

Seahorse numbers from
1821 to 2019 from the British
Seahorse Survey (BSS) for
Hippocampus hippocampus
and *Hippocampus guttulatus*
and their context to global
warming



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Seahorse numbers from 1821 to 2019 from the British Seahorse Survey (BSS) for *Hippocampus hippocampus* and *Hippocampus guttulatus* and their context to global warming

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Introduction

Since 2008, both species of seahorse native to the UK, the Spiny (*Hippocampus guttulatus*) and Short Snouted (*Hippocampus hippocampus*), have been formally accepted as indigenous to the British Isles; and since the 6th of April 2008 they have received full protection in British law under the Wildlife and Countryside Act.

Prior to this period both species were considered to be occasional visitors to our shores. However work by The Seahorse Trust through its British Seahorse Survey has shown that this is not the case and seahorses have always been native to our waters.

The stunning artwork of the Roman jewellery found in the Staffordshire Hoard (6th and 7th century) and the stylised carved pillars of the Pictish tribes (3rd to 4th centuries) show seahorses dating back many centuries in the British Isles but for some reason they seemed to go out of public thinking as a native species and have been considered warm water, seagrass specialists ever since, which for such a complicated fish like this could not be further from the truth.

In this report we set out to show that although Global warming is devastating our planet and warming our seas. It is not the reason why we have so many more seahorse sightings in recent years. It is crucial that misinformation does not reduce or water down the devastating effects of global warming to our planet by undermining the serious message that action has to be taken now.



Short Snouted Seahorse
Hippocampus hippocampus
Found and photographed by Sue
Daly of Jersey
(Picture copyright Sue Daly)
Picture 1

British Seahorses

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.

Their range is from the northernmost Shetland Isles down (predominantly) the western coastline; including 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; 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 found in most of the estuaries of the UK and even up into fresh water in rivers such as the Thames, Tamar and Dart and it is 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 habitat.

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) 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.



Short Snouted Seahorse
(*Hippocampus hippocampus*)
Picture 2 (left)

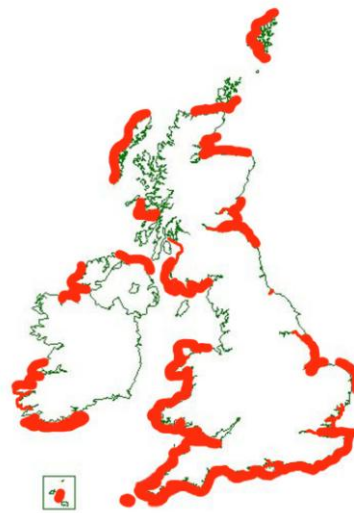


Spiny Seahorse
(*Hippocampus guttulatus*)
Picture 3 (right)



Distribution of *Hippocampus hippocampus* throughout the British Isles

Map 1



Distribution of *Hippocampus guttulatus* throughout the British Isles

Map 2

The distribution shown above 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.

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. (See fig 1 above)

Although having worked with seahorses for many years (44) the author, like so many others, thought that 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. 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.

As a result of this, the **BSS** was undertaken in 1994 (now the World Seahorse Survey **WSS**) and is the longest running and largest seahorse database of its kind in the world.

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

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)

Confirmation of native seahorses

All stages of the life cycle of seahorses have been found throughout 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. 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, showing 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 fry at a time.

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

Seahorses in antiquity

During research for the British Seahorse Survey the author came across two fascinating reports, one of seahorses on carved stones in Pictish times, and the other of gold brooches found in the Roman jewellery of the Staffordshire Hoard

(<https://www.staffordshirehoard.org.uk/>)

The stunning artwork of the Roman jewellery found in the Staffordshire Hoard and the stylised carved pillars of the Pictish tribes show seahorses dating back many centuries in the British Isles. Both finds show features in the artwork that could only have been derived from observing live or recently dead seahorses; features such as the small fins on the body.

Staffordshire Hoard

This amazing find of Roman jewellery, known as the Staffordshire Hoard is the largest hoard of Anglo-Saxon gold and silver metalwork yet found. It consists of over 3,500 items, amounting to a total of 5.1 kg of gold, 1.4 kg of silver and some 3,500 pieces of garnet cloisonné jewellery.



Seahorse Brooch in the Staffordshire Hoard

Picture courtesy and copyright of the Birmingham Museum

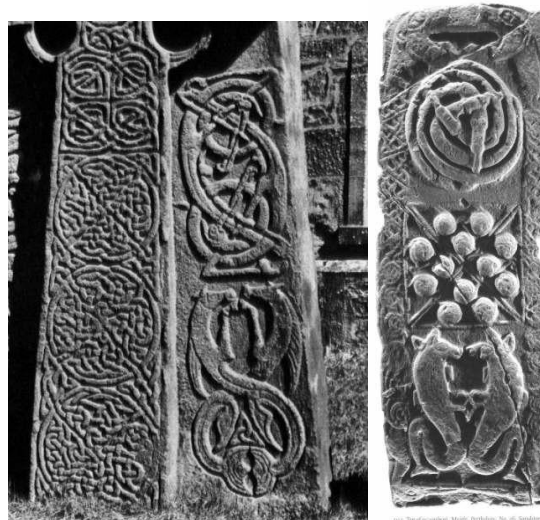
Picture 4

The Seahorse Trust was asked to advise on this piece in the collection; it is thought to be a stylised seahorse which shows unique features found only on a seahorse, such as the dorsal fin, small rings that make up the bony body of the seahorse, a large eye at the top side of the head and a long snout with possible mouth at the end of it.

Pictish Stone carvings

In 2005 The Seahorse Trust advised on another unique antiquity and that was the stone carvings from the Pictish times. They are from 'The Art of the Picts' by G and I Henderson, publ. Thames and Hudson 2004 and in it he talks about seahorses as symbols of guardianship and protection.

Like the Staffordshire hoard, some of the features in the carvings could only have been taken from an alive or a recently dead seahorse, such as the tiny ventral fin under the belly or features like the prehensile tail.



Pictish carvings

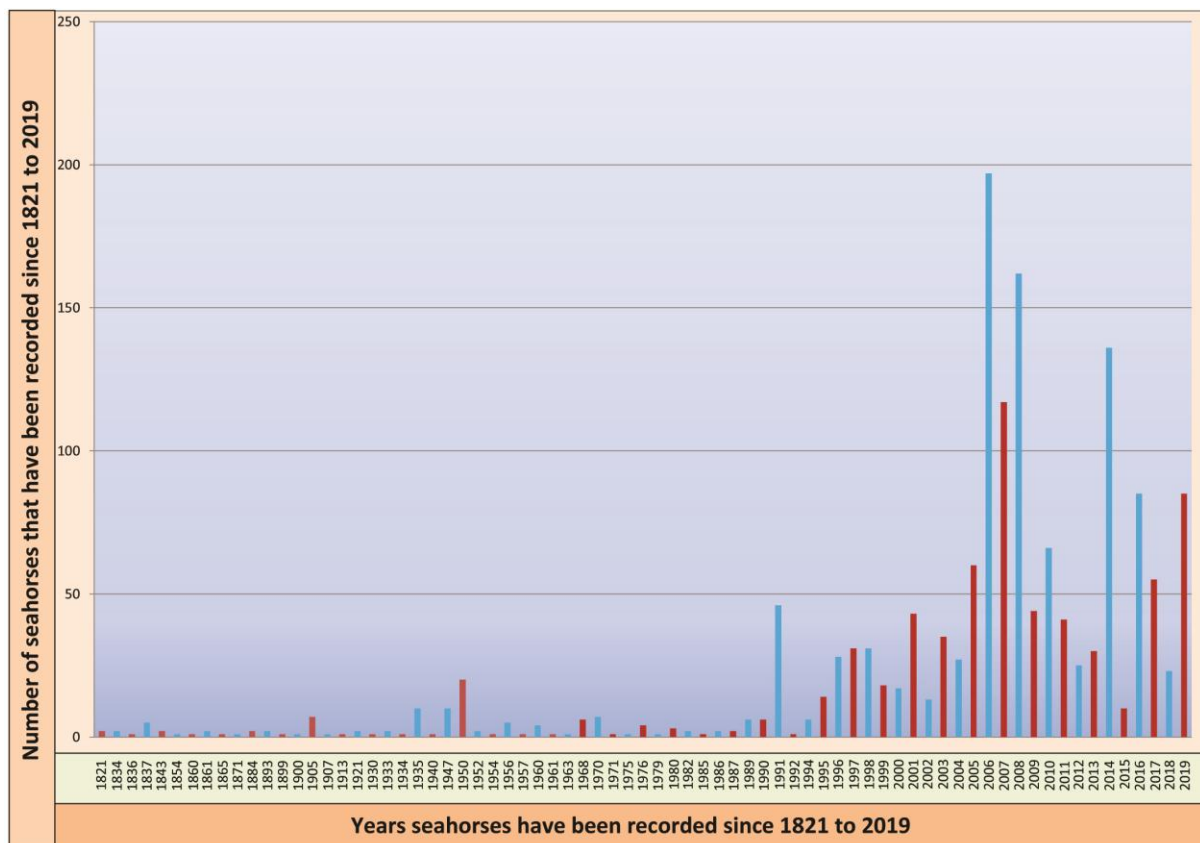
Copyright 'The Art of the Picts' by G and I Henderson

Picture 5, 6 and 7

Seahorse numbers from 1821 until 1990

During the period 1821 to 1990, seahorse numbers were relatively stable at approximately 1 to 4 per annum for the years we have evidence for and recorded (average of 2.92 per annum). This does not mean there were not equal numbers of seahorses, as we have from 1990 until 2019, present in UK waters. It just means that the numbers recorded and the numbers of people deliberately looking for seahorses were less than those in the 1990 until 2019 period. We are very aware there are seahorse records we do not have for this period, however the search for records has been intense and we now hope to have most records from during this time.

The advent of easily accessible SCUBA equipment and many more divers in the water, coupled with an increase in publicity about seahorses by The Seahorse Trust and others; also the acceptance that seahorses are indeed native to our shores has meant that seahorses have been accepted as a native genus and so more people are looking for them.



Figures for seahorses since 1821 to 2019

Graph 1

Note in the graph above, the steep incline in sightings from 1990 until 2019 is a direct result of intense publicity by The Seahorse Trust and others.

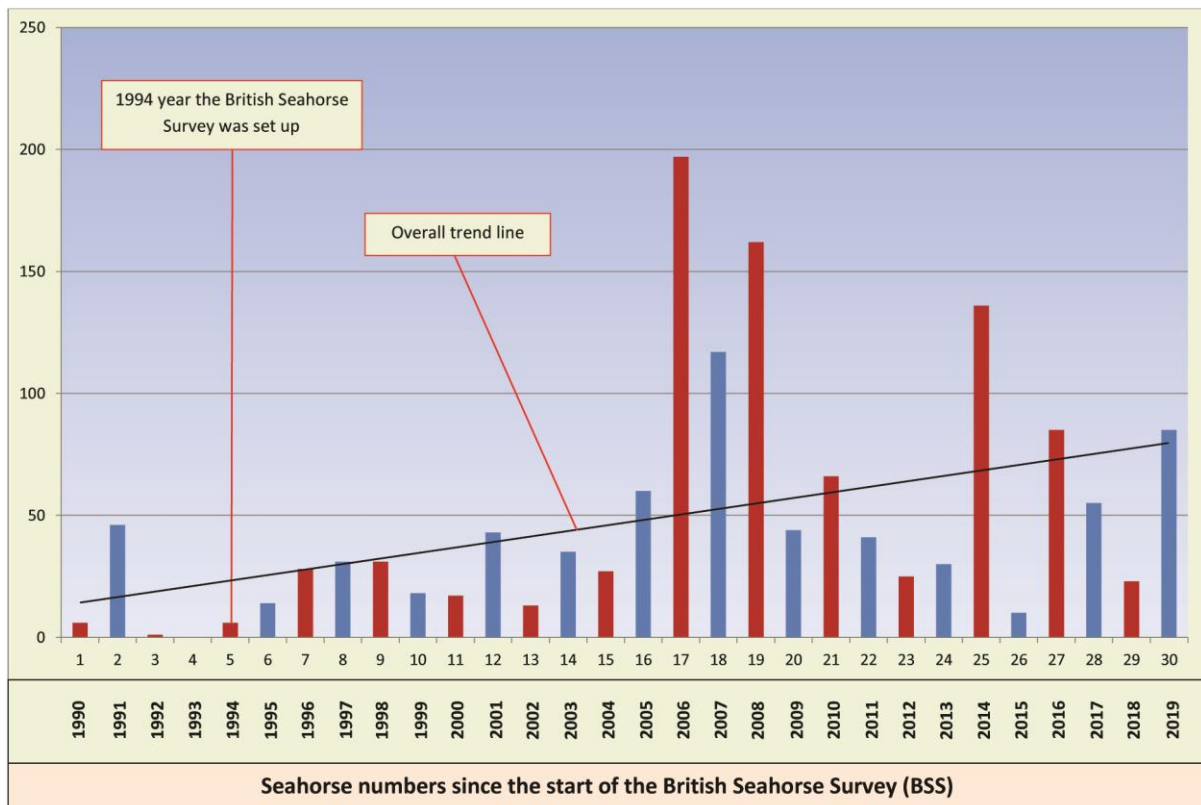
Seahorse numbers from 1990 until 2019

There are approximately 1,950 sightings recorded for the UK from 1821 to present but for the purposes of this report we have only used approximately 1,590. The ones left out of the report lack various details, and so it was thought best to exclude them to give a more accurate picture of the situation of seahorses in the British Isles.

It is generally suggested that for every seahorse seen it is thought that there are at least 10 others in the area, and this might indeed be true but it would depend on the location, habitat and time of the year. Although this is accepted as a possibility, it is not a good way of getting a population density for any area.

Prior to setting up the BSS in 1994, numbers were reasonably static, the increase appears to be directly correlated to the increase in publicity and public awareness of seahorses being a native species. This could also be linked to an increase in divers and fishermen looking for them, which has a direct correlation with the publicity generated.

From 1990 until 2019 there has been an average of 48.40 sightings per annum. Some years were much higher and others much lower than the average. However each time there is publicity, the numbers rise.



Figures for seahorses since the start of the British Seahorse Survey in 1994

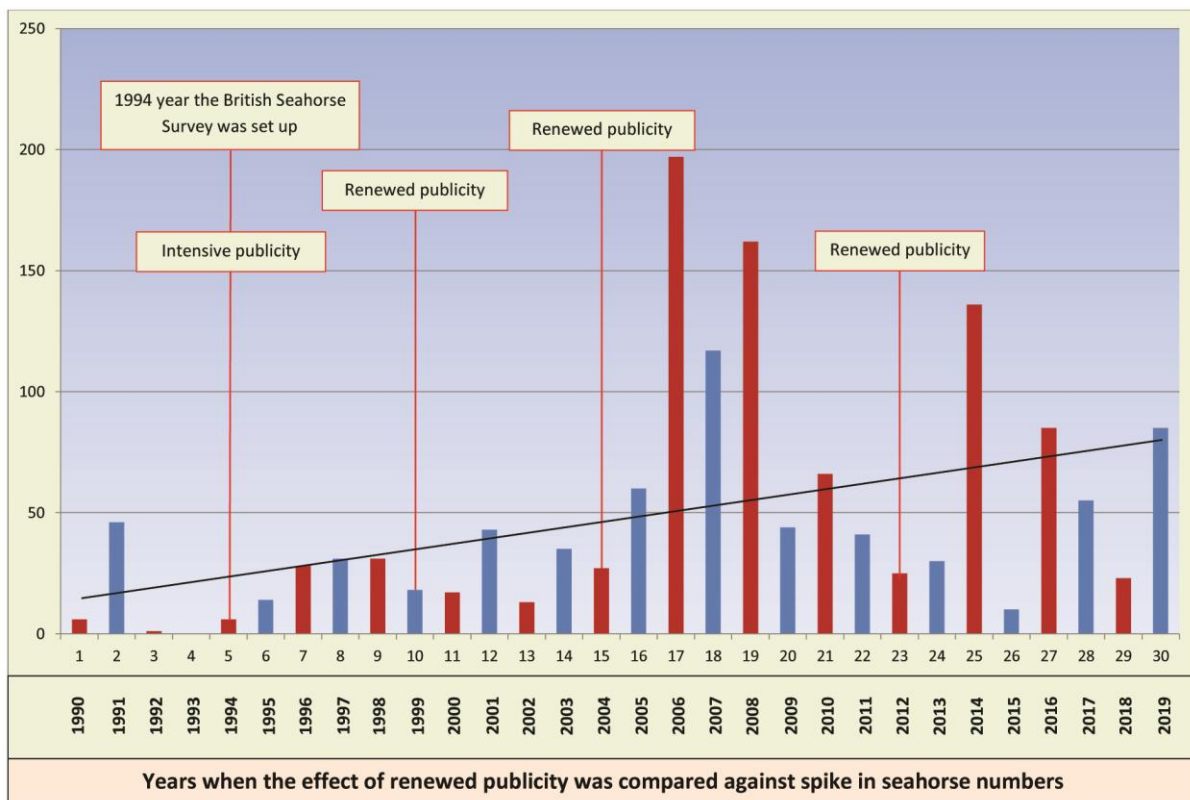
Graph 2

Publicity range

Seahorses hold a fascination for so many people and the work of The Seahorse Trust has shown that seahorses are held in an almost mythical status by many. They truly are creatures of myth, legend and fairy tale. However the real animal is equally as fascinating and whenever the trust puts out publicity about its work, or about seahorses in general then there is an upsurge in seahorse sightings and reports coming into us through the BSS. Interestingly these sightings are not just contemporary; some of them date back decades. These historical sightings are equally as valuable to us as the more contemporary ones but they are fewer in number than the more recent ones.

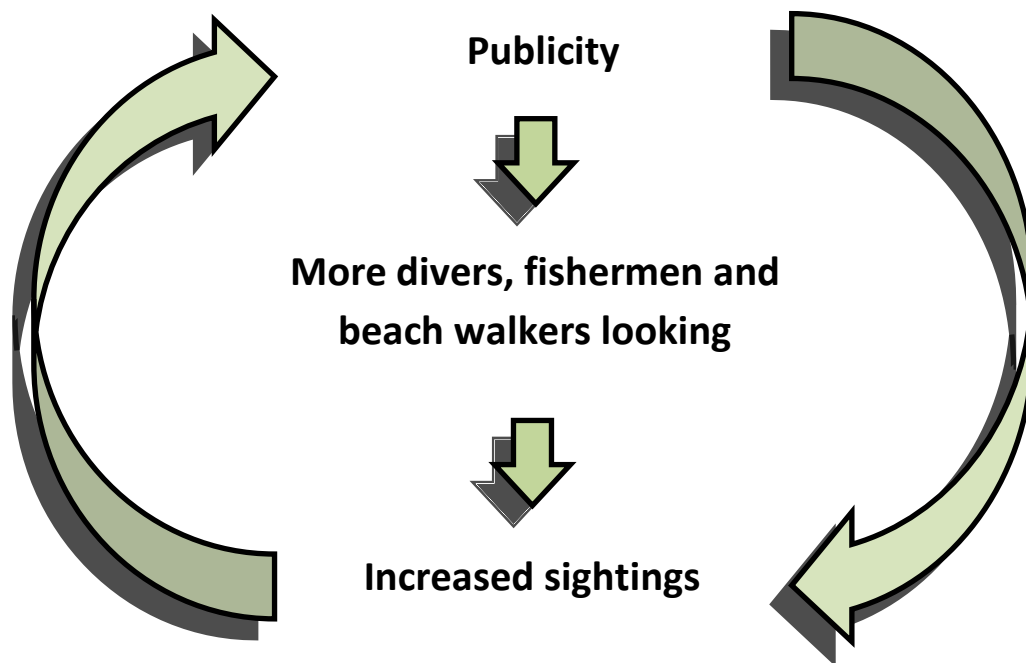
As can be seen by graph 3 below, each and every time we have a major spike in publicity, especially on the TV, it results in an increase in seahorse sightings.

These peaks in sightings and records have increased each time there is a spike, as public knowledge builds on previous communications in the media, and so the overall number of sightings and records is increasing, Having said that, since a peak in 2006, overall numbers have been dropping on average. If they were increasing and moving north due to global warming, this would not be happening.



Figures for seahorses from 1990 compared with spikes in media coverage

Graph 3



Average sea temperatures and seahorses

Average sea temperatures (in particular surface temperatures) have without a doubt risen since 1980, and are starting to increase rapidly from 1980 to 1990 onwards, but this rise is only 0.5 of a degree from 1980 until 2010.

From 1950 to 1980 it was below the 1971 to 2000 average, and after 1980 it has gone above this average, increasing in a steady but definite upward trajectory.

From 2010 until 2020 it has also risen another 0.4 (on average) of a degree but as can be seen in graph three, seahorse numbers have on average dropped during this time.

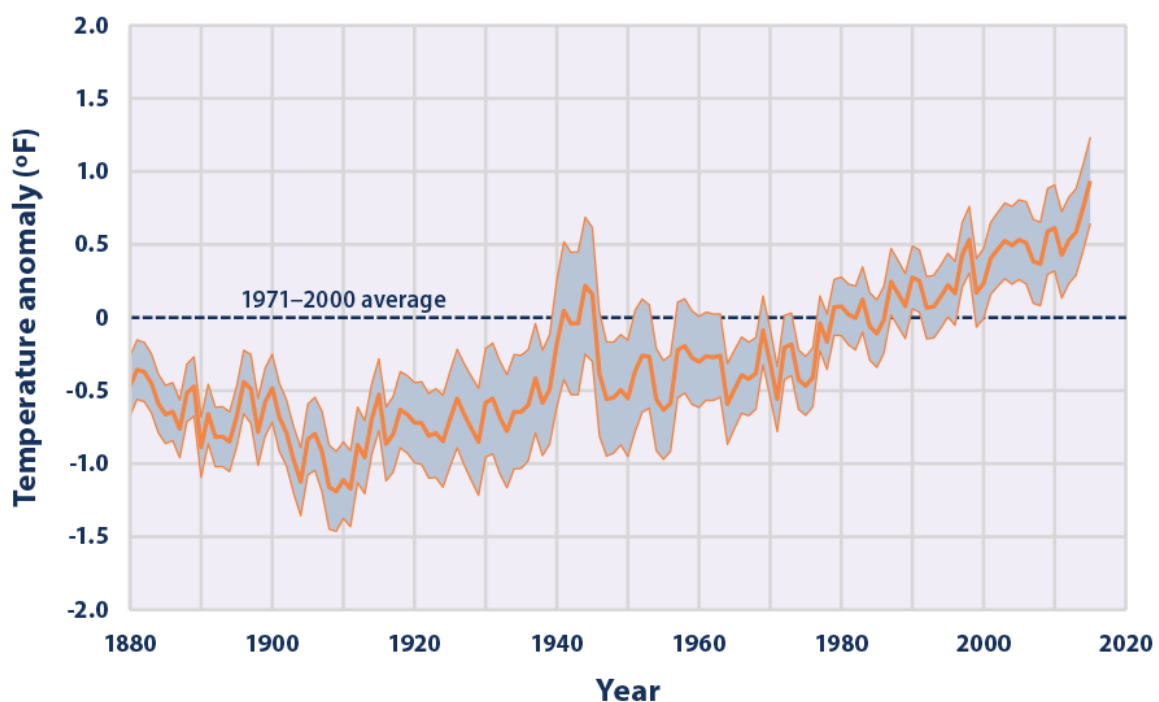
There does not seem to be a direct correlation between sea temperatures and an increase in seahorse numbers as the sea temperature rise has been steady, whereas the sightings of seahorses goes up and down. This is due to a direct link to publicity and the increase in seahorse sightings as shown in graph 3.

Seahorses during the warmer months of the year tend to be in relatively shallow water, especially the Spiny Seahorse (*Hippocampus guttulatus*) which can range from 1 metre below low water mark to 10 metres below low water mark. These shallow areas heat up in the warmth of the summer and areas like Studland Bay are known to have temperature ranges from 6 degrees in the winter to 21 in the summer, as recorded during the Studland Seahorse Project (2008 until present).

This is quite a range in temperature but what drives the seahorses into the shallow water is habitat for breeding, and crucially food items such as small shrimp and plankton. Like all seahorses the 2 native species can adapt to a range of temperatures and indeed during the winter they go to deeper water where temperatures can remain stable at 3 to 4 degrees.

Being highly adaptable is part of the success of seahorses as a species and the author is convinced that larger numbers of seahorses will move into Scandinavian countries as average sea temperatures start to rise in the future. There have already been sightings of seahorses in the Baltic and east of the North Sea. Whether these are from resident populations can only be speculated on because of the low numbers of sightings. If the habitat and food is there, then there is no reason why seahorses cannot occupy these waters in larger numbers than we know of.

At present though, there is no evidence that seahorses are moving northwards as sea temperatures increase, and it is wrong to suggest otherwise until proven one way or the other.



Average sea surface temperature from 1880 until 2020

Courtesy of the United States Protection Agency

Graph 4

<https://www.epa.gov/climate-indicators/climate-change-indicators-sea-surface-temperature>

Global warming

Global warming is a very serious and real threat to our planet and the species on it and the future of mankind is in doubt if we do not rapidly something do about it. Time is running out and we have probably only ten years before it is irreversible. Without a doubt it is leading to sea level rises, global catastrophes, increases in wind speeds; and as we chop down all the forests, storms the likes of which have never seen before in the history of mankind, in particular super storms on a regular basis.

We ignore global warming at our peril, however global warming is being used in so many false or misleading contexts; this is weakening the real argument of global warming being a threat to our planet. This gives climate change deniers arguments to support their false unsubstantiated claims, which in turn are slowing world-wide actions to do something about it.

One link that is totally incorrect is the increase in seahorse numbers and their migration northwards in the UK being linked to global warming. There is zero evidence to support this and the reports that have been put out previously have been based on a tiny handful of records and a lot of speculation. Our evidence shows otherwise.

Marine fishes, seabirds and marine mammals all face very high risks from increasing temperatures, including high levels of mortalities, loss of breeding grounds and mass movements, as species search for favourable environmental conditions. Coral reefs are also affected by increasing temperatures which cause coral bleaching and increase their risk of mortality.

However if we misreport the facts that state seahorse numbers are increasing because of global warming (or other incidences that are not supported by fact) then we weaken the overall argument for global warming as a devastating event to all life on planet Earth.

Eventually it might be the case that seahorses do move further northwards through Scandinavia in large numbers as sea temperatures rise, the longevity of the BSS will help to highlight the truth, but we urge caution at this stage because it lacks fact and evidence.

We are not saying in this report that global warming should be ignored or not taken seriously; it has to be, with an almost daily urgency to this message, especially its effects on flora and fauna. However, we urge caution in what appears to be a rise in seahorse numbers attributed to global warming and sea temperature rises, when there is in this case another reason for the rise in seahorse numbers, and that is the increase in publicity about the plight of seahorses here in the UK.

Conclusion

The Seahorse Trust, through the work of the **BSS** has proved conclusively that seahorses are a native species to the British Isles and Ireland. In setting up the National Seahorse Database they have proof of native seahorses back until the early 1800's.

However, historical evidence takes this date back even further to the third and fourth centuries through historical artefacts such as the Pictish stones and the Staffordshire Hoard and seahorses have indeed been featured in British art for many hundreds of years.

Seahorses have always lived in our waters as far north as the Shetland Isles and have possibly even benefitted from previous sea warming in the interglacial periods, and so they should always have been considered a native genus to the British Isles and Ireland, there is evidence for it.

The absence of conclusive proof of all the life stages, and the assumption that they were a warm water species had always stopped them being classified as a British species but we showed the evidence and in April 2008 they were officially classified as a British genus afforded the legal protection they required and crucially needed due to man-made pressures on their habitats.

The longevity and size of the BSS has allowed us to understand so much about the genus and its distribution but it can also show us other things such as the connection or not of sea temperature rises and the increase in sea records and migration.

Global warming is a fact, and potentially a devastating one to all life on the planet, and quite rightly a lot of things have been connected to it which is out of the ordinary. However we have to be very careful that misinformation is not generated from this global crisis. The argument for global warming should not be weakened by false information and misrepresenting the facts, which in turn gives climate change deniers false information to support their case.

We are not saying in this report that global warming should be ignored or not taken seriously, quite the reverse; especially its effects on flora and fauna. However, we urge caution that what at first appears to be a rise in seahorse numbers and a migration northwards should be attributed to global warming and sea temperature rises. In reality, there is, in this case another reason for the rise in seahorse numbers.

There are many global warming deniers out there, especially in international governments, so we cannot weaken the important facts and reality of global warming by putting out misleading or false information.

If governments and politicians are to take global warming seriously, the evidence must be based on fact, not speculation, and that fact has to be garnered from long term studies and surveys like the British Seahorse Survey.

Like all studies more long term research is needed and this is crucial in the case of native British Seahorses, even after another.

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>

Captions

Pictures

Picture 1	Short Snouted Seahorse	Sue Daly
Picture 2	Short Snouted Seahorse	Neil Garrick-Maidment
Picture 3	Spiny Seahorse	Neil Garrick-Maidment
Picture 4	Seahorse Brooch in the Staffordshire Hoard	Birmingham Museum
Picture 5	Pictish carvings	'The Art of the Picts' by G and I Henderson
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Maps

Map 1	Distribution of the <i>Hippocampus hippocampus</i>
Map 2	Distribution of the <i>Hippocampus guttulatus</i>

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Save Our Seahorses

<http://www.saveourseahorses.org/home.php>

Staffordshire Hoard

<https://www.staffordshirehoard.org.uk/>