British Seahorse Survey 2011

The Seahorse Trust

Neil Garrick-Maidment FBNA
Executive Director

www.theseahorsetrust.org
www.britishseahorsesurvey.org
Registered charity 1086027

WORKING IN PARTNERSHIP WITH NATURE.

CONTENTS

Introduction Pg. 1

Seahorse Species Pg. 2

The Survey Pg. 3

National Seahorse Database Pg. 7
- Excel database Pg. 7
- Photo database Pg. 7
- Map database Pg. 7
- Paper files Pg. 8

Seahorse measurement protocol Pg. 9
- Guide for measuring the SH's Pg. 9
- Measuring the snout Pg. 10
- What sex is it? Pg. 11

Studland Seahorse Tagging project Pg. 12
- Tagging Seahorses Pg. 12
- The use of floy tags Pg. 13
- Licenses Pg. 14
- Recovery of the seahorses Pg. 14
- Breeding Pg. 18
- Territories Pg. 19
- Profile picture project Pg. 20
- Pressure on the seahorses Pg. 20

Seahorse migration Pg. 22

Temperature influence Pg. 23

The Gulf Stream Pg. 24

Habitats Pg. 27
- Habitat graphs Pg. 29

Notable sightings Pg. 35

DNA Analysis Pg. 37

Marine Conservation Zones Pg. 38

Legal status of Seahorses Pg. 39

Statement from MMO Pg. 44

Conclusions Pg. 45

Thanks to Pg. 47

INTRODUCTION

Seahorses have been surrounded by myth and legend for centuries and as a result of this they have attained an almost mystical presence wherever they are thought to exist. These areas are usually thought to be the hotter tropical regions of the planet so it comes as a surprise to many that the British Isles are indeed home to two species of Seahorse and they have a wide and varied distribution.

The British Seahorse Survey was set up in 1994 because of an original sighting by underwater videographer Sue Daly in Jersey and it has been running for 17 years now having progressed from a paper exercise to an active surveying project working with the diving and fishing industries and with the help of the general public. It is the longest running survey of its kind in the world with well over 650 sightings to date and this continuity has been invaluable in understanding the nature and ecology of the Seahorses found around the British Isles and beyond.

All Seahorse species are listed under CITES, the BERN Convention, OSPAR and now here in the UK, for the two native species, the Wildlife and Countryside Act (2008) which was a direct result of the work of the British Seahorse Survey run by The Seahorse Trust.

Since the start of the survey we are now beginning to understand a great deal more about these elusive creatures and their behaviour. It is now understood what happens to them in the winter, where they are breeding and why we have 2 species and what their own unique traits are that help them to blend in and live so perfectly with their environment.

The survey is a good balance of science and community based voluntary help, we receive information from a wide range of sources from divers, fishermen or even walkers on the beach. Everyone can and do make a valuable contribution, in fact without these people giving up their time and getting in touch with us we would not know so much about British Seahorses.

Seahorses are a very unique species, known through myth and legend and through intense study but there is still so much more to learn and understand about these enigmatic animals and their links to their environment but time is running out. In many parts of the world the Traditional Medicine Trade (TMT) is taking in excess of 100 million seahorses (**Kealan Doyle pers. comm**.) and similar species from the wild every year, a figure that is totally unsustainable. This problem is exasperated by the loss of habitat, poor legal protection, poor implementation of the law, over fishing as a by-product and pollution from a number of sources; added together this means that it is quite conceivable that seahorses can go extinct over the next 20 to 30 years unless something is done about it and urgently.

Here in the UK adding the Seahorses to the Wildlife and Countryside Act has been a positive move forward but this protection needs to be fully implemented and at the time of writing this report this is not being done.

Spiny Seahorse (*Hippocampus guttulatus)*

Common names: Spiny Seahorse, Long Snouted Seahorse.

Distribution: Southern Norfolk, Essex, South Eastern England, along the south coast up around parts of Wales, up the West coast of Scotland to the Shetland Isles and around the all the coasts of Ireland.
There have also been sightings in the Firth of Forth.

Description: A big bony looking Seahorses approximately 17 to 18cm from the top of the coronet to the end of the tail.
Often although not exclusively covered in long spines on the top of the head and down the back which reduce with age.

Fig 1. Spiny Seahorse by The Seahorse Trust

Short Snouted Seahorse (*Hippocampus hippocampus*)

Common names: Short Snouted Seahorse

Distribution: Essex, Kent and along the south coast of England. All around the Channel Islands, around parts of Wales, Ireland and Scotland with reports during 2006 in the North Sea off Dogger Bank.

Description: A stocky solid looking Seahorse 15 to 17 cm from the top of the coronet to the end of the tail. Unlike the Spiny Seahorse around the United Kingdom the Short Snouted Seahorse seldom has spines on its head and back, although in other parts of Europe they do have them.

Fig 2. Short Snouted Seahorse by John Newman

THE SURVEY

The survey was set up in 1994 looking into historical sightings of seahorses around the British Isles and Ireland; it was a surprise to the author that so many sightings that could be attributed to a certain species of seahorse had occurred as far back as 1799, in fact sightings 40 to 50 years ago were more common than the 10 years prior to the start of the survey, why this appears is not fully understood but is probably due to the public perception of seahorses and where they come from, which is normally assumed to be the tropics. It is often difficult to get people to believe there are seahorses in the world let alone 2 species of seahorses in British waters.

The initial paper research looking for seahorse sightings was a long slow affair due to the difficulty in locating many of the sighting records but it paid off and gave a reasonable idea of where the general distribution was thought to be.
Quite a number of earlier sightings had to be discarded as the authencity of them was in doubt; often the descriptions looked to be more like pipefish than seahorses or it was a tropical seahorse being recorded in museums and natural history collections rather than UK seahorses.

Local newspaper records proved to be an interesting source of information and gave us a unique insight into local species and personal communication with long term residents of geographical regions has proven to be very useful especially retired fishermen who are a wealth of knowledge about natural history and are a valuable source of information.

Probably the most fascinating records of seahorses have to be from Pictish times; back in the 3rd to 5th century. Archaeology researcher Susanna Morgan sent the trust some images of stone carvings made by the Picts that clearly show seahorses. What is amazing is that to do these carvings the artist would have had to have seen an alive or a recently dead seahorse to get some of the detail such as the tiny ventral fin which is not seen after the seahorse has been dead for some time, or the dorsal fin that often lies flat to the body when the animal is dead.
Seahorses lay the dorsal fin flat against the body when it is not being used; this is to ensure the delicate membrane of the fin is not damaged and reduces the outline of the Seahorse as it camouflages itself in the weed it is hiding in.

Fig 3. Two seahorse effigies facing each other on a stone carving, clearly showing the prehensile tails

Fig 4. 'fish tailed' seahorses on Pictish carvings

Fig 5. Two stylised seahorses on this carving to which the artist has added bridles and hoofs. The dorsal fin is clearly seen on the seahorse's backs

Once the initial paper research had been done this gave us geographical regions to concentrate on. We then asked local divers and fishermen, museums and wildlife based organisations, such as the Wildlife Trusts for records of sightings and commonality of sightings in their particular area. This led to a large number of leads which again gave us a better idea of locations. We also found that media attention always brought us new sightings and the ongoing development of The Seahorse Trusts websites to include survey reporting forms also yielded a number of sightings that we would probably not have had access to previously.

Now that the survey has been running for 17 years and is the longest running survey of its kind in the world we are finding that most organisations and individuals now know to send the sightings directly to us. Coverage in the media is still very important to us to access previously unknown sightings.

We developed a reporting sheet for sightings that has been proven to be very successful, under advice from Dragon Search (www.reefwatch.asn.au) in Australia, we had a colour outer leaflet with information about the survey and seahorses with a paper insert that could be sent back to us separately. Dragon Search found that they often did not get reports sent to them because members of the public wanted to keep the glossy outer sheet; we found the same outcome until we adopted their policy of 2 sheets of paper. The survey sheet has been used now for 17 years and the initial format we used has been highly successful. Nowadays we tend to find 99% of sightings come via our online reporting forms and the hard copy survey form tends to seldom be used and in time will be phased out. The idea was to keep the forms (paper and online) relatively simple but get enough basic information to make a number of conclusions from it but by and far the most important piece of information is the reporters contact details. As near as possible every sighting is followed up by further contact, this has led to a great deal more information being extracted from the reporter which has provided some interesting behavioural details.

We deliberately did not to make the form too scientific or complicated as most reporters would be put off by this and we would not receive the sighting at all; it appears to have worked and we now have in excess of 650 confirmed sightings from around the British Isles (as well as a large number of unconfirmed sightings and anecdotal information).

Long term it is intended to keep the survey running and already it has become the longest running continuous survey of its kind. The information we are gathering is already being used for policy making decisions such as the banning of the use of flash photography under license and for changes in the legal status of Seahorses around the United Kingdom. The survey is also an important community tool with dive groups and others looking out for Seahorses, which in turn is giving community members a greater pride in their own 'patch'.

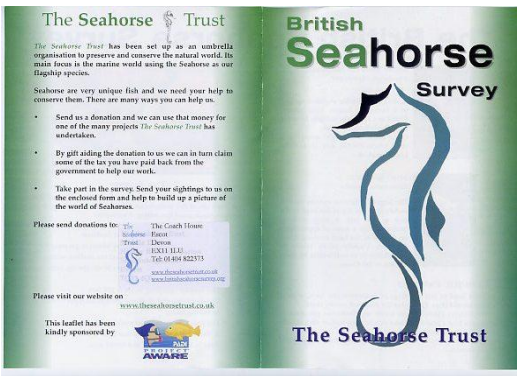


Fig 6. The British Seahorse Survey leaflet with its paper insert. The insert was chosen to be paper to maximise the numbers of sightings sent back to us.

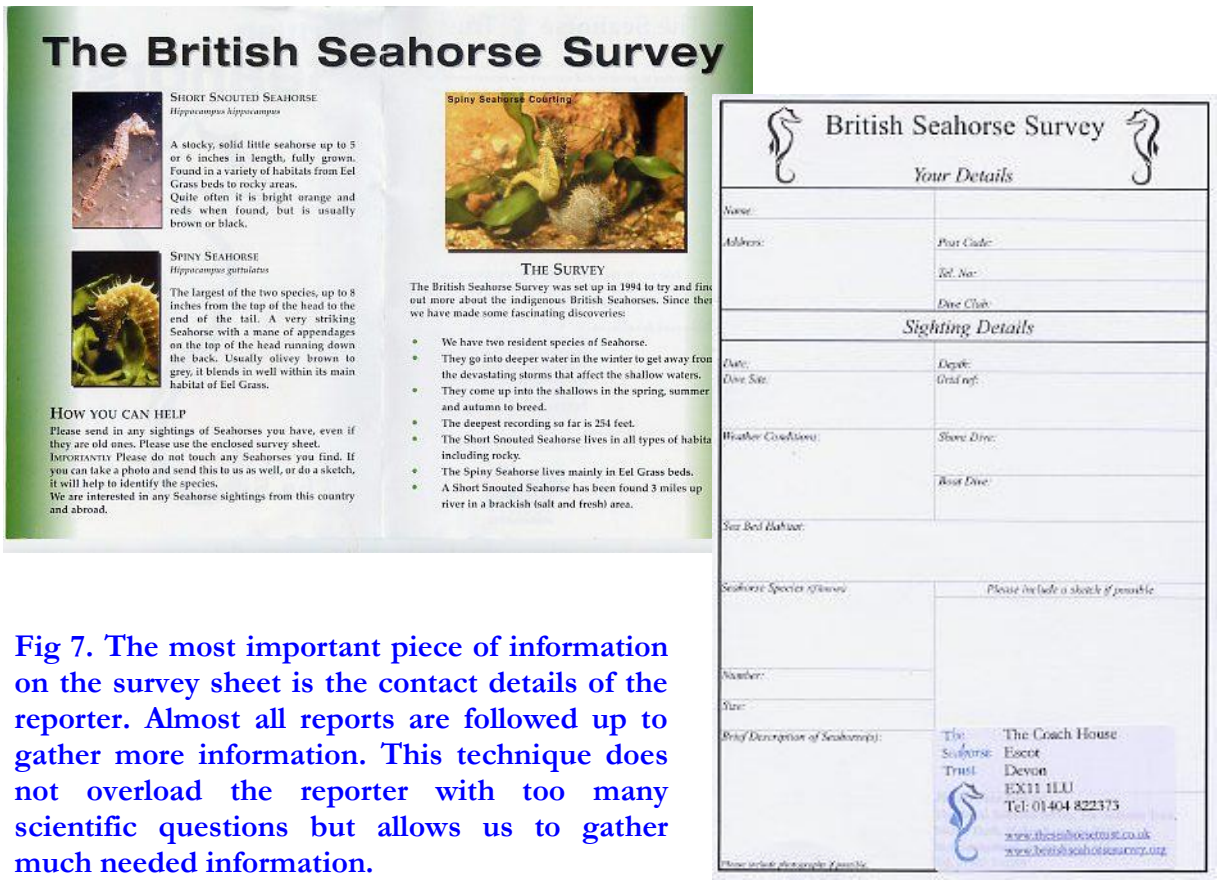


Fig 7. The most important piece of information on the survey sheet is the contact details of the reporter. Almost all reports are followed up to gather more information. This technique does not overload the reporter with too many scientific questions but allows us to gather much needed information.

The data we have gathered has also been fed into information gathered for the proposed Marine Conservation Zones; we hope that the importance of the species and their habitat will be included into this very vital network of protected areas and at time of writing this report well over 100 sites have been put forward for protection many of which contain seahorses.

National Seahorse Database (NSD)

The National Seahorse Database (NSD) for the British Seahorse Survey is held in three formats: firstly as an excel database where the details of all the sightings are held, secondly an electronic photo database to hold all the photos taken of specimens found throughout the survey and thirdly a paper record system (including written, photographic and map reports) as a secure back up.

Excel database

The excel database using Microsoft's Excel programme is an ideal format for the survey as it can be easily added to, changed if needed and cross referenced with other databases. The data is easily extracted to allow for the development of graphs and charts which are an excellent tool for analysing the data received.

Every sighting within the database has a unique identification number and this can be correlated with the photo database (where each photo has the same unique ID number for cross referencing) and the paper system.

Each sighting has its unique survey ID number, date of sighting and the full reporters contact details, we also include depth, temperature, seabed habitats, how the seahorse was found, weather and a section for additional information.

We have also added hyperlinks to allow us to have maps for each location and the photos of each seahorse relating to the sighting from the photo database. The database is improving all the time and as it develops it allows us to gather more data and develop a greater understanding of the Seahorses.

National Seahorse Photo Database

The National Seahorse Photo database is also kept electronically but a back up copy (as with the main database) is held on a remote hard drive in case of problems with the main computer. Each photo is hyperlinked to the excel sheet so that the particular Seahorse can be seen when referring to a specific record. As the information is vital to the work of the survey it is important that all work is backed up so it cannot be lost.

Copyright of the photographer is respected and pictures are given to the survey only for the use of the survey and if we are requested for pictures to be used for other means then the photographer's permission will be gained prior to use.

Fig 8. Spiny Seahorse (*Hippocampus guttulatus*) fry against a measure which is the ideal picture for the survey as it shows the species and a measurable reference.
by copyright The Seahorse Trust.

National Seahorse Map Database

We use a map system in the database to locate the seahorse sightings. Maps with GPS references are used to pinpoint the exact location of the seahorse and these are then put onto a word document in the database, this word document (with its corresponding id number) is then hyperlinked to the Excel database so that it can be called up at any point to show location and type of area the seahorse has been found in. The addition of this map database has been invaluable in showing the locations around the UK of Seahorses and as time and money allows we will be developing this further.

We have noticed from some of these maps that certain types of geological features allow for the formation of an ideal habitat for the seahorses and further research will need to be done to see if these features can used to identify potential seahorse areas.

Paper files (additional backup)

All seahorse records are also printed on paper as a secure backup; each record also includes a map and photos of the seahorses. With the inherent problems that electronic databases have and the risk of loss through computer virus's it is vital that a paper hard copy of each sighting is kept and it is intended that this will continue for the life of the survey.

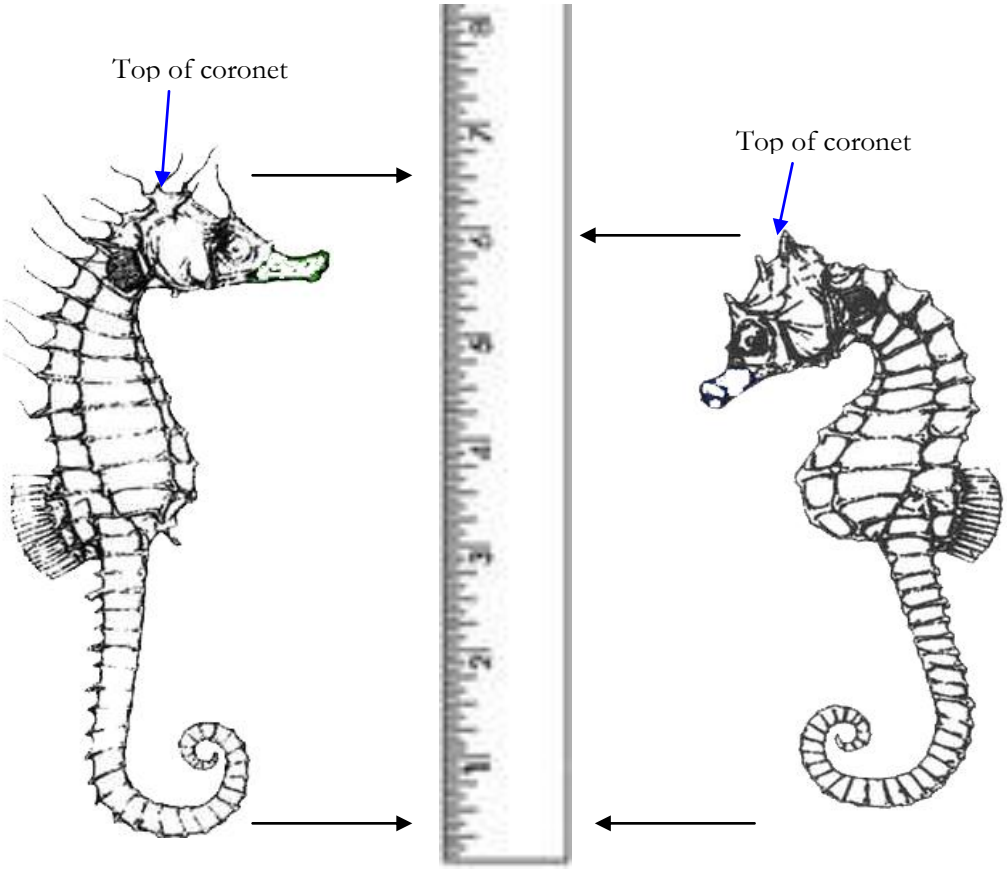
SEAHORSE MEASUREMENT PROTOCOL

Following advice from projects around the world, especially from our colleagues at Project Seahorse and Dragon Search, we established a measuring protocol when surveying for Seahorses at Studland Bay in Dorset.

Measuring Seahorses in the field should be non-intrusive and as quick as possible, this is to minimise stress on the animal and also to be compliant with the protection of Seahorses under the Wildlife and Countryside Act (1981, schedule 5, section 9); which states that Seahorses are not to be disturbed in the wild. Our tagging and measuring work is done under license from the Marine Management Organisation (MMO) and we are governed by strict guidelines on how we do our work.

Below is a basic protocol for measuring Seahorses in the field to gather as much data as possible, but designed to be non-intrusive.

Fig 9. Measurement protocol



Spiny Seahorse
Hippocampus guttulatus

Short Snouted Seahorse
Hippocampus hippocampus

Guide for measuring the seahorses.

- Approach the Seahorse slowly
- Do not handle the Seahorse
- If it swims away or turns away from you do not follow or turn it back
- Place ruler next to Seahorse vertically to measure it, do not touch it.

- Take a measurement from the top of the coronet to the end of the tail (sometimes it is necessary to estimate the length of the tail as it is curled and to uncurl it would be detrimental to the health of the seahorse. This is easily done by using pictures with a set measure in it.
- Do not release the tail from its holdfast; this could be damaging to the seahorse.
- Take pictures without a flash (this is now a requirement of the MMO license)
- Try and take a picture of the Seahorse with the ruler in the picture.
- Make notes on the Seahorse
    - Does it have spines?
    - Does the snout appear quite short compared with the length of the head?
    - What colour is it?
    - What distinguishing features does it have?
    - Does it have a pouch?
    - What habitat is it in?
    - Are there others around?
    - Anything else you might think is important.

Measuring the snout

At present, we do not measure snout length, but our colleagues at Project Seahorse and other projects around the world have advised that in an area with both or multiple species of Seahorse this would become a necessity to avoid confusion and help in identification as relying on the presence or absence of spines is not reliable enough.

To measure the length of snout compared with the head hold the ruler in front of the Seahorse as below and take a note on the length of the head and then make a note on the length of the snout. Do not stress the Seahorse; if it moves away do not chase it.

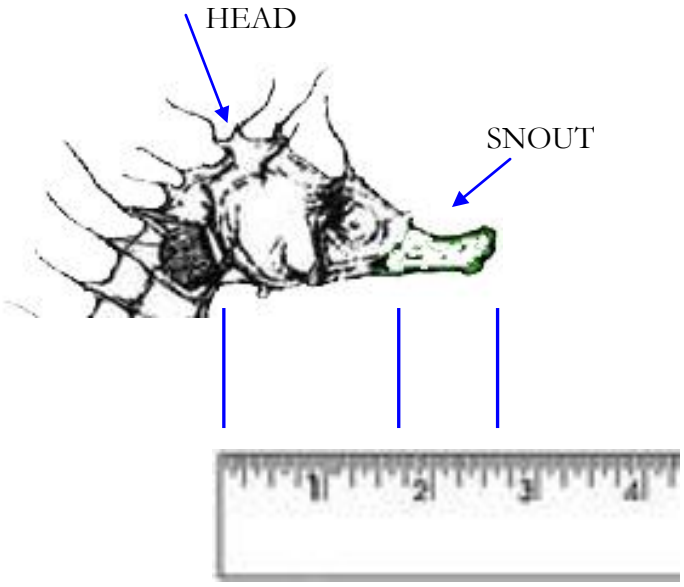


Fig 12. Head / snout measurement

Male Seahorses have a pouch to keep the fry in during pregnancy below the belly attached to the tail female Seahorses do not, even when the pouch is empty of fry it forms a diagonal line from the belly to the tail.

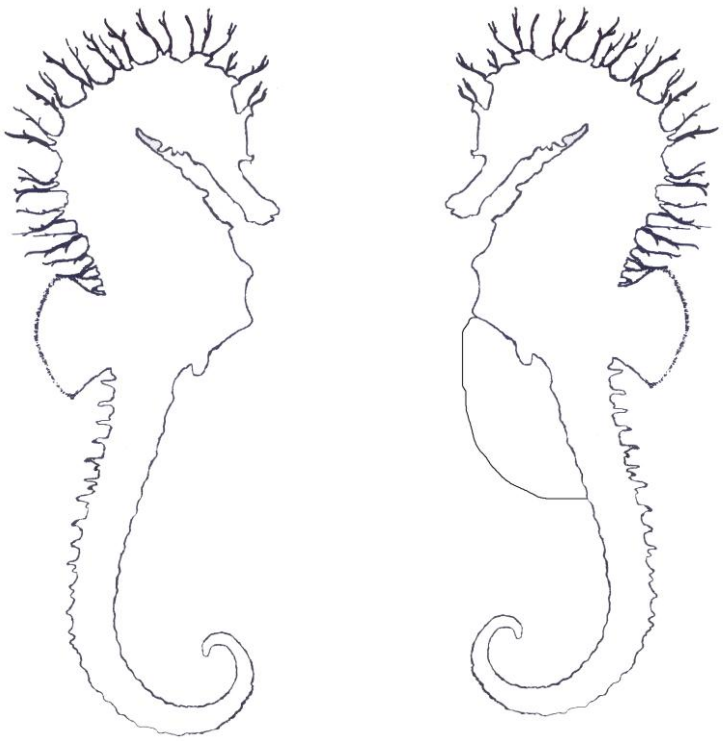


Fig 13. Sex differences in Spiny Seahorses.

STUDLAND SEAHORSE TAGGING PROJECT

Seahorses are a cryptic species; secretive, shy, a fish that is superbly evolved to live in a variety of habitats. They have an upright posture and an ability to camouflage, to blend into the background, change colour like a Chameleon they have a prehensile tail that can only be unlocked in the most extremes of weather and the ability to grow and reabsorb spiny appendages depending on the habitat they are living in. their most unusual claim to fame is that the male is the only male in the animal kingdom to have a true male pregnancy.

The two British seahorses are amazing enigmatic fish and are very difficult to study in the field. With the exception of a few animals that have very distinctive markings it makes them difficult to identify as individuals.

In 2007, marine warden Julie Hatcher (Dorset Wildlife Trust) discovered a pregnant Seahorse in the shallows of South Beach at Studland Bay in Dorset. During searches in 2007/8 we discovered approximately 40 Seahorses on the site which led to a unique opportunity for The Seahorse Trust and others to understand more about, and to be able to study Seahorses in a relatively benign environment. It gives us an unusual chance to look for and study Seahorses on a site which has proven to be internationally important for breeding Seahorses, particularly the Spiny Seahorse, but there have also been Short Snouted Seahorses spotted on the site.

In 2009 The Seahorse Trust devised a project to tag individual seahorses on the site so that we can understand more about individual Seahorses, where they live, do they pair with specific Seahorses, how often they get pregnant, what happens to them in the winter and many other questions.

Tagging seahorses

In preparing for the project we looked into a variety of ways to identify seahorses in the wild and we explored using elastomer dyes, fin clipping and tagging seahorses with a small numbered floy tag.

Our conclusions as to our final decision are listed below: -

- Injecting Elastomers were considered and we discussed this with many other projects throughout the world [Maria McGlenn, Spanish Tagging Project, Dave Harasti, Australia, Paul Camilleri, Malta] and we decided this was not the method for us. We felt that by having to remove the Seahorses from the sea to the surface and then injecting under the skin into the body was not acceptable. Seahorses do not have a muscle mass to be able to inject into and it would be very possible to inject into vital organs. We also learned that the dyes fade quickly and recovery rate for Seahorses was comparatively low. It was not known what happened to these dyed animals in the long term.
- Fin clipping was also considered but again this was dismissed. We have been involved with fin clipping for DNA analysis with Phd student Lucy Woodall for several years and there are very limited detrimental effects. However underwater for easy identification purposes an elaborate system of fin clipping would need to be developed (for up to 40 seahorses a year) and we felt that it would become too intrusive on the seahorses. We did not know about the long term effects on them. The clips would also have to be redone periodically as we know through working with Lucy that fin clips repair relatively quickly.

- Floy Tags were decided on after extensive research in captivity including one female Spiny Seahorse that had a floy tag on in captivity in a deliberately complicated tank environment for 4 years. If there was to be a problem then the design of the tank and the longevity of this experiment would have shown up the problem.

The use of Floy Tags

After a great deal of discussion and investigation we decided that floy tags would be the best way forward for our project. The Floy Tags are basically a small plastic numbered tag which is held around the neck of the seahorse by an elasticated nylon cord. It is a very small tag 5mm x 3mm made out of plastic and it fits neatly under the neck of the seahorse on the cord.

During the tests a large number of individuals were held in a number of environments some deliberately complicated so that if these tags could get caught they would do. During the 4 years none of the Seahorses were entrapped because of the tag.

Other institutions [The Sealife Centres, Blue Reef aquariums, Blue planet aquarium, NMA, to name a few] also tried this method as a means of identification on their Seahorses, again there were no detrimental effects.

We have now been using the Floy tags for a couple of years and even when we haven't seen a Seahorses for a couple of weeks they do not cause any problems to them at all, the only problem that might occur is the growth of algae on the tag but with a scrape of the thumb nail this is soon cleared.

Fig 14. Spiny Seahorse with tag around its neck. Copyright The Seahorse Trust 2010 The tag fits under the neck when fitted.

Licenses

As seahorses are protected under the Wildlife and Countryside Act, due to hard work of The Seahorse Trust, we needed to apply for a license to work with them from the Marine Management Organization.

In early 2009 The Seahorse Trust was issued with licenses to start studying and tagging seahorses at the Studland site. Due to the nature of the project the license conditions stated that the trust had to tag and recover three Seahorses to check on the effect of the tags on the Seahorses and to see if there were any detrimental effects. This was done and all the Seahorses being recovered on numerous occasions, these repeated sightings have allowed us to draw a number of important conclusions about pairings and behaviour.

Recovery of the Seahorses

The first Seahorse in the project was tagged on the 7th of May 2009, he was a fully adult male (approximately 3 to 4 years old) Spiny Seahorse who, although his pouch was fully developed to breed, was not actually pregnant. When he was tagged showed no signs of stress and the whole process took 2 minutes maximum, once tagged he was measured and photographed for the National Seahorse Photographic database.

Since the beginning of the tagging project we have now tagged 10 Seahorses and spotted 116; the reason for not tagging all of the seahorses is down to the size of the animals.

In our original licenses we had advised MMO that the minimum size of seahorse to be tagged should be 10cms from the top of the head down to the end of the tail. As the project developed, we realized that 10cms was too small and we have now increased this to 13cms. As well as self regulating this increase in tagging size we have also made recommendations to the licensing authority MMO to increase the tagging size to 13cms which we are pleased to say they have now adopted.

Fig 15. Seahorse being measured against a ruler. This seahorse is too small to tag but the information gathered from this sighting offered the first concrete proof of Seahorse fry on the site. It was only a few weeks old and would have been born in late August, maximising the availability of planktonic food.

Since the beginning of the project we have now dived the site weekly (except during stormy weather in the winter) and often several times during the week with a large team of volunteer and volunteer project divers we have repeatedly recovered all of the Seahorses, some of them many times.
These repeated dives have allowed us to gather much needed data on the Seahorses, their locations and behaviour and we have been astounded by the revelations we have made in the life of the project.
So far we have had 364 diver days, putting in a total of 612.10 hours of dive time and they have recovered all twelve tagged seahorses in total 56 times, some individuals more frequently than others.

DATE	VOLUNTEERS	HOURS	No. of Seahorses	Temperature	Unskilled	Skilled	Professional
03/08/2008	8	8	5	16	6	1	1
03/08/2008	8	8	3	16	6	1	1
14/08/2008	5	10	3	16	3	1	1
15/03/2009	5	10	2	16	3	1	1
17/03/2009	4	2	0	8	2	0	2
02/04/2009	3	2	0	9	1	0	2
14/04/2009	2	4	2	9	0	1	1
23/04/2009	2	4	0	9	0	1	1
07/05/2009	4	8	1	13	1	2	1
22/05/2009	3	2	1	13	0	3	0
22/05/2009	3	2	2	13	0	3	0
29/05/2009	3	4.5	0	17	2	0	1
03/06/2009	2	3	0	17	2	1	0
05/06/2009	1	1.5	1	17	0	0	1
17/06/2009	2	4	2	17	1	1	0
19/06/2009	10	30	3	17	4	2	4
25/06/2009	4	4	2	17	2	2	0
03/07/2009	4	7.5	1	17	2	2	0
11/07/2009	10	15	2	17	5	2	3
25/07/2009	9	12.5	2	18	4	3	2
31/07/2009	3	6	1	17	1	2	0
31/07/2009	1	1	1	17	0	0	1
07/08/2009	3	6	1	18	0	1	2
08/08/2009	4	12	0	18	0	1	3
10/08/2009	13	19.5	1	18	0	2	11
11/08/2009	13	13	1	18	0	2	11
17/08/2009	2	4	1	18	1	1	0
19/08/2009	1	3	1	18	0	0	1
21/08/2009	4	6	1	18	2	1	1
24/08/2009	4	9	1	19	2	1	1
29/08/2009	4	6	0	18	3	0	1
05/09/2009	12	36	2	14	6	4	2
06/09/2009	4	4	1	14	3	0	1
19/09/2009	6	12	0	15	4	1	1
26/09/2009	5	10	1	16	1	2	2
31/10/2009	1	1	0	16	0	0	1
16/03/2010	2	2.5	0	4	0	1	1
10/04/2010	3	3	0	8	0	2	1
23/04/2010	2	2	0	9	0	1	1
28/04/2010	2	2	0	9	1	0	1
01/05/2010	2	2	0	11	1	0	1
01/05/2010	2	2	0	11	0	1	1

01/05/2010	5	5	0	11	3	1	1
17/05/2010	2	2	0	11	1	1	0
18/05/2010	2	2	0	11	1	0	1
22/05/2010	4	6	0	12	3	0	1
29/05/2010	2	3	1	12	0	1	1
04/06/2010	2	4	0	15	1	0	1
06/06/2010	6	9	0	16	3	2	1
18/06/2010	8	16	1	15	5	2	1
18/06/2010	6	18	1	15	0	4	2
19/06/2010	2	3	0	15	0	1	1
26/06/2010	6	12	2	17	3	1	2
01/07/2010	2	5	3	17	0	1	1
03/07/2010	7	21	2	17	2	2	3
08/07/2010	2	5	2	19	0	1	1
09/07/2010	4	4	1	19	2	1	1
10/07/2010	4	14	5	18	1	2	1
11/07/2010	2	2	0	18	1	1	0
22/07/2010	2	4	1	18	1	0	1
24/07/2010	4	8	2	19	2	1	1
27/07/2010	2	3	1	19	0	2	0
31/07/2010	2	7	4	20	0	1	1
01/08/2010	2	4	2	20	0	1	1
04/08/2010	1	1.5	4	17	0	0	1
07/08/2010	4	10	9	18	0	2	2
10/08/2010	10	30	4	17	0	7	3
10/08/2010	2	4	2	16	0	1	1
14/08/2010	11	25	4	17	8	1	2
21/08/2010	3	6	6	16	0	1	2
25/08/2010	2	6	8	17	0	1	1
01/09/2010	1	1	1	15	0	0	1
16/09/2010	2	5	0	14	0	1	1
18/09/2010	2	5	0	12	0	1	1
22/09/2010	3	2.1	0	10	0	1	2
04/04/2011	2	2	0	9	0	1	1
16/04/2011	2	2	0	11	0	1	1
20/04/2011	2	2	0	12	1	0	1
14/05/2011	12	18	2	12	8	2	2
30/05/2011	2	3	1	14	0	1	1
02/06/2011	3	4.5	1	13	0	1	2
07/06/2011	2	3	1	14	0	1	1
11/06/2011	3	3	0	15	0	2	1
21/06/2011	2	3	0	15	0	1	1
25/06/2011	3	3	0	16	0	1	1
28/06/2011	1	1.25	0	16	0	0	1
01/07/2011	5	6.25	0	16	1	2	2
09/07/2011	3	4.5	0	16	0	2	1
TOTAL	**346**	**612.1**	**116**		**116**	**107**	**123**
DATE	VOLUNTEERS	HOURS	No. of Seahorses	Temperature	Unskilled	Skilled	Professional
			Total Volunteers			**346**	

Chart 1. showing no of divers, hours taken and number of Seahorses seen since the start of the project.

16.

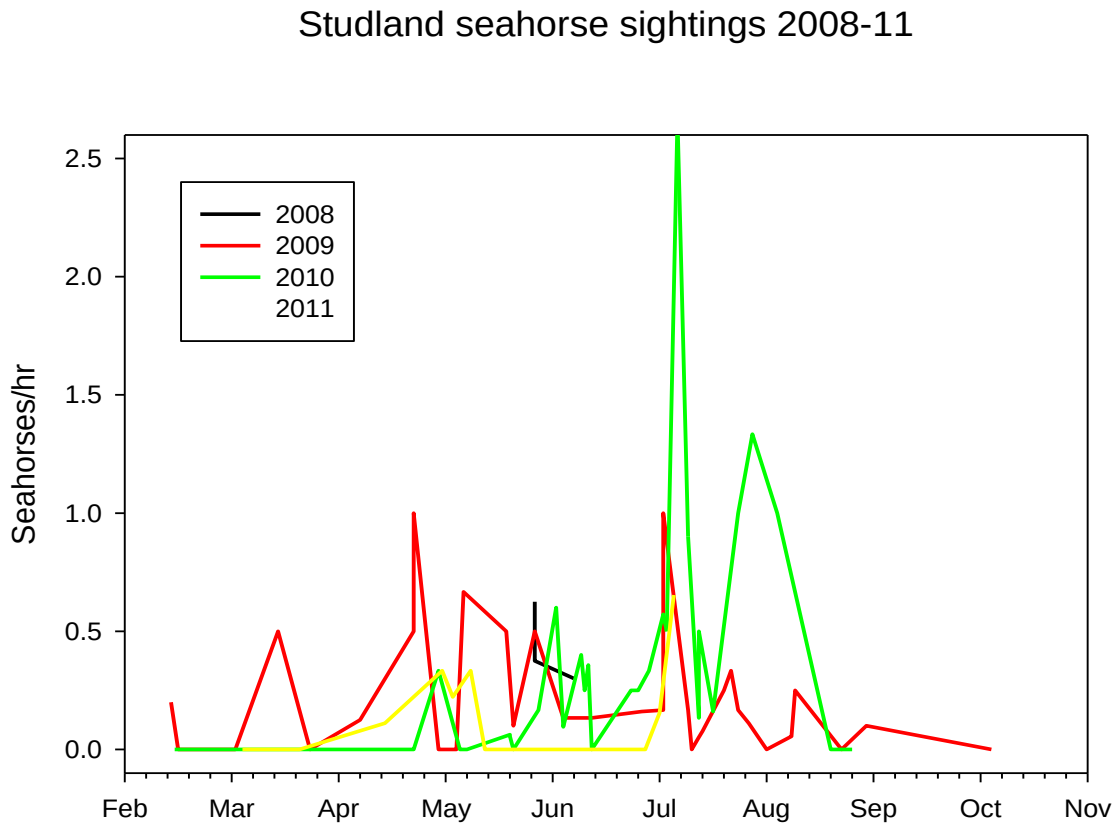


Chart 2. Hours taken by divers to find seahorses compared with number of seahorses found per annum over the period of the survey.
Prepared by and thanks to Dr. K. Collins.

Out of the 10 tagged seahorses we have had four pairs, one single male and one single female. With the exception of the single female tagged by a former trust volunteer which was not seen again and was presumed to be in transit when tagged, we have seen all of the other tagged seahorses on numerous occasions.

The females within these pairs are less frequently seen, mainly because they are known to have a wider territory than the males. Their behaviour indicates they tend to visit the males early in the day to reinforce pair bonding and pass eggs over if needed. They then disperse to other parts of the range. They appear to be more mobile within their home range.

The courtship display has been videoed once on the site which is believed to be a first in the British Isles for this species.

The males can often be found in exactly the same spot every day which makes it easier to find them. It is not known why they do not move as much as the females but it is assumed that they 'hold' the dominant territory and the females visit them rather than the male going in search of the female.

Breeding

Since the start of the tagging project in 2009 all of the paired males have been constantly pregnant during the breeding season (spring to autumn). We estimate that they are getting pregnant every 28 to 30 days (approximately once a month, coinciding with the full moon). This means that up until mid October 2010 each of them has been pregnant on average 5 times each year, probably more. Taking into account that on average the Spiny Seahorse gives birth to 3 to 5 hundred fry each time (mean average of 400). The four breeding males alone have produced 16,000 fry, 2,000 each a year.

From previous experience they are expected to keep breeding until at least mid-November. Although some fry found on other sites have been born (judging by size) throughout the winter. Although we know this happens we feel that the normal period for breeding is during the warmer months of the year. The day length is longer and there is a greater abundance of food for the fry and adults which allows for greater survival rates.

Fig 16. Pregnant male Spiny Seahorse. Copyright, The Seahorse Trust 2010

It is assumed that out of every 1,000 fry that are born in the wild (**Amanda Vincent pers comm**.) only 2 will survive to maturity. This means that each male has the capability of producing 4 or more surviving offspring per breeding season, whilst a very high survival rate for seahorses it's relatively low for other fish species. The long term internal brooding of the eggs and unborn fry and the precocious nature of the fry when they are born leads to relatively high survival rates. Once born the fry have phenomenal appetites and if they are not eaten by predators they will grow very quickly. After a couple of weeks in the planktonic soup they will settle to the seabed where their cryptic nature allows them to hide well and grow fast

This high productivity means that recruitment to other areas, via long shore drift, the Gulf Stream and other currents would explain why Seahorses can be found around most of the British Isles; from the Shetland Isles in the north down to the south coast.

The site at Studland is internationally important for the breeding of Spiny Seahorses as they are breeding sufficiently to allow for recruitment to other sites and due to the numbers found on the site. Due to current pressures at Studland action needs to be taken immediately to secure this population on the precautionary principle until we know more about the population numbers and dynamics and how the loss of an important site such as Studland could affect the national population.

Territories

Territories are held seasonally by adult, sub-adult and juveniles alike of both sexes and although they are predominantly for breeding there is more going on than we originally assumed.
Males and females both hold territories, with the female territory being large than the males and it overlaps her partners area. The females are known to have a wider territory; approximately 20 square metres (on average) than the males (approximately 10 to 15 square metres on average) and as her behaviour indicates she visits the male early in the day to reinforce pair bonding and pass eggs over if needed; the males can often be found in exactly the same spot every day which makes it easier to find him. (For her and the hard pressed researchers looking for them)
It is not known why the males do not move as much as the females but it is assumed that they 'hold' the dominant territory and the females visit them rather than going in search of the female; this reduces time wasted in search of a female (another good reason for pair bonding) and we know that the male releases pheromones from his pouch (something the female cannot do) which encourages the females to seek him out, rather than him going looking for her, wasting time and much needed energy reserves.
If one of the pair holds the dominant position it becomes easier to relocate the partner in what can at times be quite a turbulent environment and it makes sense for the male to 'hold' the main territory rather than using up much needed reserves looking for the female, this in turn allows him to use maximum resources in brooding his fry in his pouch which is resource heavy due to the nutritional and biological needs of the unborn fry.
By cutting down on time needed to search for a partner this increases breeding potential in what is a relatively short optimum period of the year, this in turn allows for maximum fecundity from both the male and female.

A seahorse territory needs to have a number of things to make it the ideal site, importantly secure cover from predators, an abundance of food and no other adults in it.
Breeding adults are not tolerated at all in the territory by males or females however juveniles are often seen in the same area, frequently only metres from the breeding pair.

This tolerance of juveniles in the territory is evidence that a territory is held for breeding purposes only and is not related to food availability. This makes sense as breeding pairs do not have to waste time searching out partners each day as their partner is always within the territory whereas if they have to 'deal' with other breeding adults this would not only waste time and energy but also be counter productive

At present it is not known if seahorses reoccupy territories held in previous breeding seasons, further research is needed into this and the longevity of the tagging project will allow us to conclude more in the future.

Profile picture project

We have now undertaken developing a picture profile project which in the long term will replace the tagging project. The idea is to take a head profile photograph on both sides of the seahorse so that this can used to identify individual seahorses.
It is in its early stages at present but is being based on the Seahorses unique mane of spines and spots on its head.
By building a photographic database of known seahorses we hope to be able to identify them just by a side view so that we can stop using tags. The tagging project is a superb way of identifying the seahorses but occasionally tags fall off and there have been a couple of occasions where tags have been deliberately removed by divers. We have managed to identify the seahorse again because of their location but also by identifying them through existing pictures.

Pressures on the Seahorses

South Beach at Studland, Dorset is a site of multi use and intense pressure, mainly man made; the combination of uses means that there is unsustainable damage to the seagrass bed (**Dr, K. Collins 2010**) and in turn the species that occupy it.

One of the main usages of the site is as an anchoring leisure area for visiting pleasure craft and yachts that are seeking shelter from storms and high winds; it is traditionally a natural shelter anchorage.
The main reason why this has become an issue in recent years is due to the sheer quantity of vessels using the site now, anywhere up to 2 or 3 hundred boats a day (maximum counted 369) in high season (May to September). The vast majority of these boats drop anchor into the sensitive seagrass and when removing their anchors they tend to drag the anchor through the grass before lifting it, which in effect is like ploughing a field.

A second harmful pressure on the site is the mooring buoys there are in total 51 on the site and it is understood from Crown Estates who own the seabed that not one of them have planning permission or are legal. Some of these are owned by local businesses to encourage trade to the area which in itself is not a bad thing but the damage from the mooring chains is destroying large areas of the seabed; part of the beauty of the area these visitors come to see. The moorings tend to be attached to the seabed with very heavy chains that rise and fall with the movement of the tide; whilst they are rising and falling they move around in a circle around the mooring block which scraps away the seagrass and anything else that lives there. This erosion is just the start of a process which could end up with the loss of the seagrass meadow and the beach itself from loss of sand. Once the seabed is exposed it means there is nothing to hold it together, the sand gets very fluid and does not allow the seagrass to re-establish making the seabed very mobile and open to erosion by wave action; this in turn will make the shore line erode very quickly possibly leading to major coastal erosion.

Fig 17. The chains shown below were secured to chains that were in excess of 20 metres long but only in a 2 metre depth; both were on the edge of the seagrass and both scoured into the seagrass and acted like scythes in cutting down the seagrass.

There is an answer to this whole situation and that is the implementation of environmentally friendly moorings (EFN's) and banning anchoring. By providing EFN's this would allow visiting yachts and boats to safely moor up to a maintained, insured mooring. These moorings have a small foot print on the seabed as they tend to be screwed deep into the seabed which allows seagrass to grow right up to them. The chain or connection cord to the buoy on the surface is suspended by a submerged float which keeps it off the seabed and an elasticated holding rope and this stops the seabed erosion as it does not drag through the seagrass.

By using this form of mooring it would make sense to increase the number of moorings fourfold within the area and banning anchoring, this could be funded by charging for use of the moorings as is done elsewhere in the world.

The site at Studland is internationally important as a breeding colony of Spiny Seahorses and it is suggested that they are breeding sufficiently to allow for recruitment to other sites but are under immense pressure which if it is not controlled could lead to the loss of this extremely important site.

Due to current pressures on the site action needs to be taken immediately to secure this population; especially in light of their high status protection under the Wildlife and Countryside Act (schedule 5 section 9), on the precautionary principle until we know more about population numbers and dynamics and how the loss of an important site such at Studland could affect the national population.

SEAHORSE MIGRATION

Seahorses are a slow moving fish with a limited swimming ability; their only form of propulsion is the tiny dorsal fin on the back of their trunk which will 'flutter' between 35 and 70 beats per second and the movement moves down the dorsal fin from the top to bottom, pushing the Seahorse along. When not swimming the fin will lie at rest against the body, which is a good defence against accidental damage that can occur when amongst algae and rocks that can damage the delicate membrane of the fin and during storms where they will get bashed around in the surge. The pectoral fins on either side of the head aid in stability and appear to help in changing direction, these lie flat against the side of the head when not in use and like the dorsal fin flutter at high speed when in use.

Traditionally it was thought that the sightings we had in the British Isles were just 'accidental visitors' that had been washed across the channel from the continent; or a seasonal migration from across the channel, this appears to be highly unlikely for a number of reasons. Primarily the current in the channel tends to work from west to east or east to west so most of the seahorses that would probably have to raft [that is be attached to an object as it drifts in the current] and would be driven by the current the wrong way, although undoubtedly some would have made their way across the channel but not in the numbers we have recorded over the years. Although we do have a couple of sightings of Seahorses in mid channel (**Sue Daly personal observation and Ivor Rees; seahorse caught in a scientific trawl**) the chances of a small fish with limited swimming ability being able to swim across the channel unaided seems highly unlikely and would not explain in excess of 650 sightings recorded on the British Seahorse Survey's National Seahorse Database (see page 7).

The work of the survey has shown that they do migrate but not across the channel and any recruitment from across the channel is more accidental but does aid to the genetic diversity here in the UK. The migration that does occur particularly applies to those Seahorses that are found in exposed areas where the seahorses are at great risk of damage from severe winter storms and extreme tidal and weather conditions; in sheltered areas such as Poole harbour, the River Dart in Devon, Plymouth Sound and the Solent (amongst many others) and some of the more sheltered areas such as estuaries around the coastline the population appears to stay the same area all year around.

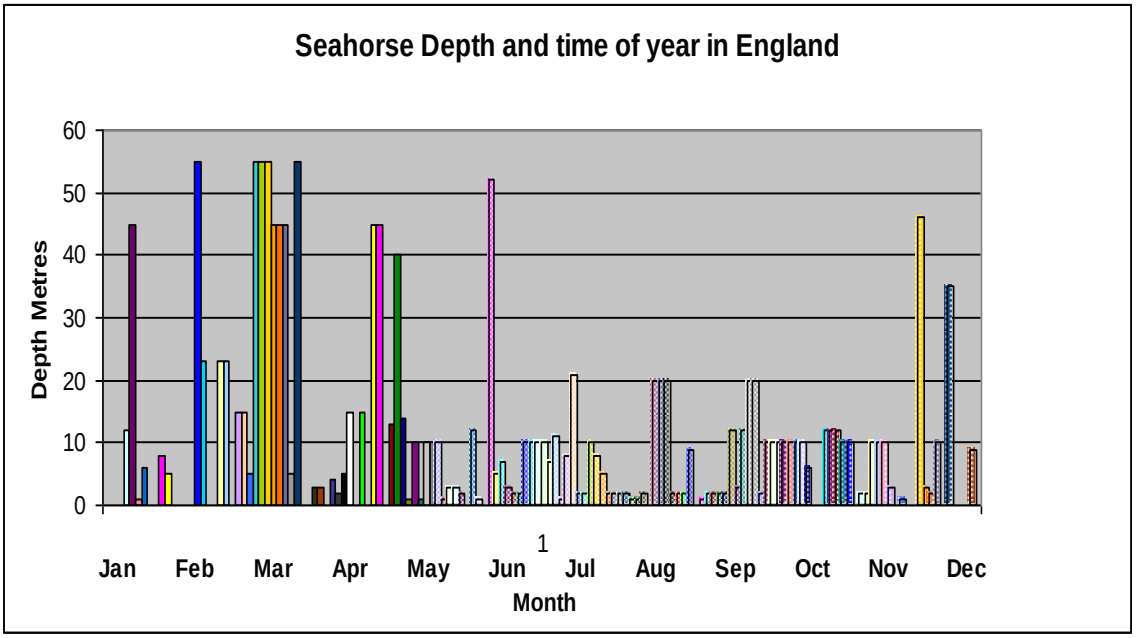
The recordings of deeper depths occur during December through to April, which is the time of the worst storms and turbulent seas and the lowest temperatures (leading to a decrease in vital food supplies). This migration to deeper water is in response to the winter storms and looks to be a highly successful survival technique.

It can be assumed from the known data such as observations of pregnant males in the wild and recordings of juveniles at various times of the year that the Seahorses are returning to shallower waters in the warmer months of the year for breeding [European seahorses are known to breed in captivity more frequently during the warmer months, although this is not a firm rule]. This coincides with the time of year for the various peaks in plankton blooms, (food for seahorse fry) which tend to be from early April the first and largest peak through to the autumn during which time there are several smaller and medium sized peaks throughout of varying degrees, mainly during peak lunar cycles. This is a very similar pattern to the corals in the tropics that coincide their breeding cycles with maximum water movement around the lunar cycle; this allows for better distribution of the eggs

Through the work of the survey we have confirmed a resident breeding population in the British Isles but as described above there would be limited recruitment from continental Europe, this would most likely be by 'rafting'.
We know form the work being undertaken at Studland that seahorses are indeed resident in UK waters and can be presumed to have been resident for a very long time. There is absolutely no evidence to suggest that we only have Seahorses in our waters due to global warming.

Work of PhD student Lucy Woodall has recently shown that the European populations of both species can be divided horizontally throughout its range.
The UK populations form part of a Northern European Meta population whose southern geographical limit is on the Atlantic Coast of France, roughly in line with Cape Finistere and the northern geographical limit is Scotland up into the Shetland Isles.

Chart 3. Seahorse Depth and time of year chart for England



Temperature and seahorses

There is a direct correlation between seahorse movement and depth; this is influenced in two ways firstly by the Gulf Stream (explained below) and secondly by localised UK temperatures depending on the time of the year and the weather, the warmer and more sunny the weather the longer and greater the plankton bloom.
Plankton is the keystone to the marine environment and the building blocks of life, not just in the sea but influencing land as well and seahorses

Chart 4. Average temperatures and number of times of Seahorses seen at Studland during tagging project

Year	Average temperature	Number of Seahorse sightings
2008	16.00	11
2009	15.63	34
2010	14.74	66
2011	12.57	11

THE GULF STREAM

The plankton blooms which are the foundation of all life in our seas are caused by the influence of the Gulf Stream and seasonal levels of sunshine; the warm nutrient rich 'river of water' that flows west to east from the Gulf of Mexico where it gets its name from across the Atlantic to the shores Europe, passing mainly up the west coast of the UK (although it also passes up the English Channel and into the North Sea in a diluted form)

If we did not have the influence of the Gulf Stream the UK would have the short hot summers and very cold long winters experienced by Canada, which shares the same line of latitude as us.

The longer hours of daylight and warming sea temperatures during the summer months, increase sea temperatures to the point where the planktonic algae (phytoplankton) increases into enormous blooms which are then followed by a boom in zooplankton animals; the herbivores that eat algae followed very quickly by carnivorous planktonic animals. The increase in planktonic animals is a good time for producing Seahorse fry which will consume in excess of 3,000 pieces of plankton in a 24 hour period, they are virtual eating machines due to their very poor digestive system, which consists mainly of a digestive tube running from the mouth to the anus, during the passage through this digestive tract the food is only partially digested and is often excreted partially digested, because of this they need to consume large amounts of food to give them the required nutritional intake.
It is not by coincidence that a large number of creatures that feed either directly (like the Basking Shark) or indirectly (like the Leather Backed Turtle that feeds on Jellyfish that feed on plankton) on plankton are found in the same geographical regions and most of these geographic regions are the ones influenced by the Gulf Stream. In the British Isles this tends to be on the South, South West and Western coasts, with a lesser influence on the Eastern coast.

Fig 18. Basking Shark Distribution following the influence of the Gulf Stream

Map courtesy of MARLIN

Fig 19. Rhizostoma Jellyfish distribution, they are one of the main food items for Leatherback turtles which follow them as they drift across on the Gulf Stream.

Map courtesy of MARLIN

Fig 20. Leatherback Turtles are the largest of all the turtle species and are usually solitary

Map courtesy of MARLIN

Fig 21. Pink Seafans are found mainly on the South West and western Irish coasts.
They feed mainly on plankton and like the other species on these pages are reliant on the Gulf Stream to bring them the plankton.

Map courtesy of MARLIN

Fig 22. The main influence of the Gulf Stream which originates across the Atlantic from the coast of Mexico affects mainly the western, south western, southern and north western coastlines.

In 2006 the first reports of Seahorses (*H.hippocampus*) found in the North Sea occurred on the Dogger bank area (**Dr John Pinnegar and Craig Mills, Care for the Environment, Lowestoft**), as can be seen by the Gulf Stream map this is where there is a confluence of the Gulf Stream coming up from the south through the English Channel and down from the north around the top of Scotland.

Fig 23. Dogger Bank in the North Sea marked in Red. The H.hippocampus sightings cane from this region during a tow by Care for the Environment's Dr John Pinnegar and Craig Mills

It can be concluded that without the vital importance of the Gulf Stream bringing warmer waters and nutrient rich waters to the UK would not have the vast diversity of species that live here and indeed we would probably not have the Seahorses as a resident population.

HABITATS

Its been long thought that all Seahorses live just in seagrass beds, slowly this is being disproved and the evidence from The British Seahorse Survey reports 2002, 2003, 2004, 2007 and now 2011 show this to be far from the case, *H.guttulatus* does seem to be found more commonly in seagrass than *H.hippocampus* but the choice of habitats is wide spread from seagrass to man-made objects and marinas, it shows that both species are highly adaptable and will probably select habitats based firstly on food availability and secondly on the type of habitat.

Although both species can be found in the same habitat and there have been sightings within metres of each other. There does seem to be a slight difference in their preferred habitat and the evolution of the shape of the body, the appendages on it and the snout shape and length have allowed both species to coexist in the same area and in quite diverse habitats.

Whether it is different food types that drive the differing habitat needs or the diverse food types are a direct result of the adaption is not known but the Spiny Seahorse has a proportionally longer and narrower snout than the Short Snouted Seahorse. This allows it to delve deeper into nooks and crannies and amongst tighter weeds but is this an adaption to the prime habitat of seagrass with epiphytes or a broader adaption.

Fig 24. Spiny Seahorse in Eel grass by Eva Durant

Around the British Isles, the Spiny Seahorse have on the whole more body appendages than the Short Snouted Seahorse which is the perfect disguise for being amongst algae that is often covered in epiphytes or in the brown algae that is often found in seagrass. In fact Spiny seahorses are frequently found in this brown algae when moving around in the

seagrass, especially as juveniles or sub adults when they have not established a territory of their own.
What it doesn't explain is why older Spiny Seahorses have less spines than youngsters, unless it is because the youngsters are moving around more across the seagrass meadows and the extra length in the spines allows them to have more cover in a variety of habitats. Once the adults they have established a territory they, tend to choose pure seagrass and there is less need for the fully branching spines.

The Short Snouted Seahorse does not often have appendages in British waters which is ideal for the preferred habitats where there are little or no algae. They had appendages this might make them stand out.

Fig 25. A Short Snouted Seahorse pair doing courtship display in a silty sand habitat
By John Newman

The Spiny Seahorse seems to have a need for some form of cover whether this is weed or rock and they are seldom found out in the open over sand or silt or mud. Spiny Seahorses appear to be more specialised in their environmental needs
The Short Snouted Seahorse has a much more even spread on habitat preference and can be found in most areas from being concealed in algae to moving across open silt and sand. This might be another reason why the Short Snouted Seahorses tends to not have spines in UK waters; if they did have spines, moving across habitats might be disadvantaged by having a growth of spines.

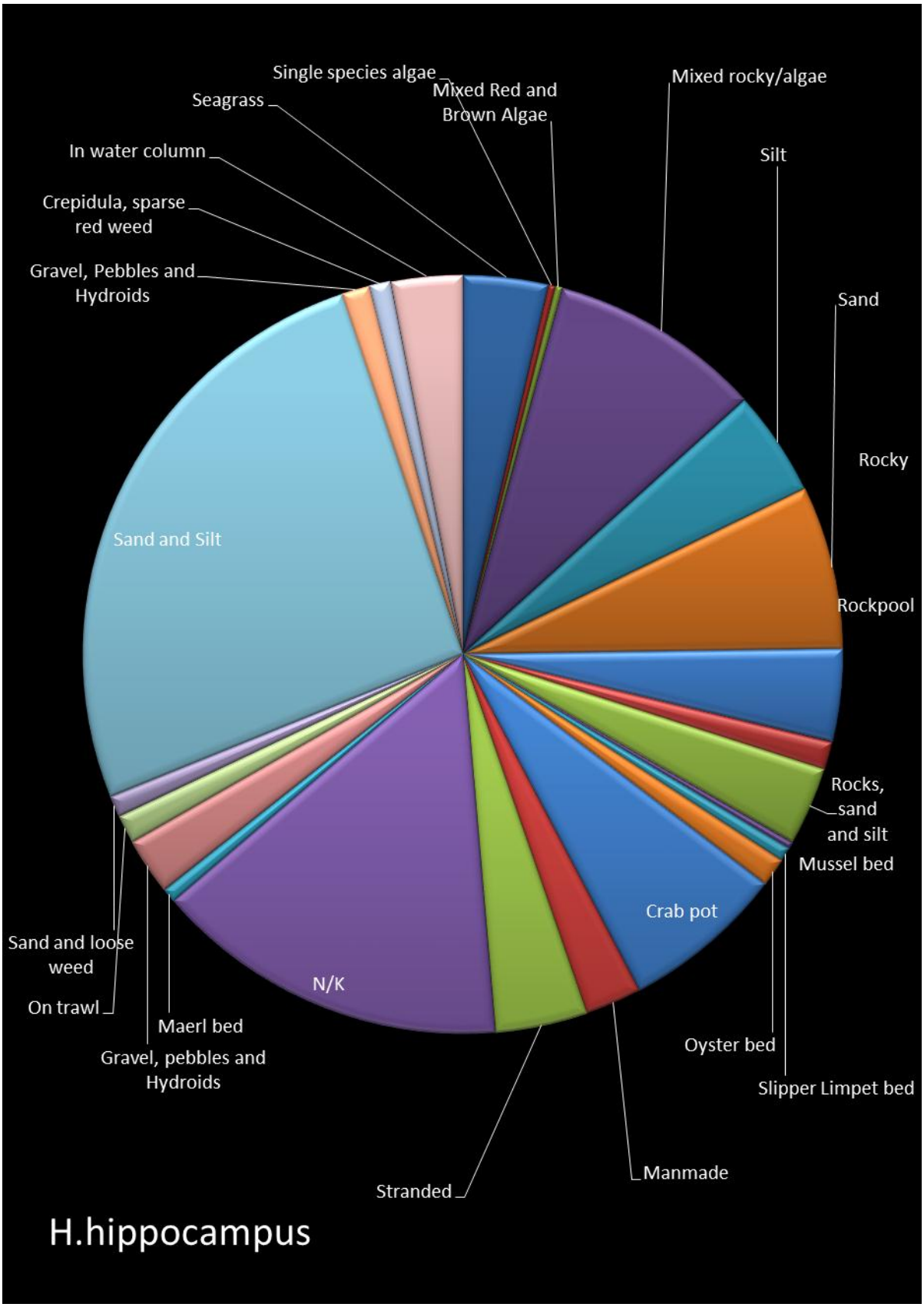


Chart 5. Habitat breakdown for the Short Snouted Seahorse.

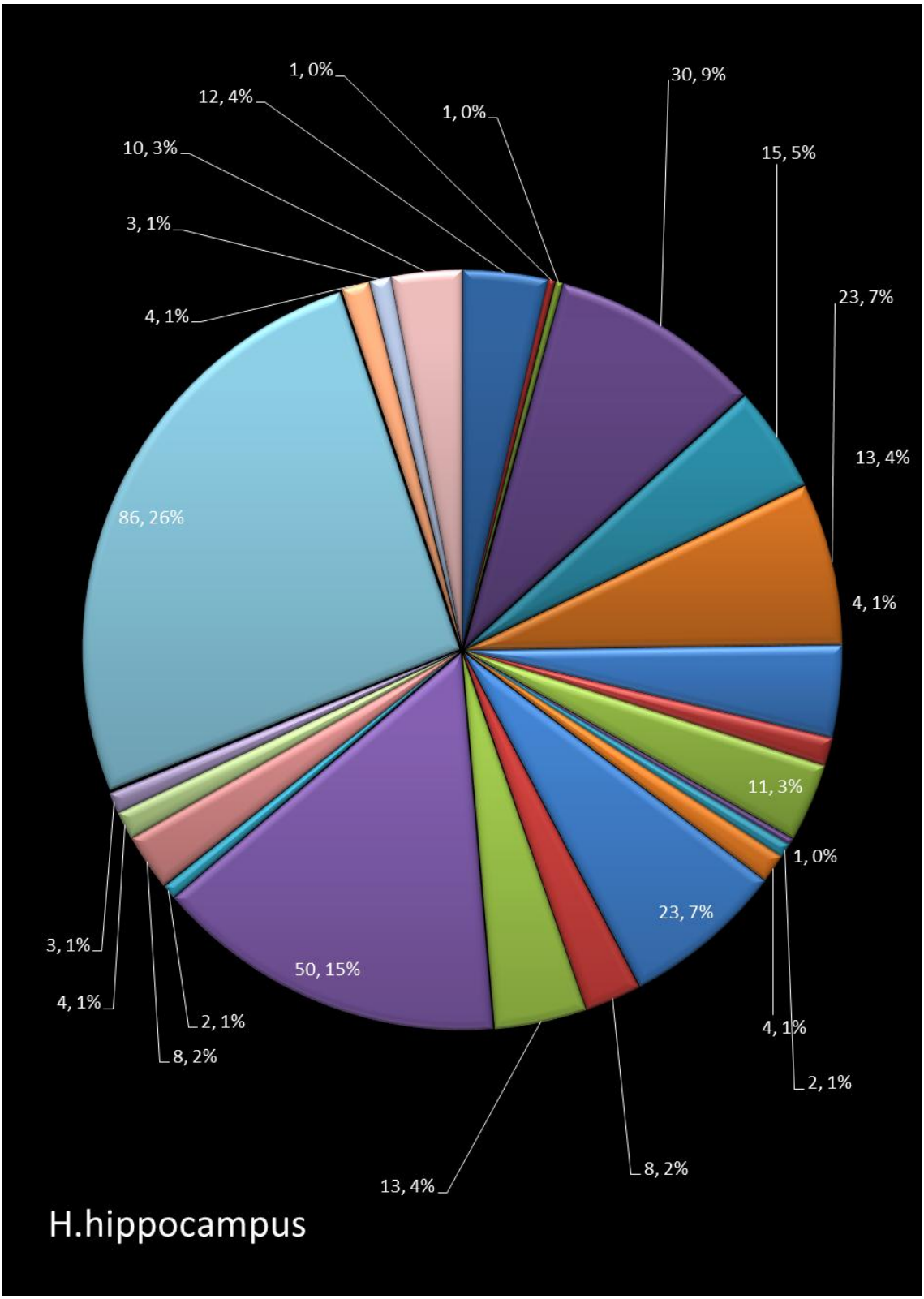


Chart 6. Percentage of habitat breakdown for the Short Snouted Seahorse.

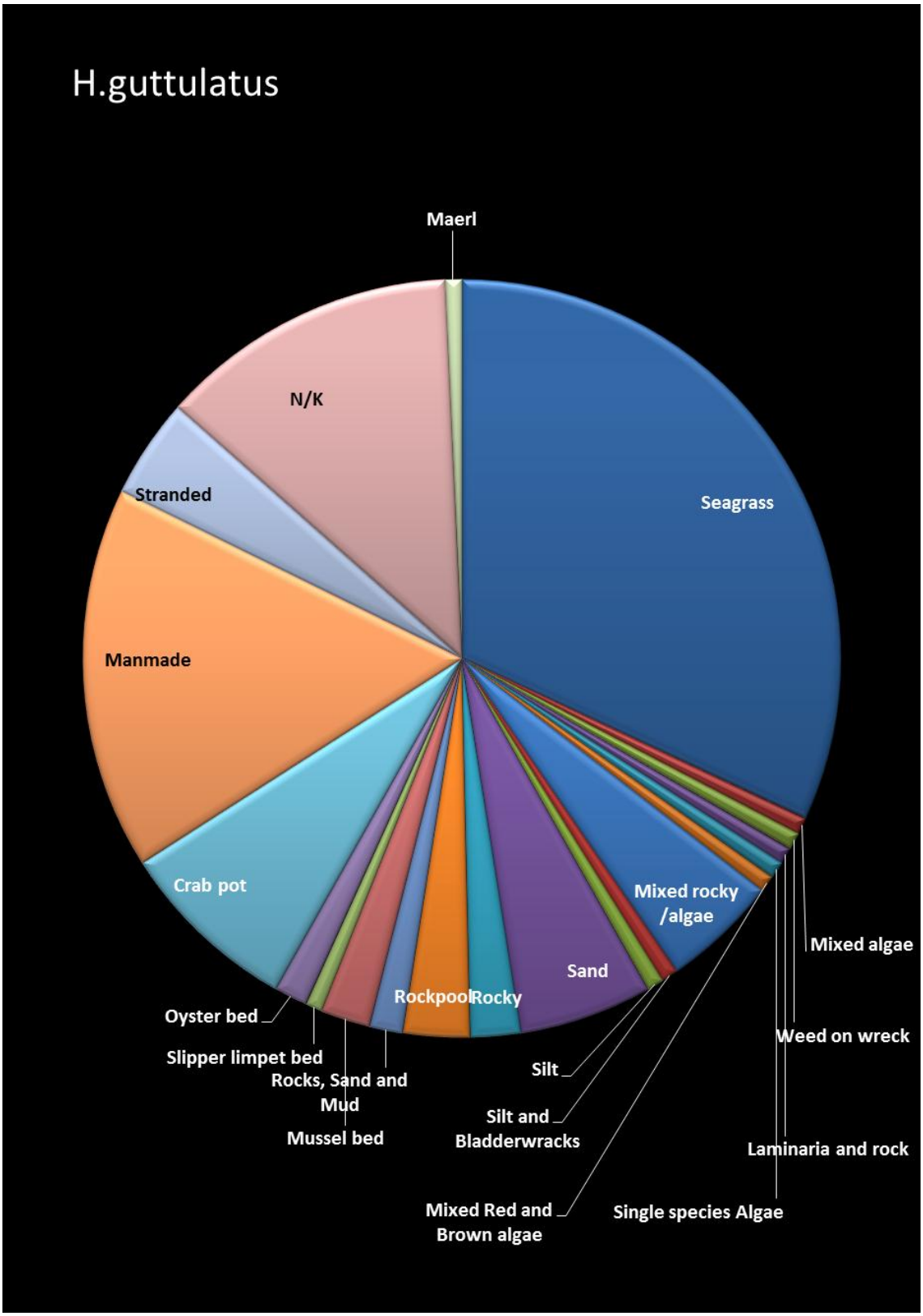


Chart 7. Habitat breakdown for the Spiny Seahorse.

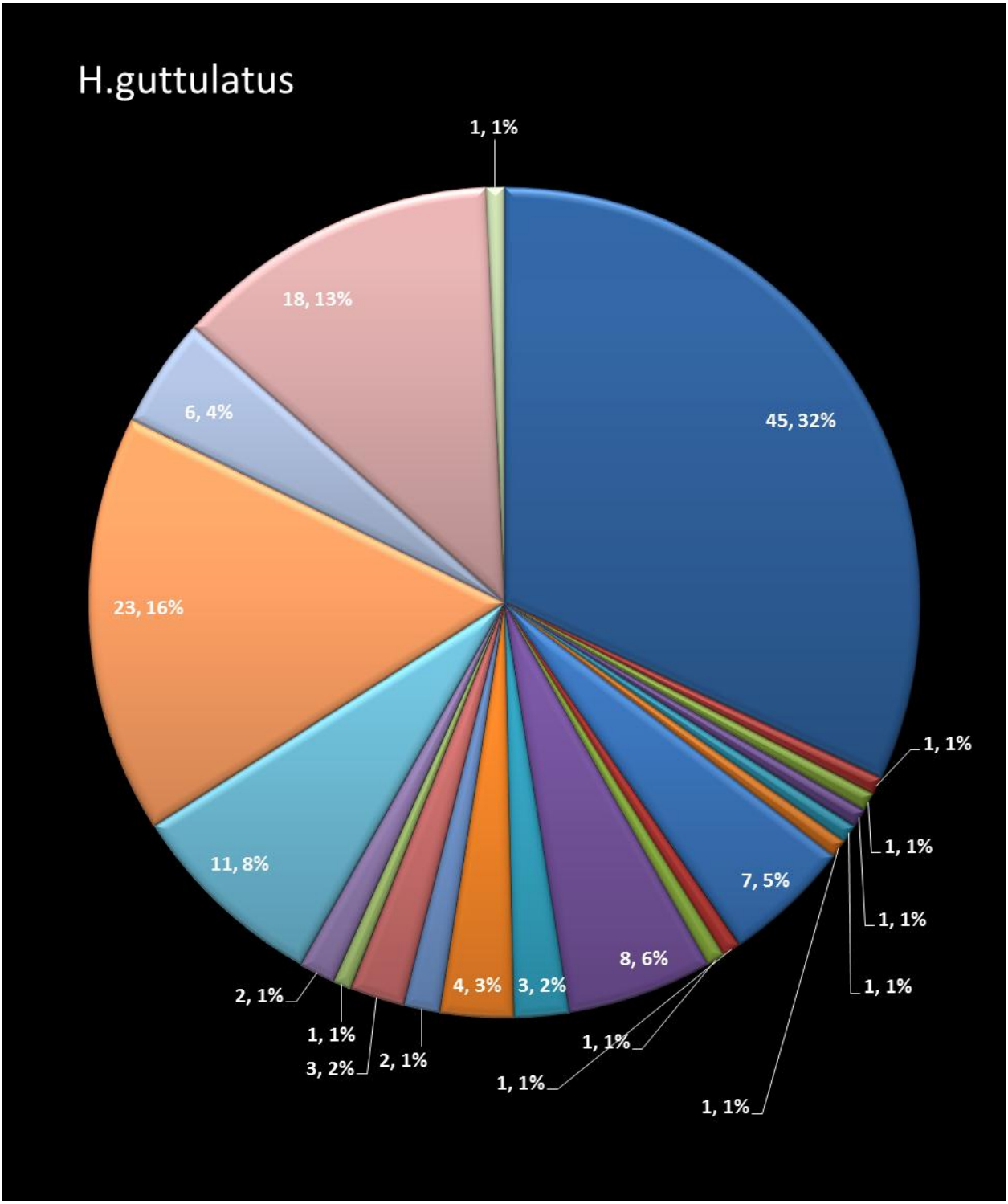


Chart 8. Percentage of habitat breakdown for the Spiny Seahorse.

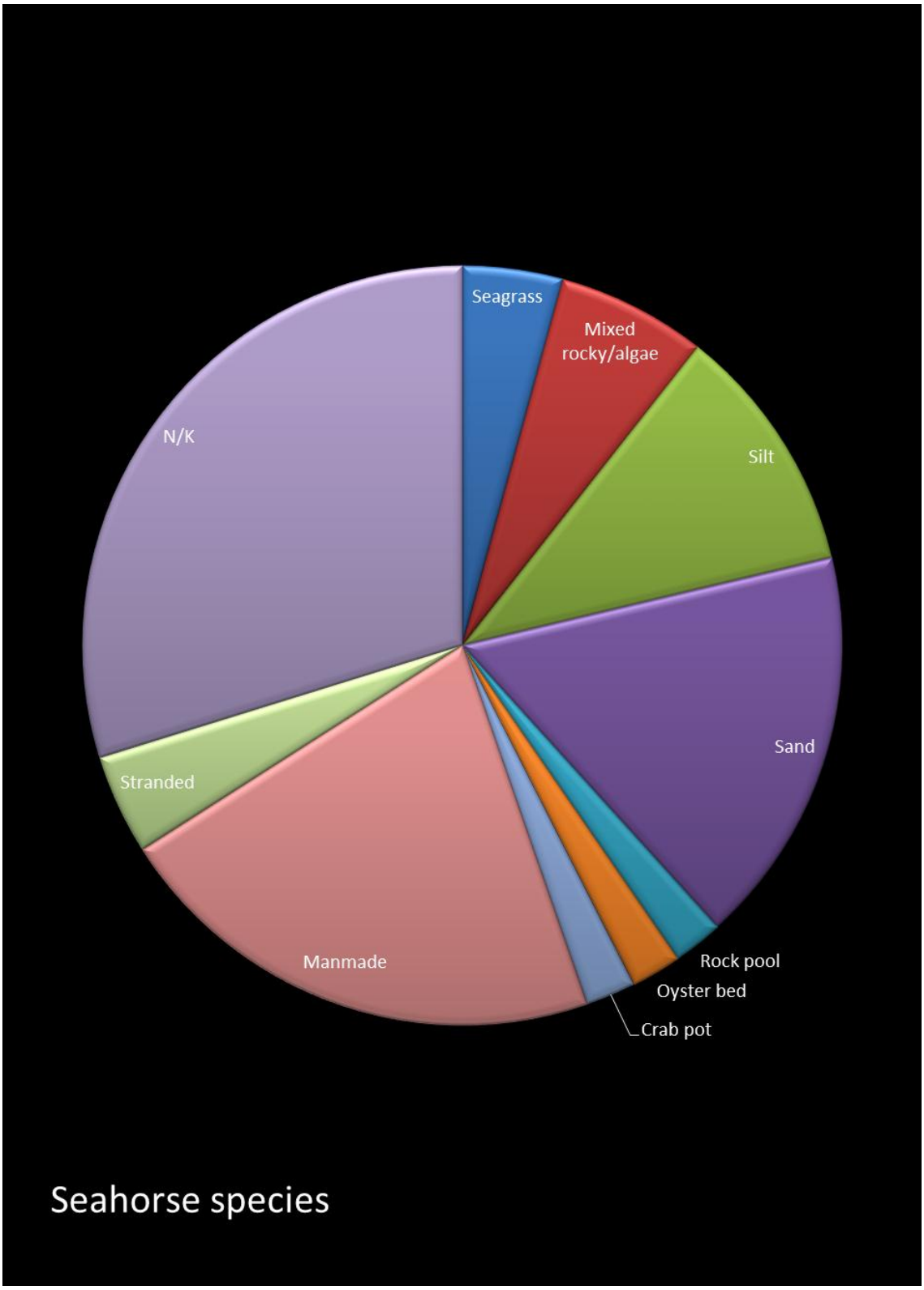


Chart 9. Habitat breakdown for unknown/unconfirmed Seahorse species.

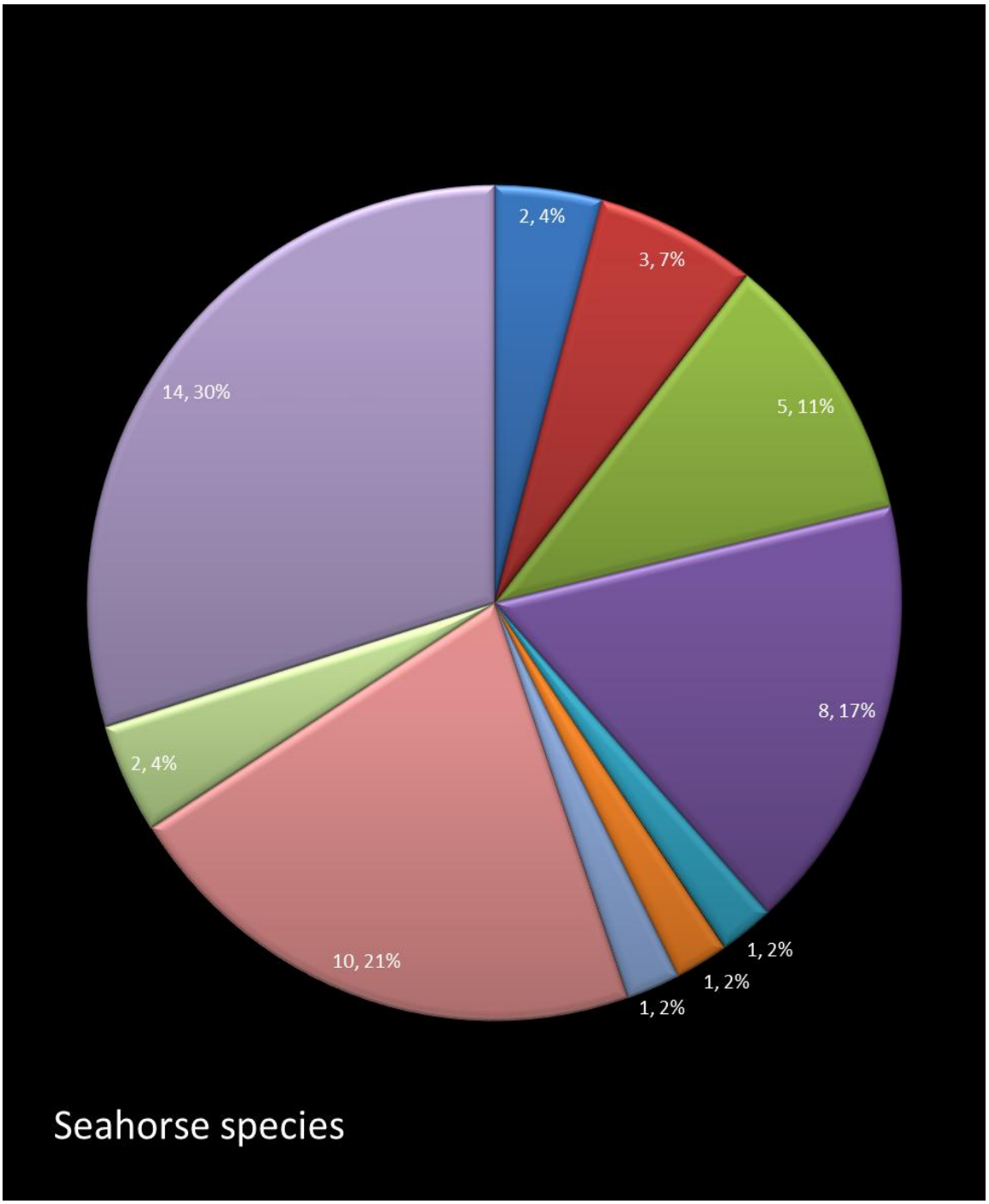


Chart 10. Percentage of habitat breakdown for unknown/unconfirmed Seahorse species.

Notable sightings

The last few years have produced some very notable sightings of Seahorses from a variety of sources and in a variety of habitats and locations all of which are helping to build a unique picture of these amazing creatures. As the knowledge builds of the Seahorses it is allowing us to understand and plan for the future protection of them. Fishermen and divers have proven to be an invaluable source of information about Seahorses and other marine creatures and the success of the survey has been due to the relationship built up with many communities including these two.

Listed below are just a small handful of the fascinating sightings that have occurred over the last few years, the National Seahorse Database itself has in excess of 650 sightings from a wide variety of sources.

- Probably the most important sighting for the survey as a whole, and Seahorse knowledge in general was in 2004 and that was of a fully pregnant male found by Julie Hatcher the warden from Kimmeridge Marine Centre of a Spiny Seahorse (*Hippocampus guttulatus*). This seahorse was photographed at Studland Bay and then followed a few days later by a video sequence taken by Colin Froud showing the same animal having given birth. We confirmed the identification by matching the spines on the head and dorsal region. This was the first time in the British Isles we could pin point within a few days when a seahorse had given birth in the wild. Judging by the size of the pregnant male's pouch he would have given birth to a minimum of 350 fry and up to 500 fry.

- Another sighting of note was by Sue Daly from Jersey in August 2006, [Sue is also the surveys coordinator for the Channel Islands] she reported a sighting from a marina where a group of children had been 'netting' seahorses alongside the pontoons where the boats were moored up. The children had found approximately 30 Seahorses of a variety of sizes from juvenile down to fry.
  Sue went down the following day to check out the site and found another small group of 8 seahorses.
  We know from previous sightings that the Seahorses are breeding in this location and Sue has videoed Seahorses in the marina before.

- Another spectacular series of sightings that have occurred three times now is the finding of Seahorses in the cooling waters of a power station on the coast of Kent on the 26th of September 2005 and twice in 2006 in November a week apart. The Seahorses were found in the filter screens which are used to keep unwanted items out of the power stations. These filter screens are checked regularly by William Jones who has been monitoring the fish species that are caught up in the water intake.

- Water intakes seem to attract Seahorses we have a report by boat skipper Chris Mowlem in September 2005 who had a Seahorse dragged into his water cooling intake on his engine, amazingly it survived.

- As well as divers and fishermen the general public are a good source of information and we frequently get sightings by members of the public finding washed up Seahorses on beaches. Just occasionally they are still alive and will be returned back to the sea. The dead ones help Lucy Woodall in her work on the DNA analysis of European Seahorses (see below pg. 37).

- By far the largest Spiny Seahorse (*Hippocampus guttulatus*) we have ever seen was caught by fisherman Michael Bailey of Dorset in Southern England, it was almost 9 inches (23cm) from the top of its head to the end of its tail. After being photographed it was returned back to the wild safely.

Fig 26. The largest spiny Seahorse found in British waters.

- A first for the survey in May 2006 was the sighting of Seahorses in the North Sea on Dogger Bank. Dr John Pinnegar and his team from CEFAS were sampling the area and a Hippocampus hippocampus female came up in the trawl. This is a first for this area but not surprising when you consider that Seahorses are found on both sides of the North Sea and down into the English Channel.

- The Studland Seahorse tagging project run by The Seahorse Trust is constantly providing us with notable sightings especially the males on the site that get pregnant frequently.

- A couple of recent sightings of note were dried Seahorses found amongst the sand dunes at Saunton sands in North Devon in 2010. These Seahorses had dried and were light enough to be blown up into the sand dunes where they were found by walkers.

DNA Analysis

The Seahorse Trust works with many organisations and individuals in its quest for knowledge about Seahorses especially the British Seahorses. With this in mind we worked with Lucy Woodall, a PhD student, who was looking at the identification and genetic makeup of the 2 European Seahorses.

Lucy studied the DNA in the species found throughout Europe to try and identify if there are just the 2 species throughout the range or whether they divide into sub species or even if there other species. She has been taking samples from specimens from as far a field as Bulgaria, Spain, France, Italy and also here in the UK and her work is ongoing and will be invaluable in the captive breeding work The Seahorse Trust is doing with many other aquariums to create secure captive populations.

When the British Seahorse Survey got a report a of a sighting we then contacted Lucy and she would travel to the site, if the animal was still held she would take a small fin sample or we arranged for the animals to be sent to her if they were dead.

Lucy has completed her work now and has made the discovery that the meta populations of European Seahorses should be roughly split north / south along a line level with La Rochelle in France. There is also caution with the UK group of animals and as a precaution it has been decided to keep this population separate for breeding purposes until further evidence is produced one way or the other.

Fig 27. The British Seahorse Survey would not be possible without the kind help of many people including the diving and fishing industry. In this picture fisherman Michael Bailey has kindly taken us out on his boat to sample the Seahorses in Dorset

Fig 28. When a specimen is to be sampled Lucy brings an array of equipment to do the sampling, she has perfected the technique now so samples can even be taken underwater; not an easy task.

MARINE CONSERVATION ZONE'S

In 2009 the Marine Bill was passed in England and Wales which had been hard fought for by conservationists for many years. It came in on a wave of optimism that the coastline of the British Isles was to be protected from over fishing, over exploitation and destruction.
As part of the Marine Bill the idea of Marine Conservation Zones was put forward and a number of organisations such as Finding Sanctuary and Balanced Seas set about gathering valuable data under one roof to put forward suggested sites to be protected around our shores.

In principle this was a good idea and we applaud the government for passing this legislation and for the setting up of the data gathering organisations and we hope the outcomes will be achieved.

At the time of writing this report there are 52 proposed Marine Conservation Zones (pMCZ's) including Studland Bay in Dorset; the research site used by the trust to study Spiny Seahorses has been vital in getting this and many other areas put forward.

The data gathered by The Seahorse Trust and its amazing team of volunteers has been vital in the decision making process for submitting Studland Bay forward as a MCZ and is a testament to the hard work and dedication these volunteers have worked hard towards.

The setting up of the MCZ's will be a slow complicated process and along the way there will be many objectors to the idea of the protected zones. This is usually people who still wish to go about their activities, regardless of how destructive they are. By processing the relevant data it will be shown that we are running out of time with our wild areas, especially the marine environment and if nothing is done soon then we will be too late.

Seagrass meadows are the home to British Seahorses but they are also vital areas for nurseries for commercial fish species and others; an area that absorbs CO2 which is vital in the fight against global warming and in areas such as South Beach in Studland bay in Dorset they are crucial to stop the sea eroding away the beach and cliffs

LEGAL STATUS OF BRITISH SEAHORSES

Seahorses are formally protected in England and Wales under the Wildlife and Countryside Act (1981) which is a direct result of the work of The Seahorse Trust and its amazing team of volunteers. This protection came into place on the 6th April 2008 with a vital addition to the protection which means that not only are the two species fully protected but the habitat they live in as well. This is a superb addition to the protection of the Seahorses that will ultimately lead to better all-round protection for them and the habitat they occupy.

The protection was a culmination of a great deal of hard work by many thousands of volunteers and others and shows how the voluntary sector can and does influence the protection of wildlife in the British Isles through 'citizen science'.

Wildlife and Countryside Act 1981 Schedule 5, section 9 (as amended)

Seahorses are protected under schedule 5, section 9 which states offences are:-

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

Schedule 5 lists animals species that are protected under Section 9; Section 9 which prohibits the intentional killing, injuring or taking of the species listed in Schedule 5 and also prohibits their possession and the trade in the wild animals listed. The 2 seahorse species are also further protected from disturbance by prohibiting actions that affect places they use for shelter.

Section 9 has several parts (see below) that specifically protect against killing and taking (9.1), possession of or possession of part of (9.2), disturbance or destruction/obstruction of places of shelter (9.4), selling (9.5a) or advertising for sale (9.5b).

Category of Protection	Schedule
Animals which are protected from killing and taking	**Schedule 5 – Section 9.1**
Animals which are protected from intentional killing or injuring.	Section 9.1a
Animals which are protected from taking	Section 9.1b
Animals which are protected from possession	**Schedule 5 – Section 9.2**
Animals which are protected from being possessed or controlled (live or dead).	Section 9.2

Animals which are protected from disturbance	**Schedule 5 – Section 9.4**
Animals which are protected from intentional damage or destruction to any structure or place used for shelter or protection.	Section 9.4a
Animals which are protected from intentional disturbance while occupying a structure or place used for shelter or protection.	Section 9.4b
Animals which are protected from their access to any structure or place which they use for shelter or protection being obstructed.	Section 9.4c

Animals which are protected from sale	**Schedule 5 – Section 9.5**
Animals which are protected from being sold, offered for sale or being held or transported for sale either live or dead, whole or part.	Section 9.5a
Animals which are protected from being published or advertised as being for sale.	Section 9.5b

Marine Management Organisation licensing advice

The Marine Management Organisation (**MMO)** state in their licensing advice (Marine Licensing Guidance No.5 Wildlife License Guidance February 2011 (version v0.2MR210111) under advice and guidance covering zero to 12 nautical miles that:-
[It is an offence....] To kill, injure, take, damage or obstruct place of shelter or breeding or to disturb while occupying that place.

The MMO have also introduced a ban on the use of flash photography when working under license which has been in force since September 2010. This was put in under the precautionary principle (a European ruling, enforced in law) after consultation with Natural England following a submission by The Seahorse Trust following concerns about the welfare of wild Seahorses and the activities of a few underwater photographers.
This concern was prompted by the trust after one of its study animals vanished after a number of photographs had been taken during 2010. These pictures were shown on a public website showing the animal in a great deal of stress with dilated eyes, stressed body posture and discolouration associated with stress.
It should be noted that due to a large number of losses in captivity flash photography is banned in responsible public aquaria throughout the world.

English and Welsh Seahorses are also protected under:-

OSPAR List of threatened and/or Declining species and habitats 2008

United Kingdom Biodiversity Action Plan

Bern Convention A2

CITES moved from Annex D to Annex B

Studland Bay as a case study:

The seahorses at Studland Bay should have been swinging by their tails in excitement after their inclusion under the W and C Act. Suddenly the Seagrass they live in should have been protected and their very fragile home should be safe from the onslaught of up to 350 boats dropping anchors on their small bay every weekend and the existence of 51 illegal moorings which scour the seabed clean through poor design.

But as is always the case the interpretation and implementation of the law is very different from reality when reading the small print. It is being argued that it has to be shown that the damage is intentional. Dropping a huge anchor onto fragile seagrass and allowing it to drag through, uprooting the seagrass and killing it is not deemed as intentional even if the perpetrator knows about the existence of the Seahorses or the seagrass below them.

The Seahorse Trust and others are at present in talks with Natural England, Crown Estates, MMO and others with regard to the status of Seahorses and the potential damage and loss of Seahorse habitat due to development projects and the situation at Studland Bay.

Natural England had 6 years to be prepared for the legislation to come into place but it appears the full implications of the law were not thought through and they appear to be at a loss as to how to deal with the situation. We hope by working together this situation can be overcome, particularly as there are a number of developments that have been undertaken since the change in the law, and many being planned for the near future that can and will affect seahorses and other species.

An example of this is the development in Brixham Harbour; which the trust was not against on the grounds of what was there was far more polluting than what has since been built. Prior to building the development was stopped so a survey could be done on the area. The Seahorse Trust was consulted on what sort of survey would be deemed correct for this site but sadly due to cost considerations not the law they did a minimal survey that was wholly inadequate which did not find Seahorses.

Based on this low cost survey, permission was given to continue on the grounds that because Seahorses were not found then they did not exist there. Our survey has shown quite the reverse and if a full survey had been done properly then they would have been found.

We were not against the building of the new fish quay for the reasons stated, but the point is that an inefficient survey was done due to cost restraints.

Another example was the proposed redevelopment of the harbour in Penzance in Cornwall. Again a survey was carried out with very limited funds by surveyors who did not have experience with seahorse surveying. Because it was done in the winter when the seahorses had migrated into deeper water then the seahorses were not there. The method of the survey also did not allow for the cryptic nature of the species.

In both these cases, the finance been in place, a full indepth survey would have been carried out at the correct time of the year which would have given an accurate picture of the Seahorse populations in both those areas.

All in all we are still highly elated that the protection has come into place but now the hard work needs to start and that is to put into place industry standard guidelines for those that commercially survey and to ensure in multiuse areas that the seahorses and their habitats are fully protected from destruction. With this in mind the trust is in talks with MMO and others to look into this and the best ways of achieving the best results for the seahorses and the habitats they occupy.

Statement from Marine Management Organisation

(This appears on The Seahorse Trusts website)

In April 2008 seahorse species, which normally occur in our coastal waters, received full protected under the Wildlife and Countryside Act 1981 (as amended).

This protection means that it is an offence to intentionally or recklessly disturb any seahorse.

Photography and filming of seahorses is likely to cause disturbance particularly if a flash is used and could constitute an offence. The Marine Management Organisation (MMO) can issue licences with certain conditions which authorise the disturbance of seahorses. These licences are normally only issued if there is no satisfactory alternative and if there is conservation, educational or scientific benefit.

A licence is not required if the photography does not cause any disturbance to the seahorses. This could possibly be achieved if the photos are taken without a flash and are taken for only a few seconds ideally taking just one quick image. Subsequent returns to the specific location which are known to contain seahorses are likely to cause disturbance.

In certain circumstances the photography may cause no additional disturbance, for example, if you accidentally caught a seahorse in a crab pot and photographed it this would not be an offence providing no additional disturbance was caused by the photography and every effort was made to re-release the seahorse as soon as practical.

Please contact the MMO for more information about wildlife licences:

Marine Conservation and Enforcement Team
Marine Management Organisation
PO Box 1275
Newcastle upon Tyne
NE99 5BN

Tel: 0191 376 2564/2565
Fax: 0191 376 2681
Email: conservation@marinemanagement.org.uk

The Seahorse Trust feels this statement does not go far enough and does not encompass the full letter of the law and is working with MMO and others to try and tighten this up and to advise on the interactions between divers, fishermen and others to ensure the welfare of seahorses is first and foremost.

Conclusion

Seahorses in the British Isles and Ireland are better understood now than they were 13 years ago when the British Seahorse Survey was started. We have a better idea of the habitat preferences of the 2 species and we better understand their distribution, behaviour and migratory patterns, how temperature and day length affect them over a yearly cycle through the effect of storms and how man's influence affects them over shorter and longer periods.

We know for certain through our work and in collaboration with Lucy Woodall, who looked into the DNA of British and European seahorses that there are indeed two species native to the British Isles with both species co-existing due to subtle but important differences in behaviour and slight anatomical variances.

The Spiny Seahorse (*Hippocampus guttulatus*) and the Short Snouted Seahorse (*H.hippocampus*) occupy slightly differing preferences in habitat with the Spiny preferring seagrass and the Short Snouted a wide variety of other habitats and it is the subtle design of their snouts which allows them to target food items in different ways. The Spiny Seahorse has a longer snout that can probe between narrow gaps in seagrass whereas the Short Snouted Seahorse has a wider shorter snout that is more suited to open areas; this is reflected in their habitat preference (see page 28).

We now know for certain they are resident in our waters and breeding. The assumption based on the National Seahorse Database with in excess of 650 sightings, reported and confirmed and a number of other anecdotal sightings, is that the population although not very common is indeed stable and hopefully subject to no marine or environmental disasters will remain so. The implementation of the proposed marine reserves throughout England will be vital in securing their future along with a number of other sensitive species.

In these times of global warming doom and gloom scenarios it is refreshing to see an exotic, tropical looking animal that is not here because of the global warming but because it has always been a resident here;. There has been a long association of Seahorses and the British isles; they were even recorded by the Picts on their stone carvings during their reign in Scotland during the 3rd to 5th centuries and there is no reason not to surmise that they have been resident even longer.

The increased knowledge gained by the survey has allowed us to target areas of known populations to gain a better understanding of them and as the survey continues we will break down some of the barriers and gaps in our knowledge. The very longevity of the survey is helping to build a unique picture of these very unique highly specialised animals.

The knowledge has only been gained by the kindness of others giving up their free time to search for the seahorses and with better promotion of the survey via the internet and the media we will get more volunteers helping us in our work, showing citizen science works and it is possible for non-scientists and scientists alike to make a substantial difference.

Even with the knowledge we have after 13 years of the survey there is still an even greater need for more knowledge. As the survey goes on into its 14th year and beyond we will be adding to the National Seahorse Database so we can get a greater understanding of one of the British Isles must elusive but enigmatic species; whose future will hopefully remain a positive one.

Through collective involvement with various individuals, organisations and partners The Seahorse Trust got both species fully protected under the Wildlife and Countryside Act and they got the use of flash photography banned because it is known to harm Seahorses.

With the forthcoming proposed Marine Conservation Zones, that the trust has contributed extensively to the future appears to be better. Not only is this for Seahorses but many of our other marine species, however it will require collective work to push this through and enforcement that is effective.

We have a greater understanding of the movement of Seahorses yearly and seasonally and now the proof that they are indeed indigenous and breeding in our waters. The knowledge of seahorses is far greater now and we have shown that territories are established seasonally solely for breeding purposes. Juveniles are tolerated as long as they are not in breeding condition. At this stage we do not know whether seahorse's pair beyond a seasons and ongoing work is needed to look into this.
The migratory movement and patterns are influenced by longer day length and increased seasonal temperatures.

We have scratched the surface in our understanding of seahorses in the wild in the British Isles and by working with colleagues around the world we will gain a greater understanding of this very unusual enigmatic little 'horse of the sea'

Thanks to:

The survey has not been possible without the input of so many people all around the British Isles from fishermen, divers and to beach walkers and rock poolers. It is very difficult to name all of the people who have helped to make the survey a success but listed below are a few who deserve mentioning; in particular the estate of the late Betty Van Pepperzeel whose timely bequest to us gave us the much needed financial boost to push the survey on and to Sylvette Péplowski of WWF who has been a great supporter of the survey for many years.

With many thanks to all who have helped the survey especially:

John Newman
Rebecca MacDonald
Shane Benzie
Kim Maidment
Eva Durrant
Jonny Aird
Paul Lott

We would also like to thank others who have helped directly or indirectly with our work especially:

Dr David Gibson National Marine Aquarium
Dr Ken Collins
Robin James Weymouth SEALIFE Centre
Julie Hatcher
Dr Paul Camilieri, Malta
Lucy Woodall (DNA identification project)
Susanna Morgan (picts)
Dr Lin Baldock
Natural England
Jenny Mallinson
Dan Davies
Steve Trewhella
Sue Daly
Maria McGlenn (Spanish tagging project)
Dragon search www.reefwatch.sn.au
Mike Markey
Neil Wellum and staff of the Marine Management Organization
Dr Heather Koldewey, Zoological Society of London
Professor Amanda Vincent, Project Seahorse

Without the kind funding of so many individuals and organisations we could not achieve our work and we would like to offer our sincere thanks to them all and those that wish to remain anonymous:

Heritage Lottery Fund
SEALIFE Aquariums
Garfield Weston Foundation
Seahorse Ireland
Purbeck Natural Club
Lincolnshire wildlife Trust
Pearson Books
Kaleidoscope Koi
National Marine Aquarium
WWF
James Gibson Trust
Salisbury Cathedral School
Calderglen Zoo
Queens Gate Junior School
Dorset Open Water Club
Aigal Outdoor Wear

Web design and maintenance

GLS Solutions http://www.gslsolutions.co.uk/

And to the many others individuals and organisations too numerous to mention

The Seahorse Trust
British Seahorse Survey
National Seahorse Database
Studland Seahorse Tagging Project
c/o The Seahorse Trust.
Escot Park
Escot.
Devon.
EX11 1LU.

Tel: 01404 822373

e-mail info@theseahorsetrust.org
web: www.britishseahorsesurvey.org
web: www.theseahorsetrust.org