is basically a seagrass specialist during the warmer months of the year and so well adapted to this habitat, it would be more accurately described, if it was called the Seagrass Seahorse.

The range of both species is from the northernmost Shetland Isles down the western coastline - including all around the Irish coastline - down to and along the south coast. They are also found throughout the east coast and all along the south coast. The most sightings and records come from the south coast from the Thames estuary all along the south coast around to North Cornwall and this is because of more people looking for them; primarily SCUBA divers, beach walkers and fishermen.

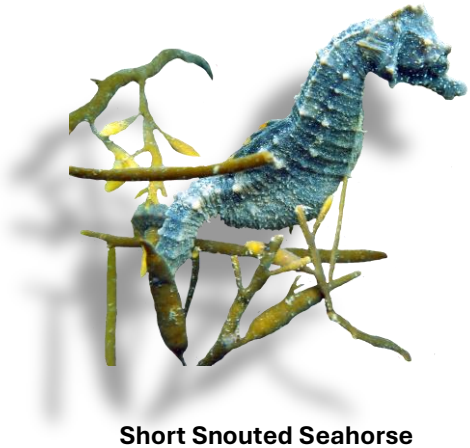
They have also been found down the east coast of Scotland, and out into the North Sea, onto the Dogger Bank. Both species are present in the Scandinavian countries of Norway and Sweden, and especially in Denmark and the range of both species is all around the North Sea, including Germany, Belgium, Holland and France.

Both species are found in most of the estuaries of the UK and even up into fresh water in rivers such as the Thames, Tamar, Dart and Southampton Waters and it is feasibly possible they are found in many other estuary complexes.

The Spiny Seahorse (***Hippocampus guttulatus****)* tends to specialise in seagrass during the warmer months of the year, whereas the Short Snouted (***Hippocampus hippocampus***) can be found in a variety of habitats including man-made marinas and harbours and is very adept at adapting to differing types of habitats.

During the winter, both species occupy the same deep-water habitats which are usually made up of small rocks and sand. If they live in sheltered areas, then the need to migrate is not there (it uses a great deal of energy to swim long distances) and if it can be avoided, they will, so they will occupy these areas all year round. Poole Harbour in Dorset is a good example of this, as is Torbay in Devon on the south coast.

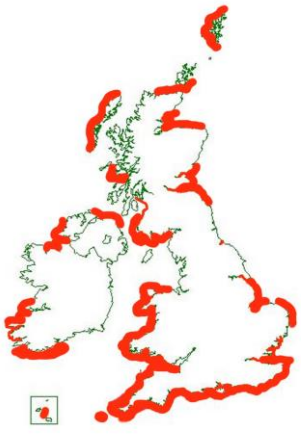
The distribution shown below is based on sightings contained in the British Seahorse Survey database and in our opinion is not complete; it is possible seahorses will also be found in the areas where they are not shown on the maps, subject to habitat suitability.



Short Snouted Seahorse
(*Hippocampus hippocampus*)

Spiny Seahorse
(*Hippocampus guttulatus*)

Distribution of *Hippocampus hippocampus* throughout the British Isles
Map 1



Distribution of Hippocampus guttulatus
throughout the British Isles
Map 2

British Seahorse Survey

The British Seahorse Survey (**BSS**) started in 1994 as a result of a single seahorse sighting sent to the author by underwater camerawoman, Sue Daly, of an adult female Short Snouted Seahorse from the Channel Island of Jersey. (**picture on the right**)

Although having worked with seahorses for many years (51) the author, like so many others, thought, at that stage British seahorses were just occasional visitors to our shores. However, this one sighting got the author thinking about British seahorses and whether they existed as a native species or were they just occasional, accidental visitors.

The thought that such a small fish, that is not known to be a great swimmer could swim across the channel seemed a bit far-fetched and unlikely, especially due to the strong east/west drift of the currents within the channel. The author decided to investigate further and was surprised to find seahorse records dating back to 1821 and historic references dating back to the third century, where they featured in the artwork of the Pictish tribes.

As a result of this, the **BSS** was started in 1994 (now the World Seahorse Survey **WSS**) and is the longest running and largest seahorse database of its kind in the world and is administered and run by The Seahorse Trust.
https://www.theseahorsetrust.org/conservation/british-seahorse-survey-2/

Sightings and records come from a wide variety of sources such as public registers, wildlife databases, museums, books, journals, beach walkers, fishermen and increasingly SCUBA divers as more people are searching for seahorses around the world.

The sightings and records are received into The Seahorse Trust in various formats from telephone calls, emails and more often than not through our online reporting form. They are then put into an Excel sheet containing various headings including:

Date	Report	Species	Weather conditions
Location site	Map	Description	Personal details of the recorder
Grid Ref	Moon Phase	How found	
Seabed habitat	Depth	Behaviour	
Size (of Seahorse)	Colour	Sea temperature	
Sex	Pregnant (or not)	Photo (hyperlinked to photographs)	

The report and map parts of the database are in pdf form and hyperlinked to the Excel database, so records can easily be opened and printed off or sent electronically if required (minus legally protected personal details).

Since both species were protected in 2008 by The Seahorse Trust, it is now a legal necessity to acquire a wildlife license from the Marine Management Organisation to actively seek, photograph and record seahorses in English waters.

The Seahorse Trust has actively informed, shaped and structured parts of the licence and we are proud to say our code of conduct when working with seahorses in recommended by MMO. https://www.theseahorsetrust.org/pong/

Confirmation of native seahorses

All stages of the life cycle of seahorses have been found throughout the lifetime of the survey and the final conclusive proof was during the Studland Seahorse Project **SSP** (2008 to present); run by The Seahorse Trust, where we found fry, juveniles, sub adults, adults and crucially pregnant males. We have followed individual males throughout the breeding season and noted when they get pregnant and when they give birth, with one male logging 5 breeding cycles in the season that we know of, there were probably more.

Prior to this project we had all the stages of life in seahorses but had never found the conclusive proof that they got pregnant, gave birth, and got pregnant again within one season, proving they were indeed native species.

The ongoing and crucially long duration of the Studland Seahorse Project has allowed us to study individual seahorses and pairs of seahorses over long periods, plotting pairings and births. This has allowed us to ascertain that the average birth of seahorses takes place every month around the full moon, to take advantage of the high tides and greater numbers of plankton.

It also occurs from late March to early autumn; usually late September to early October, depending on the autumn storms, allowing the pairs of seahorses to get pregnant and give birth approximately 6 to 7 times a year, giving birth to up to 500 or more fry at a time. Recent evidence suggest that the Short Snouted Seahorse in particular might even breed during the winter at depth.

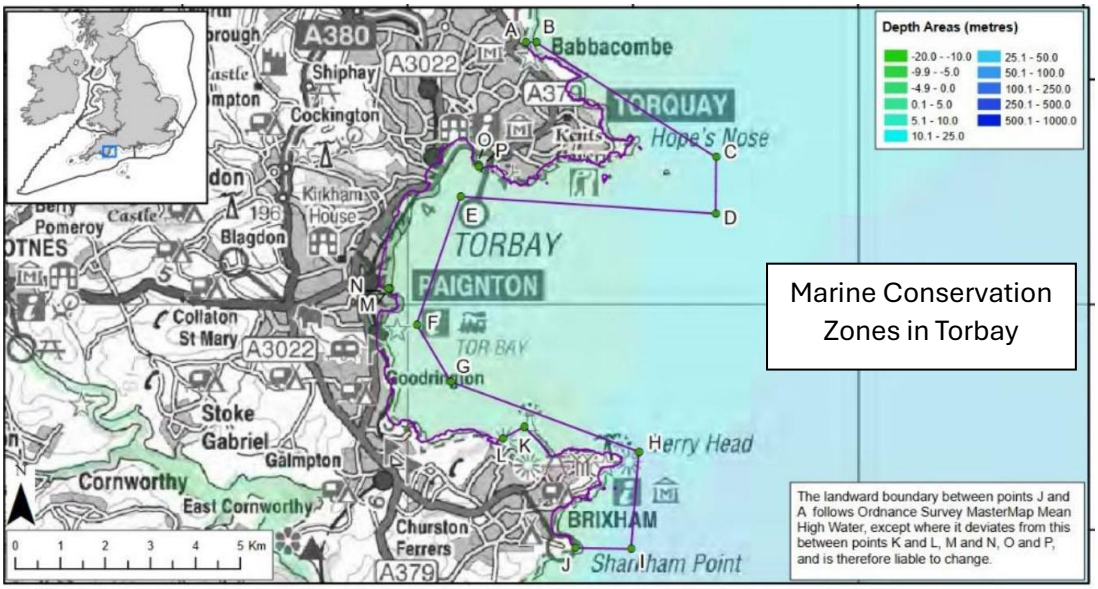
This project has been crucial to our overall knowledge of seahorses in the wild and has also helped others to understand seahorse life cycles in other parts of the world.

Broadsands

Broadsands is located in Torbay, Devon, on the Southwest Peninsula of the UK. It is a sandy, crescent shaped bay and protected from a wide range of weather patterns. It was chosen for this study, as it faces due east, the same aspect as Studland Bay, which makes it susceptible to all the same weather patterns as Studland Bay.

Like Studland, it is a shallow bay, up to 5 metres deep and it has seagrass across its mouth area. However, crucially unlike Studland Bay it is not heavily used by boat traffic.

Broadsands is heavily used by water users (swimmers, paddle boarders etc.) in the warmer months of the year, however it is not a destination for large numbers of motorboats, which gives us a lot of scope to contrast the results we have from Studland Bay going back to 2008



Marine Conservation Zones in Torbay

Torbay MCZ Boundary

- Marine Conservation Zone
- MCZ boundary co-ordinates
- 12nM Territorial Seas Limit
- Land

Point	Lat	Long	Point	Lat	Long
A	50°28' 56.577" N	3°30' 53.713" W	I	50°22' 54.176" N	3°28' 43.575" W
B	50°28' 56.672" N	3°30' 41.504" W	J	50°22' 53.948" N	3°29' 46.345" W
C	50°27' 36.776" N	3°27' 16.558" W	K	50°24' 20.277" N	3°30' 46.261" W
D	50°26' 56.267" N	3°27' 16.201" W	L	50°24' 11.481" N	3°31' 10.201" W
E	50°27' 4.566" N	3°32' 3.667" W	M	50°25' 57.664" N	3°33' 20.724" W
F	50°25' 32.303" N	3°32' 49.579" W	N	50°25' 57.698" N	3°33' 22.789" W
G	50°24' 51.681" N	3°32' 9.958" W	O	50°27' 27.653" N	3°31' 44.030" W
H	50°24' 4.093" N	3°28' 36.757" W	P	50°27' 26.162" N	3°31' 44.055" W

Google Earth image of Broadsands.

The Broadsands Survey Project

The first stage of this project has been kindly funded by the BSAC Jubilee Fund and was conducted in 2024 and consisted of 3 boat and 5 shore dives (10 dives in total with an average of 1.5 hour per dive, so a total of 60 hours underwater for this season), with a basic team of 5 highly experienced divers (one as acted as dive marshall), plus Dr Collins and Jenny Mallinson from Southampton University who came out on the boat and conducted an electronic survey of the extent of the seagrass meadow on one of the boat trips.

The author took the role of project lead and organised the dives by land and boat. Most of the dives were undertaken from shore, however 3 boat trips occurred and were also funded by the BSAC Jubilee Fund, as was the diver's air.

The boat trips were used for ease of access, an increase in the number of dives undertaken and because on one trip Dr Ken Collins conducted scans for us over the full extent of the seagrass meadow.

The voluntary divers used were highly experienced and skilled divers who have volunteered for The Seahorse Trust on other seahorse and seagrass surveys.

The survey techniques used are based on the Seahorse Survey Course which was written by the author and Beccy MacDonald-Lofts and is taught on behalf of the trust by Beccy who is the voluntary Educational Director of The Seahorse Trust and licensed seahorse surveyor.

Having extensive experience in this sort of project the author is ideal for the role, especially as he already holds the necessary Marine Management Organisation wildlife licence to search for and record seahorses.

Project Plan

2024 was always intended to be an acclimatisation and exploratory year and was primarily a habitat and seagrass survey, however as all the team held seahorse licences, it was intended that if we found seahorses then all the protocols involved in our MMO wildlife licence would kick in and the dives would be treated as seahorse dives. As it turned out we did in fact find seahorses and so this precaution was relevant.
Year 2 and onwards will involve more indepth recording of the site, now that we know what we are looking at and the extent of the seagrass meadow.

Areas covered

We were looking primarily at the entire area of Broadsands in the first year to get to understand the site better, and this is why the boat has been crucial to the work. It

allowed us to be deeper and to conduct more dives for longer periods, than shore dives would have allowed.

The areas dived were based on the team's historic knowledge of the bay and we have all dived on seagrass in Broadsands for up to 30 plus years, although few of us have dived it since before Covid.

There was some suggestion from modern maps by other organisations that seagrass did not exist there anymore, however, this did not make sense for what historically was a large seagrass meadow. Our hunch and historic knowledge paid off, there is indeed a very large seagrass meadow at Broadsands, with a wide array of species living in it, including both species of Seahorse.

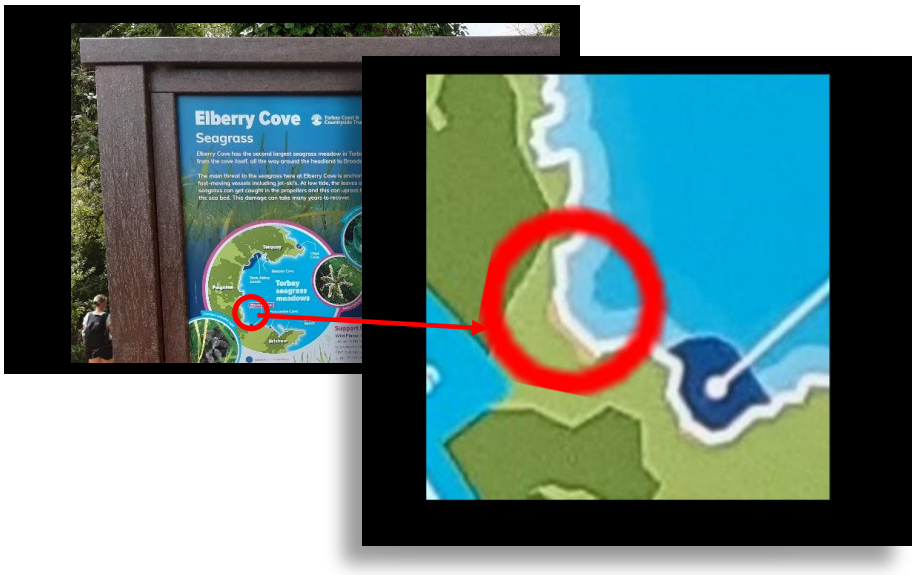
Area of Broadsands dived

Electronic seagrass survey

We were very lucky to have Dr Collins and Jenny Mallinson from Southampton University with us to conduct the electronic survey using a MX Aquatic Habitat Echo sounder (Biosonics, 2021) which was linked to a Panasonic Toughbook laptop running Biosonics Visual Acquisition software. This was operated at 204.8 kHz with a ping rate of 5 Hz from the vessel travelling at 4-5 knots. The data was post-processed with Biosonics Visual Aquatic software, at default settings using a bottom tracking algorithm and thus determine the height of the vegetation/seagrass.

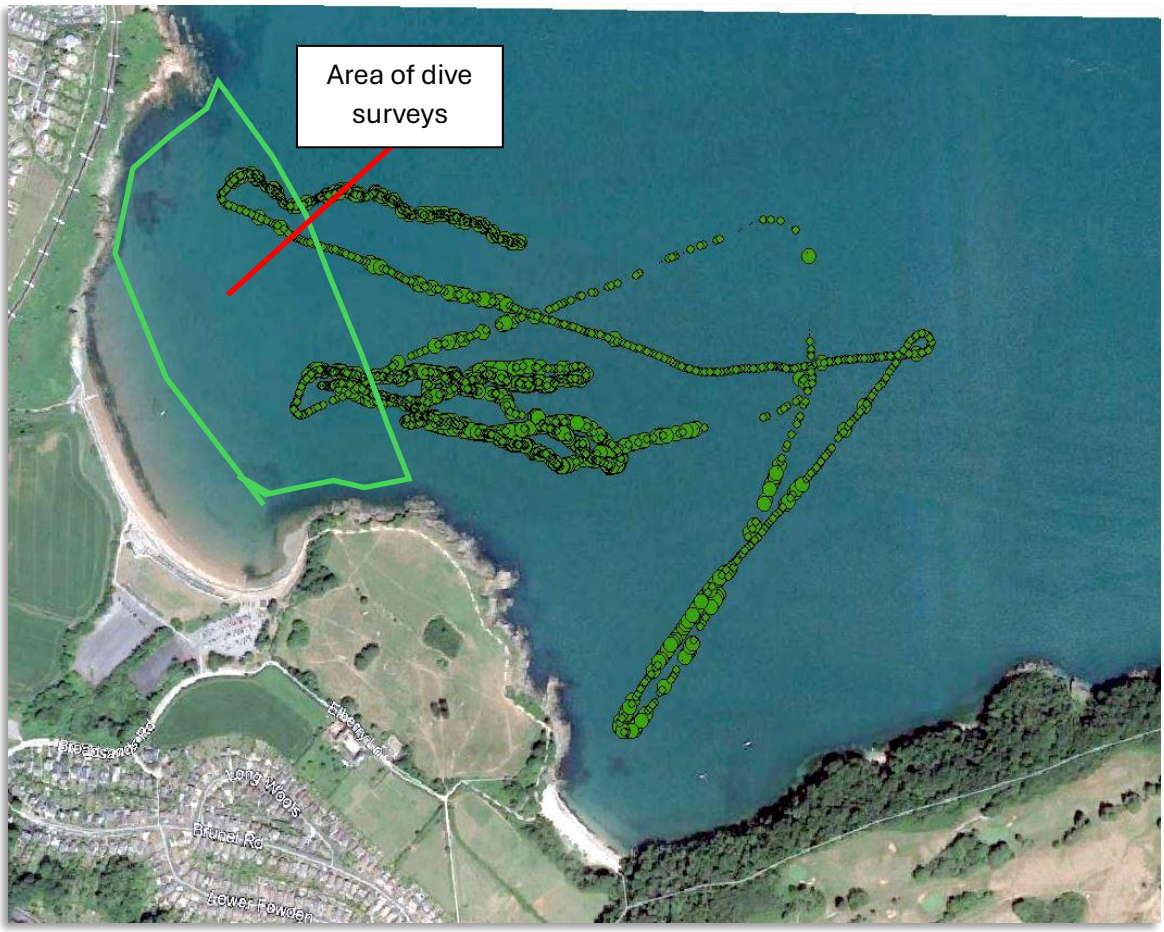
Biosonics (2021) MX Aquatic Habitat Echosounder
https://www.biosonicsinc.com/products/mx-aquatic-habitat-echosounder/

Previous surveys by others showed little to no seagrass in this area, indeed one local organisation does not even list it on local maps. However, the author and 3 of the other divers have dived Torbay extensively for the last 30 plus years and there has always been a seagrass meadow here and this was one of the reasons why this site was chosen.



Broadsands with no seagrass represented on local information board erected in 2024

As can be seen from the image below, the seagrass meadow proved to be much larger than anticipated with seagrass going out into the bay from the spring low water mark, up to 8 to 9 hundred metres (possibly more) and it was the full width of Broadsands Bay going around into Elberry and in the other direction into Saltern Cove and three beaches.



Picture courtesy and copyright of Dr Ken Collins (© 2024)

The Seagrass

The species of seagrass found on the site is *Zostera marina* and was across the entire site, however the major difference with the seagrass at Broadsands, compared with Studland Bay was the density of the seagrass, it varied across the range of the bay and primarily formed clumps, ranging in size from 1 metre to several metres across. Some of these clumps were quite dense and others a bit more open, by contrast in Studland Bay it tends to be a continuous meadow of seagrass.

From the inshore side of the bed at the top of the picture above, there was more clumping and smaller clumps of seagrass. As you progress across the bay towards the south of the picture (in the dive area) the clumps of seagrass tend to be longer and larger.

We are not entirely sure why this is the case, but we suspect that unlike Studland Bay it is a more exposed meadow of seagrass and as such it cannot form the extended continuous meadow that makes up Studland Bay, which is protected on 2 sides by beach/cliff and cliff.

Small clump of seagrass approximately 30 centimetres across

Larger clumps of seagrass approximately 1 metre across

Larger clumps of seagrass, 2 plus metres across and as can been seen in this image they were starting to join together

In the southwestern part of the survey area the seagrass was in larger areas forming meadows.

Animal Species recorded

What was interesting was the variety of species found within the study area, including both Seahorse species.

Below is a list of species photographed, however there were more that are unrecorded and in time a full list of species within the seagrass study area will be recorded as we develop the project over future years.

Sea Potato
Echinocardium cordatum

Masked crab
Corytes cassivelaunus

Common cuttlefish
Sepia officinalis

Common cuttlefish (eggs), lots in the area.
Sepia officilanis

Spiny Cockle shell
Acanthrocardia aculeata
Picture Kim Maidment

Necklace shell
Euspira catena
Picture Kim Maidment

Anemone
Species not identified

Burrowing bivalve
Species not identified

Lug worm casts
Arenicola marina

Ballan Wrasse
Labrus bergylta
Picture Kim Maidment

Conger Eel
Conger conger

Lesser Spotted Dogfish egg
Scyliorhinus canicula

European Shore Crab
Carcinus maenus

Common Hermit Crab
Pagurus bernhardus

Common Lobster
<u>Homarus</u> gammarus

Alongside all the species photographed above, there were large numbers of Sand Gobies, young flat fish, sand shrimp, prawns, juvenile whiting and pollack etc. In time a full species list will be gathered and added to the data for the area.

Common name	Latin name
Sea Potato	***Echinocardium cordatum***
Masked Crab	***Corytes cassivelaunus***
Common Cuttlefish	***Sepia officinalis***
Spiny Cockleshell	***Acanthrocardia aculeata***
Necklace shell	***Euspira catena***
Anemone	Species not identified
Burrowing bivalve	Species not identified
Lug worm casts	***Arenicola marina***
Ballen Wrasse	***Labrus bergylta***
Conger Eel	***Conger conger***
Lesser Spotted Dogfish eggs	***Scyliorhinus canicula***
Short Snouted Seahorse	***Hippocampus hippocampus***
Spiny Seahorse	***Hippocampus guttulatus***
European Shore crab	***Carcinus maenus***
Common Hermit Crab	***Pagurus bernhardus***
Common Lobster	***Homarus gammarus***

Seahorses in Broadsands

One of the highlights of the surveys during the summer of 2024 was finding both species of British Seahorse at Broadsands. We were not expecting to find seahorses on the site; however, the presence of both British Species was a massive bonus and will help us compare and contrast the site with Studland Bay in Dorset.

What was curious about finding both species is they both occupied the same habitat - living on seagrass- and were both found in very close proximity to each other, very different to other sites.

In time we will actively monitor and search for seahorses on the site under our Marine Management Organisation wildlife license.
It is a legal requirement in England and Wales to have a wildlife license to go looking for seahorses.

The Seahorse Trust achieved full legal protection and recognition for both British seahorse species in 2008 and since then we have actively worked hard to advise MMO on licensing requirements and we have written protocols for when working with seahorses in the wild. We have also written and teach a Seahorse Survey Course to ensure best practice when surveying for seahorses around the world.

Protocols are available here: https://www.theseahorsetrust.org/pong/

Short Snouted Seahorse (Hippocampus hippocampus)

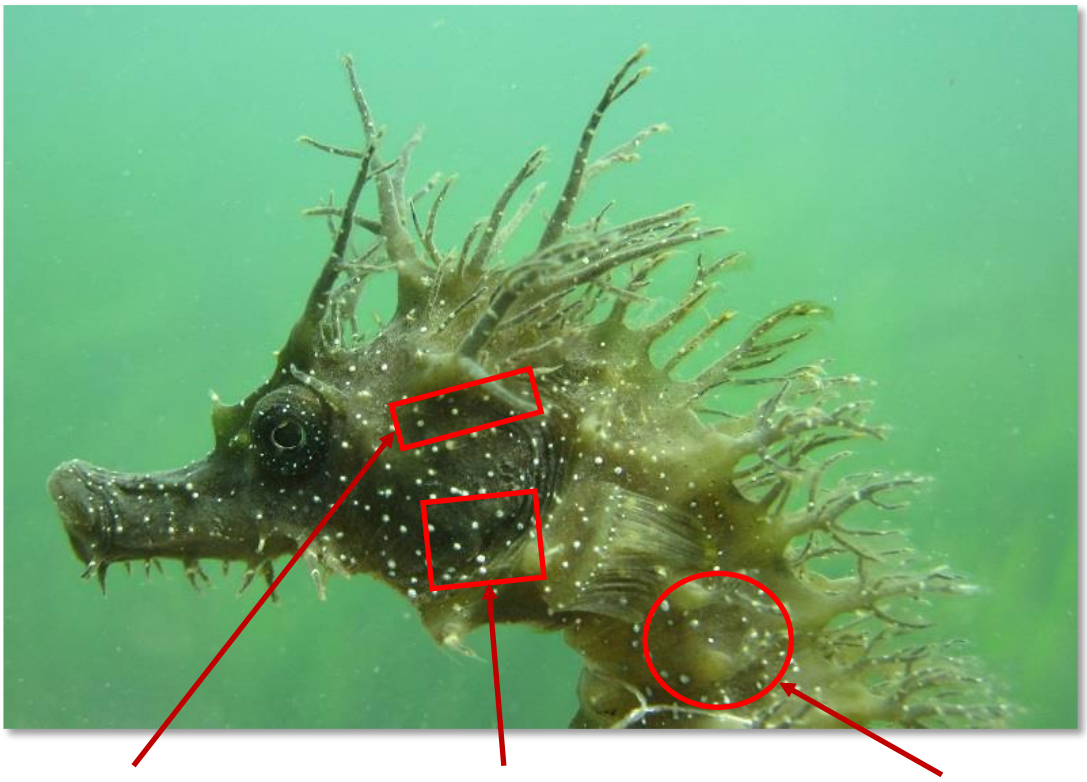
Spiny Seahorse (Hippocampus guttulatus)

We have also developed a system of facial recognition when working with seahorses to allow for the identification of individuals in the wild and in the future, we intend to use this for the seahorses in Torbay.

Facial recognition

When understanding seahorse behaviour, it is helpful to identify individual seahorses, the first stage is quite easy because male and female seahorses are easy to identify because of the absence or presence of the brood pouch. Once you have done this you then need to find a way of identifying individuals and one way of doing this is a facial recognition system we have developed based on the dots and lines that make up a 'fingerprint' on each side of the seahorse's head.

It is very important to try and get a picture of either side of the head because you might only have one on file.



Line of spots **Cluster of spots** **Unique shape of spots**

These differing types of marks on the head show which seahorse you are working with; we have even identified individuals from 2 years previously.

We are working with colleagues to use Artificial Intelligence (AI) to identify individuals from photographs, however, this is a long-term development project and so not in use yet.
We are also working with colleagues to ensure we have a computer-driven method of accurately measuring the seahorses, this is ongoing but very exciting.
All of these projects are furthering science and our understanding of seahorses in the wild and a massive thank you to everyone taking part and making it happen.

Conclusion

Year one in 2024 was always going to be an exploratory year for this project, it was about getting our bearings and understanding the site, the seagrass and some of the species that lives in the area.

Thanks to the generous grant from the BSAC Jubilee Fund, it allowed us to explore by boat for longer and further out into Broadsands than shore diving would have done, and the results have far surpassed our initial hopes.

Broadsands was designed to be a compare and contrast site to our long term study in Studland Bay in Dorset and was chosen to match the same east facing aspect, the presence of seagrass and the depth of the water, all of which are similar to Studland Bay.

Historically the bay has had seagrass in it, however recent contemporary reports suggested that there was little to no seagrass in the study area. We are pleased to announce that this is wrong, and the seagrass bed is indeed larger than we had hoped and comparable to 30 plus years ago when the author and some of the divers used to dive the site.

What is very interesting about the seagrass in this site, which might be because it is a more exposed site than Studland, is the clumping of the seagrass as opposed to one long and large seagrass meadow. It is very distinctive in the clumps which range in size form under one metre up to several metres. There are a few areas on the south of the site where the seagrass is continuous before it goes into the rocky shore and this might be as suggested that it is more protected than the main area of the seagrass bed.

Without a doubt the seagrass looks to be in good health and there is a wide range of species living in the seagrass, some of which have been mentioned in this report. Where the seagrass meets the edge of the rocks the species living in, on and around the seagrass does increase as would be expected and this is where the lobsters were found.

On the north side of the bed there are a few rocks and interestingly invasive Jap weed has taken a hold and created quite a diverse habitat with lots of species living around it. These rocky areas are where the biggest concentration of shoals of fish are (Whiting etc)

By far the biggest surprise in the survey was the presence of both species of British Seahorse, Short Snouted (***Hippocampus hippocampus***) and Spiny Seahorses (***Hippocampus guttulatus***). We have found seahorses in other parts of Torbay, but these are usually adults. In all cases in Broadsands the seahorses were juveniles of approximately 6 to 8 months old, maybe a year.

Normally the Short Snouted Seahorse is not considered a seagrass species but as stated they are found together, and on one occasion, they were within 1 metre of each other.

A lot more investigation will be needed to understand the seahorses and their connection with the site, but initial results have been good, and it gives us hope for the future study of the site.

Based on the results of 2024 we have decided to continue on for the next 5 years and we are aiming to seek more funding from various organisations to continue with boat dives, more electronic scans and shore dives.

Broadsands in Torbay will be an interesting compare and contrast site with Studland Bay in Dorset, and this will lead to a greater understanding of seagrass and the species that live in, on and around it, especially the seahorses. Crucially though it will allow us to compare the difference between a seagrass meadow that is heavily used by boats and one that is not.

Thanks to.

This project would not be possible without the generous grant of the BSAC Jubilee Trust and our incredible team of volunteers. I would also like to thank Teign Diving owner Mark and his team who were very supportive on our boat dives.

I would especially like to thank Dr Ken Collins and Jenny Mallinson from Southampton University who conducted the electronic survey on the seagrass. Ken and Jenny also oversee our project in Studland Bay and have a great team assisting them there.

Crucially though I would like to thank the survey team of Kim, Paul, John and Will who have given up so much time to undertake the surveys and help with photographs and studying the area and The Seahorse Trust as a whole.

BSAC Jubilee Trust
https://www.bsac.com/this-is-bsac/what-we-do/british-sub-aqua-jubilee-trust/

Teign Diving
http://teigndivingcentre.co.uk/

Southampton University
https://www.southampton.ac.uk/

Appendix 1

Native seahorses protected under the WCA

As a result of the long term nature of the British Seahorse Survey, both native species were put forward by the author in 2002 for acceptance and submission as recognised native species to the British Isles. We submitted data and knowledge to the protection process, and as a result in 2008 (6th of April) both species were added to the Wildlife and Countryside Act under schedule 5, section 9. This gave them full protection in law and at the same time accepted them as a native species.

Section 9	
Part 1	intentional killing, injuring, taking
Part 2	possession or control (live or dead animal, part or derivative)
Part 4 (a)	damage to, destruction of, obstruction of access to any structure or place used by a scheduled animal for shelter or protection
Part 4 (b)	disturbance of animal occupying such a structure or place
Part 5 (a)	selling, offering for sale, possessing or transporting for the purpose of sale (live or dead animal, part or derivative)
Part 5 (b)	advertising for buying or selling such things

https://www.gov.uk/government/publications/protected-marine-species/fish-including-seahorses-sharks-and-skates

Appendix 2

Marine Management Licence

Lancaster
House Hampshire
Court Newcastle
upon Tyne

NE4 7YH

conservation@marinemanagement.org.uk

0300 123 1032

www.gov.uk/mmo

WILDLIFE AND COUNTRYSIDE ACT 1981

LICENCE ISSUED UNDER SECTION 16: POWER TO GRANT LICENCES

Licence Number: L/2019/00062/5

Date of issue: 13th December 2023

The Marine Management Organisation, in exercise of Section 16 (8)(a) of the Wildlife and Countryside Act 1981, having been satisfied that:

- there is no other satisfactory

solution; grants this licence for:

- scientific or educational purposes.

Licence Holder

Name:	THE SEAHORSE TRUST
Address:	36 GREATWOOD TERRACE TOPSHAM EXETER EX3 0EB

Licence Dates:

Valid from:	18th December 2020
Valid to:	18th December 2028

Appendix 3

Various methods of seahorse and seagrass surveying.

Diver surveys

With the diver led surveys there is a variety of techniques we can use, depending on the area, habitat and depth. These techniques have been perfected in surveys conducted by The Seahorse Trust over many years and recommended by the UK government body, the Marine Management Organization, through which The Seahorse Trust has its licences to conduct the survey work. Licences that the Trust has helped to shape and develop and so we have confidence in their effectiveness.

As part of our Seahorse Survey Course, (written by Neil Garrick-Maidment and Beccy MacDonald-Lofts from The Seahorse Trust) we also teach these techniques and over the years we have become very competent in finding and recording seahorses.

The Broadsands survey team has extensive experience in looking for and finding seahorses but crucially also for understanding the species and their needs.

The four basic types of survey we use for diver led surveys are:

1. Linear transect
2. Durant transect
   [Named after Dr Durant who perfected it in partnership with The Seahorse Trust]
3. Circular transect
4. Transects with points

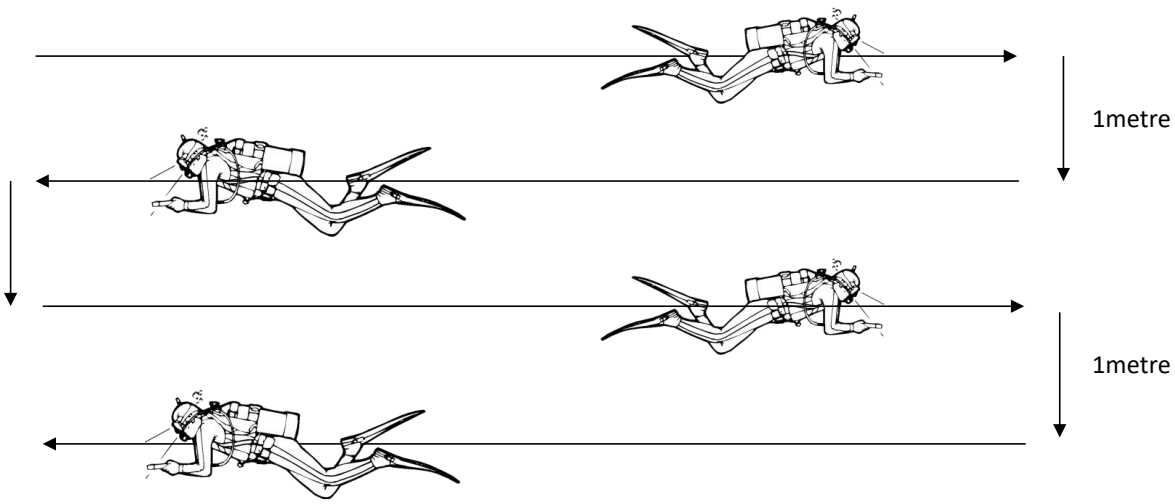
These four methods will and can cover most situations, combining and adapting them will cover all situations.

Linear transect

This is ideal for small areas or along one continuous edge, the divers will concentrate straight ahead keeping low to the seabed to see the seahorses. This is our most frequently used transect, which produces excellent results.

Transects should not be more than 1 metre apart (it is amazing how well a seahorse can disappear in just one metre!)

At the starting point, the surveyors will take the exact GPS position on the surface and then an accurate compass bearing. They will make sure they sync their camera exactly to the GPS devices, so when you are back at your computer you can trace your route and the position of where you took your pictures.

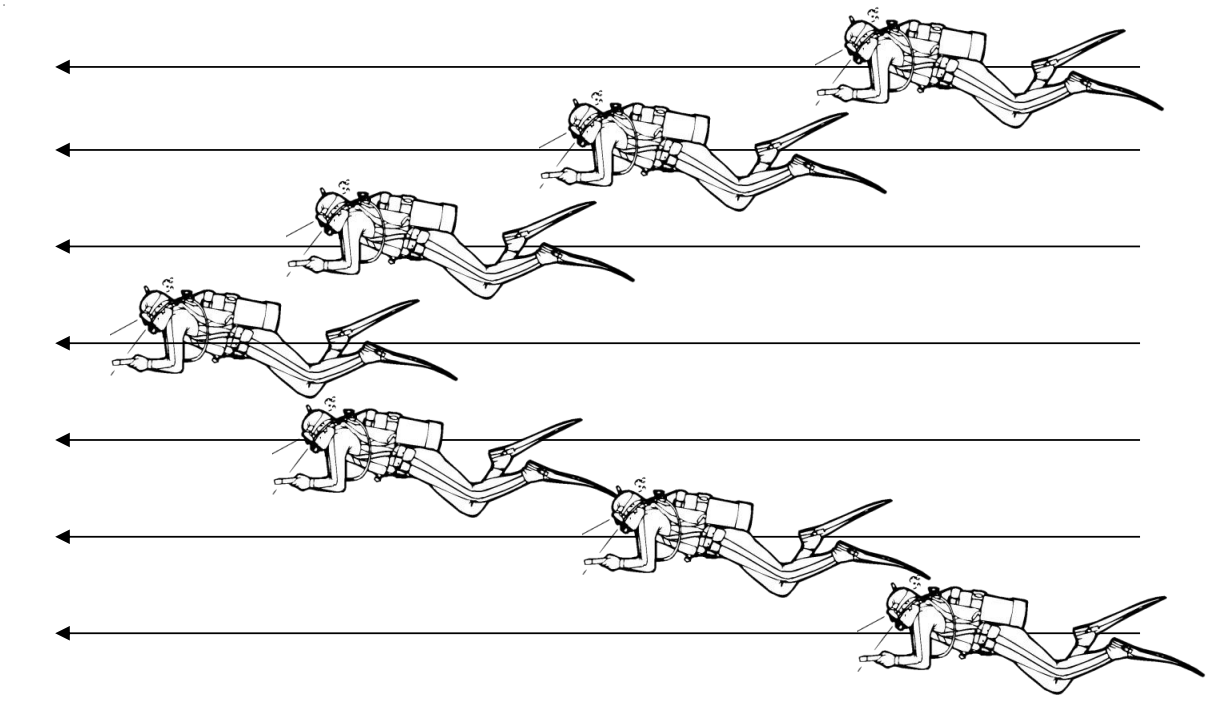


Linear Transect – ideal for small areas or a continuous line.

Durant transect

Multiple divers searching is ideal when covering large areas, the V-shaped dive pattern of the Durant transect means that areas that have not been covered by the diver in front can be concentrated on by the diver behind, making sure that no area of seabed has been missed.

Divers should be just behind and to one side of the diver in front of them.

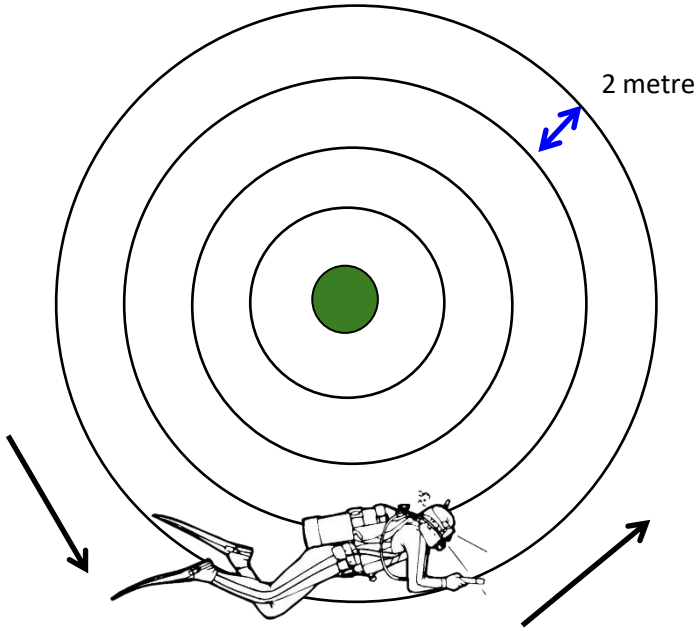


Durant Transect- perfect for large areas with multiple divers

Circular transect

This should be used when searching for individual seahorses in a known breeding territory or if a seahorse has disappeared after being spotted. A shot line is used to mark the centre of the search area and then work outwards in a circle, increasing by a metre each full turn.

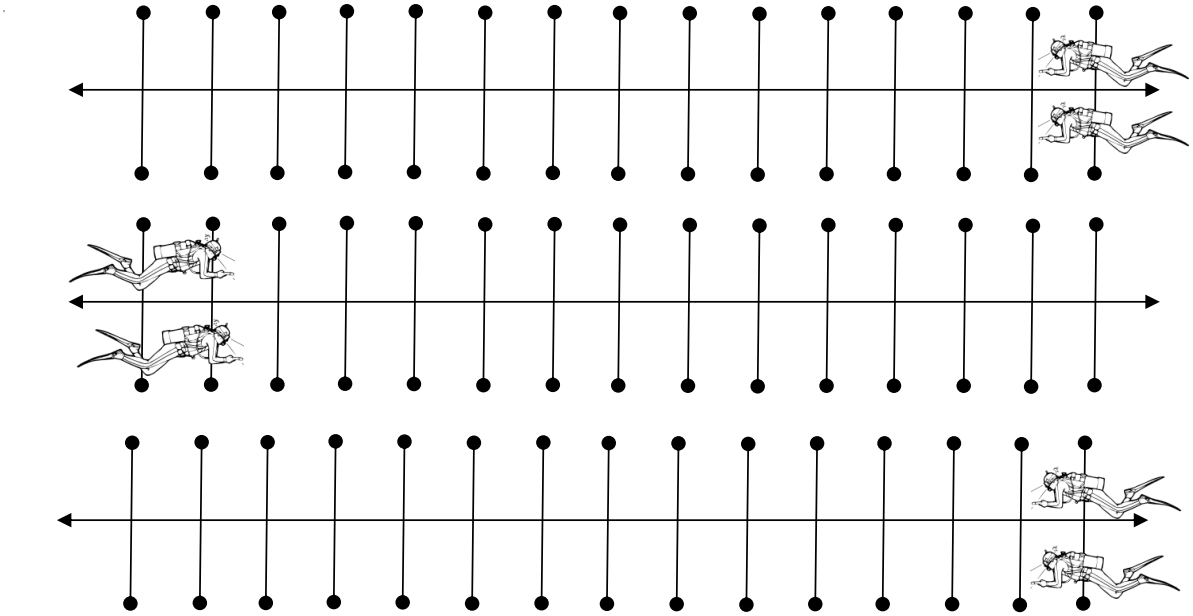
This type of survey requires a lot of care and observation of the seahorse to stop any stress to it, so should only be used by experienced surveyors.



Circular Transect – ideal for searching small areas with a great degree of focus

Transect with points

This is for large areas, so that the surveyors can stop every 2 metres and then search 1 metre out from the transect line; very good for covering large areas, also very useful for assessing habitat.



Transect with points – ideal for habitat analysis over large areas

Appendix 4

World Seahorse Survey reporting form

World Seahorse Survey

Office Only	***RECORDER DETAILS***
Name: *E-mail:*	
Address:	*Post Code:* *Telephone No:* *Boat:*
SIGHTING DETAILS	
Date:	*Depth:* m
Moon phase:	*Viz:* 0 m *Temp:* '
Site:	*Grid ref :*
Weather conditions:	*How found:*
Sea Bed Habitat:	
Seahorse Species (if known):	*Description (Insert picture):*
Number: 1 *Tag no.* 0	
Size: cm	
Sex: *Male* *Female* *Additional information:*	

Please save the form on your computer, fill it in and then send it to theseahorsetrust@gmail.com

Appendix 5

Boat dive plan

- Clear instructions on dive area and dive duration
- Dive flag to be shown on boat whilst diver are in the water
- SMB/Dive flag to be shown by lead diver in each team
- Each diver should carry an SMB, ready to be deployed.
- 4-6 divers on the boat, 2 in each team.
- 1 stand by diver and 1 supervisor for each team

Shore dive plan

- Clear instructions on dive area and dive duration
- SMB/dive flag to be shown by entire team at all times.
- Experienced divers in each team

Risk Assessment

This is a shore and boat accessed dive. The boat will be used on 3 occasions to generate an overall location of the seagrass meadow, thereafter, shore dives of smaller teams will also be undertaken to conduct seahorse surveys within and around the seagrass meadow.

Overall, the risk is low on this site compared with Studland Bay as very few boats go into the area, having said that it is crucial that diver awareness is generated at all times, such as with a dive flag on the dive boat, each dive leader deploying a dive flag and at least one diver on the shore dives has a dive flag deployed at all times.

Other things we considered for the safety of the divers:.

- Charged gas cylinders will be secured on the boat at all times under the instructions of the skipper and/or dive leader.
- Exhaustion from the shore swim
- Fishing vessel trawling or dropping pots.
- Oxygen held by boat.
- Depth not compatible for decompression sickness but due to longevity of the dive's hypothermia can creep up on divers and we have taken this into account on the dive planning. We also confirm with each diver underwater and on the surface that they are OK and not too cold.
- Plymouth decompression chambers and DDRC
    - Emergency number: DDRC +44 (0) 1 752 209999
    - At sea call Coastguard VHF Channel 16, DSC Channel 70