



Cornwall



2021 Annual Report

Marine Strandings in Cornwall and the Isles of Scilly

Report by
Cornwall Wildlife Trust
Marine Strandings Network

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Photo 1: Known bycaught female juvenile common dolphin, 21st October 2021, CEFAS sample boat off The Lizard.

Photo by Emma Neave-Webb

I. Executive Summary

Data on marine organisms that stranded on the shores of Cornwall in 2021 were collected by the Cornwall Wildlife Trust Marine Strandings Network (CWT MSN). All species were recorded in the strandings database held at the Environmental Records Centre for Cornwall and Isles of Scilly (ERCCIS). When possible, most cetaceans, seals, basking sharks and turtles were examined *in situ* and recorded in detail by trained volunteers of the Network.

A total of 207 cetacean strandings were recorded in Cornwall during 2021. As in previous recent years, short-beaked common dolphins (*Delphinus delphis*) represented the majority of cetacean strandings (54%, n=111), followed by harbour porpoises (*Phocoena phocoena*) (11%, n=30). We continue to see a marked difference between the number of common dolphin strandings and harbour porpoise strandings compared with the years before 2016 when the figures were proportionally more similar.

Of the 207 cetacean carcasses that stranded during 2021, 14% (n=28) were suitable and accessible for retrieval by the CWT MSN team for post mortem examination, under licence and on behalf of the DEFRA-funded Cetacean Strandings Investigation Programme (CSIP). Post mortem examinations (PME) concluded that accidental entanglement in fishing gear, known as bycatch, was the cause of death for 36% (n=10) of the cetaceans examined.

114 cetaceans (55% of the 207 total) were examined and recorded *in situ* by MSN volunteers using the BEEP protocol, and photos examined in detail by experienced BEEP assessors within ERCCIS. It was found that 18% of the 114 (n=20) showed features consistent with definite or probable bycatch or entanglement in fishing gear.

Our annual Cetacean Bycatch Report 2021 can be found in Appendix One of this report. The percentage of bycaught or probably bycaught animals in 2021 was 21% of animals assessed by both PME and BEEP, the same as in 2020.

There were 291 seal strandings reported during 2021, the highest number of stranded seals since recording began. Of these 291 seal strandings, 21% (n=62) were males, 14% (n=41) females and 65% (n=188) of unknown gender. Whitecoat pup deaths in June and July correspond with Seal Research Trust (SRT) observations of white coat pups and reflect the outliers for the start of the grey seal pupping season in Cornwall. Seal strandings exceeded the ten-year average in all months apart from August. The reason for this considerable increase is unknown but may be driven by whitecoat and moulted pup deaths. Thanks to collaborative work with the SRT, seal strandings are checked against individual identification of seals in Cornwall. Three matches were made between the SRT and MSN catalogues which are detailed in this report.

35 of the 291 seals reported were retrieved for *post mortem* examination in 2021, representing 12% of seal strandings. Of those examined at *post mortem*, infection and trauma were the leading causes of death. One seal's cause of death was identified as Hepatic amyloidosis. This seal who was entangled and identified by SRT will feature in a peer reviewed paper by James Barnett - J.E.F. Barnett, J.A. Gilbertson, N. Arrow, J. D. Gillmore, P.N. Hawkins, L. Larbalestier, D. Jarvis, S. Sayer and M.E. Wessels (In Press). Hepatic amyloidosis in a chronically entangled grey seal (*Halichoerus grypus*). Journal of Comparative Pathology.

There were no turtle strandings in 2021, the first year since 2010. Other strandings of note include 75 reports of birds including a Manx shearwater and black-throated diver, and 9 reports of sharks.

In 2021, CWT MSN carried out a variety of outreach and engagement work including active social media, and our annual Callout Volunteer training.

2. Introduction

Records of stranded marine organisms have been collected in Cornwall and the Isles of Scilly for many years, the earliest record being from 1354. To date, the Cornwall Wildlife Trust Marine Strandings Network (CWT MSN) database holds over 10,500 records, comprising of data relating to stranded cetaceans (whales, dolphins, and porpoises), seals, turtles, birds, cephalopods, fish (including sharks), seeds, hydrozoa, molluscs, echinoderms, and crustaceans.

The records are shared with several other partner organisations including the Natural History Museum (NHM) which has collated records of all stranded cetaceans in the UK since 1913. In 1990, the NHM began working in collaboration with the Institute of Zoology (IoZ) to research the mortality, biology, and ecology of cetacean populations around the British Isles, under contract to Defra (Department for Environment Food and Rural Affairs). This project, now known as the UK Cetacean Strandings Investigation Programme (CSIP), is currently under the management of the Institute of Zoology, funded by Defra, and contributes to the UK's programme of research on cetaceans and its response to ASCOBANS (the Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas).

The CWT MSN operates under the CSIP licence (granted by Natural England) for the possession and transportation of cetacean carcasses. Over the last 28 years, in response to the increasing number of stranded cetaceans in Cornwall, more detailed data has been collected by the team in Cornwall. Building on over a decade of work by volunteer Strandings Coordinator Stella Turk MBE and other dedicated researchers, a more formal network of volunteer recorders was established by Cornwall Wildlife Trust in 2003. This network was led and developed further by MSN Coordinators Jan and Jeff Loveridge to provide a comprehensive reporting and recording system for strandings, in particular of marine mammals. Rigorous procedures for reporting and recording stranded marine animals were introduced, together with training for volunteers in investigating carcasses to ensure accuracy. In 2012, the co-ordination of the Marine Strandings Network was passed to the Marine Team of the Cornwall Wildlife Trust, with data management provided by the Environmental Records Centre for Cornwall and Isle of Scilly (ERCCIS).

The Marine Strandings Network now consists of a team of approximately 200 trained volunteers throughout Cornwall and the Isles of Scilly who record all reported strandings of organic organisms from over 360 miles of coastline. All MSN volunteers are given detailed training to ensure accurate and consistent data collection and are continually supported by CWT staff. Detailed reports and photographs are obtained where possible, as well as some tissue samples on occasion for analysis by various partner organisations. The data and photographs collected by MSN volunteers are then verified and assessed by experienced experts following the Bycatch Evidence Evaluation Protocol methods developed by CWT MSN. Analysis of the data collected by the CWT MSN and partners is ongoing.

The CWT MSN has a dedicated Strandings Hotline telephone number (0345 201 2626), for the reporting of dead stranded marine animals. The Hotline number operates year-round and is staffed by a rota of dedicated volunteer Hotline Coordinators. Carcasses reported to CWT MSN are either examined *in-situ* by trained volunteers, or via post mortem examination by a veterinary pathologist under the *aegis* of the Defra-funded Cetacean Strandings Investigation Programme (CSIP).

For more information about the protocols and methods which are used for the Marine Strandings Network please contact strandings@cornwallwildlifetrust.org.uk.

3. Strandings in 2021

3.1 Cetaceans

A total of 207 cetacean strandings were recorded in Cornwall during 2021. As in previous recent years, short-beaked common dolphins (*Delphinus delphis*) represented the majority of strandings (54%, n=111), followed by harbour porpoises (*Phocoena phocoena*) (11%, n=30) (Figure 1). The number of harbour porpoise strandings has risen slightly in 2021 (n=30) compared with 2020 (n = 24 - please see previous MSN reports for detail). Due to decomposition, 34 stranded cetaceans could not be identified to species level.

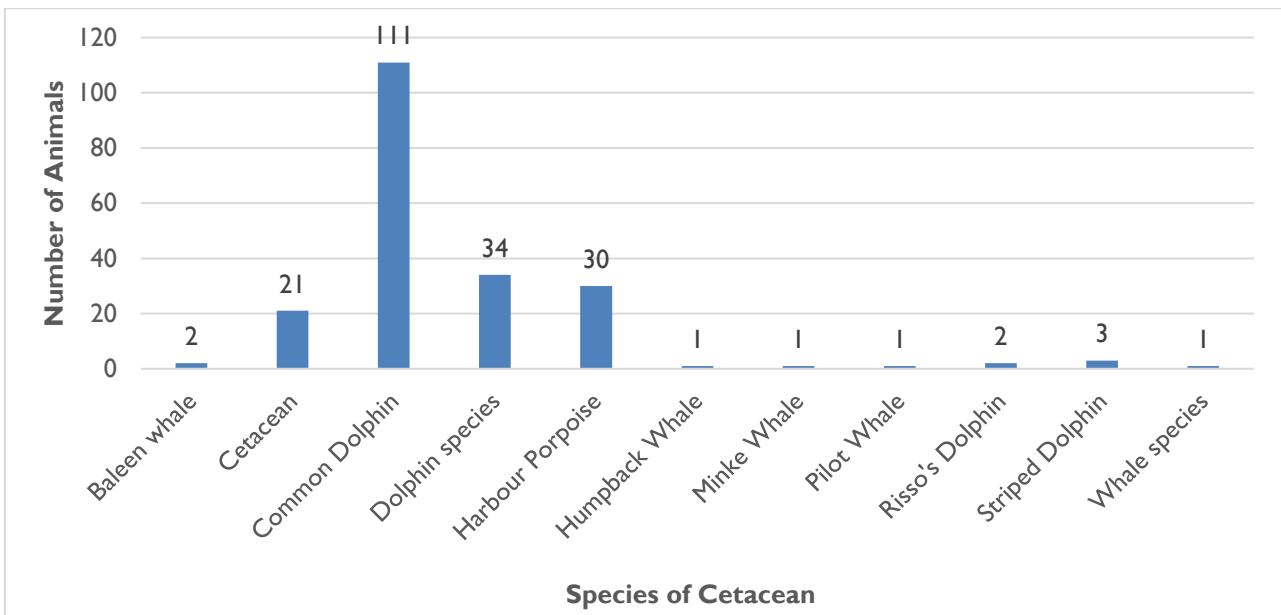


Figure 1: Number of cetacean strandings by species during 2021

There were a significantly lower number of strandings in June and July 2021, with only 3 carcasses recorded over the two calendar months. The highest numbers of strandings were recorded in March 2021 (Figure 2).

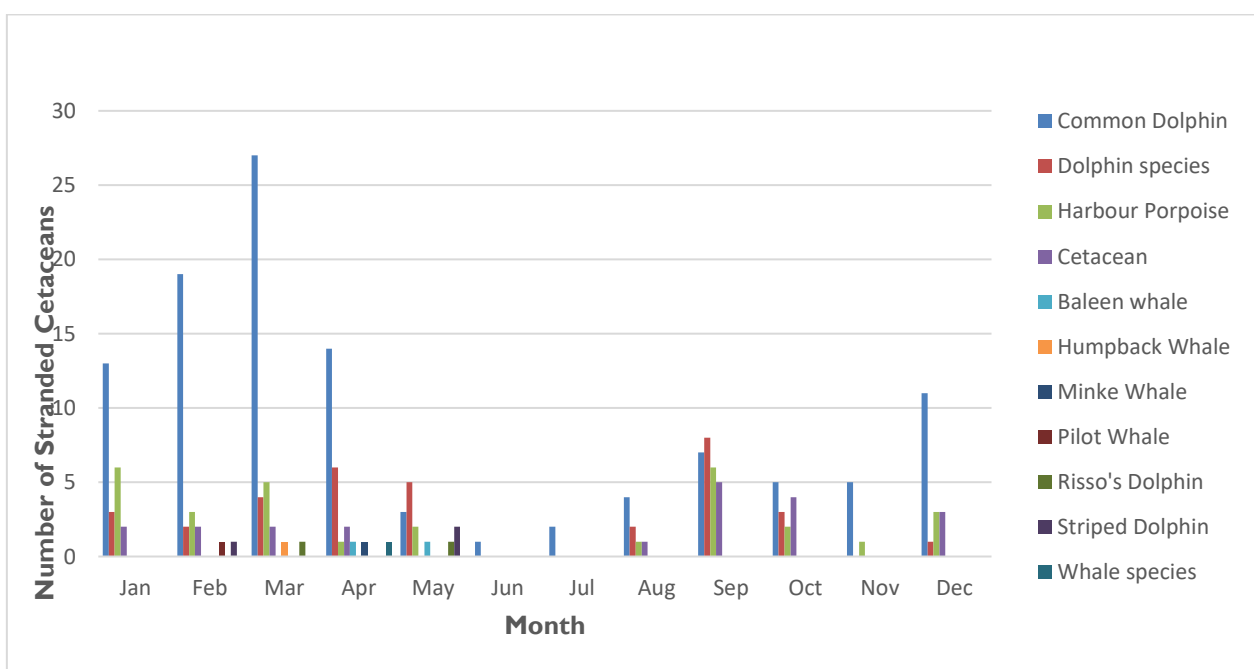


Figure 2: Cetacean strandings by species/month during 2021

Figure 3 shows the locations of all cetacean strandings in 2021 and highlights the geographical spread of cetacean strandings during this year.

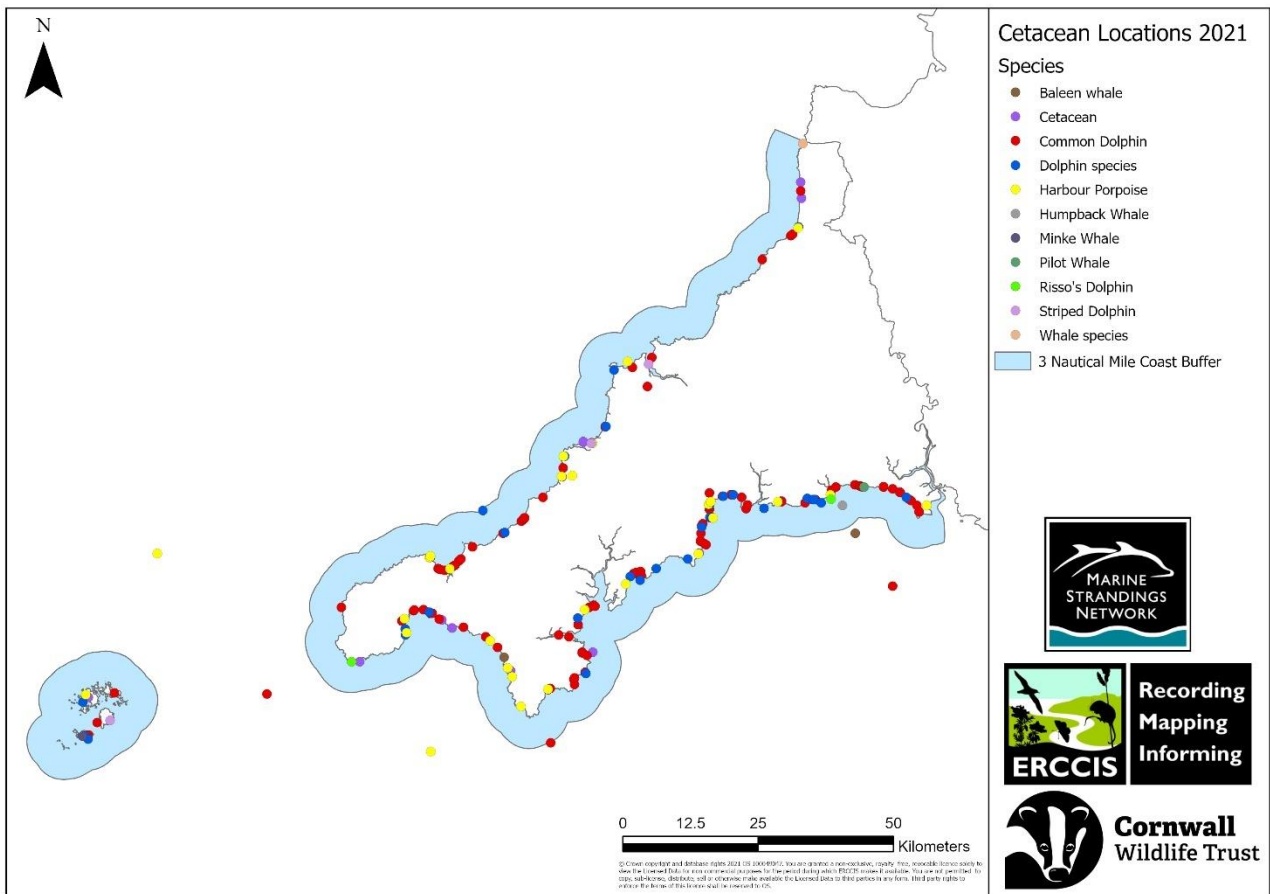


Figure 3: Locations of cetacean strandings in 2021 (n=207)



Photo 2: Female juvenile harbour porpoise at Tolcarne Beach, Newquay January 2021. Photo by Emma Louise Gallagher

3.1.1 Comparison with previous years

In total, 207 cetaceans were reported to and examined by CWT MSN in 2021, which is a slight increase from the numbers seen in 2020 (n=202), but similar to the numbers seen over the past six years (Figure 4). Overall, the numbers of cetacean strandings in 2021 remain higher than the average number of cetacean strandings from the last 27 years (n=131). 2021 cetacean stranding numbers were higher than the monthly average from February through to May, and in September and October (Figure 5).

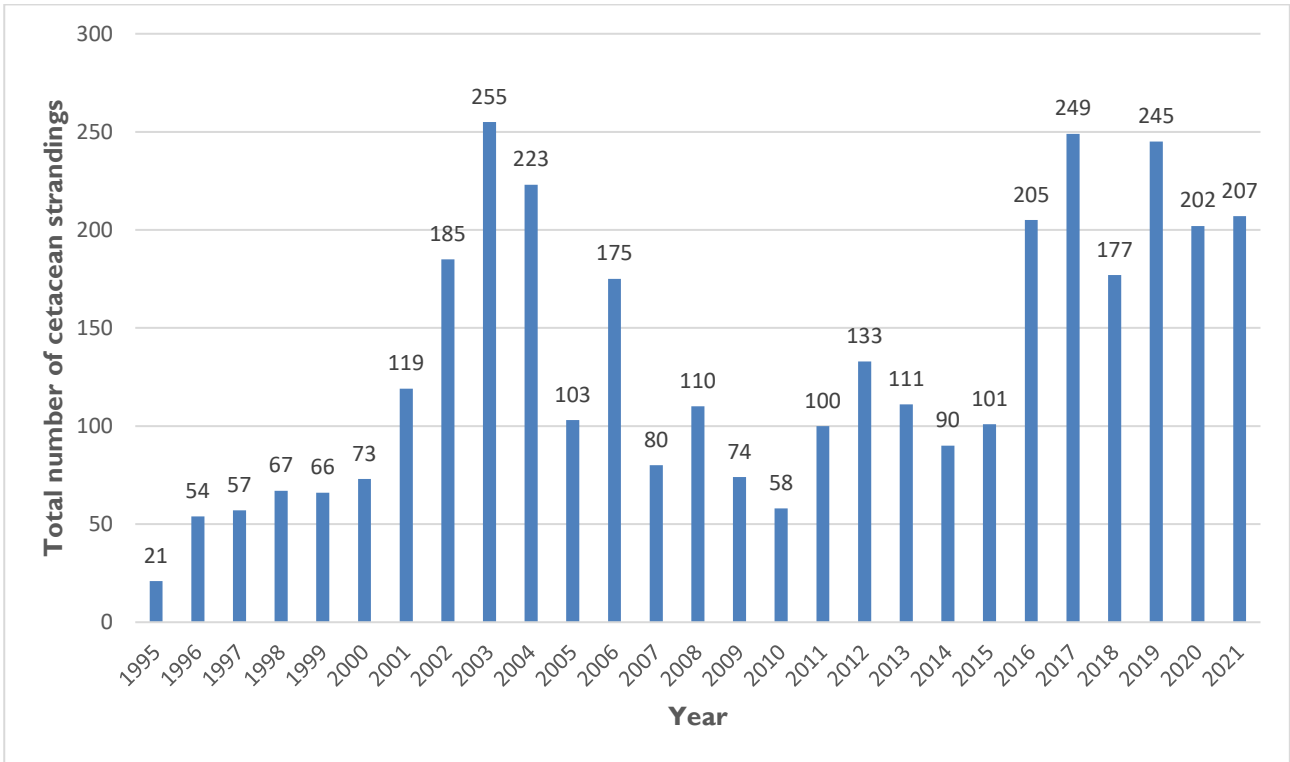


Figure 4: Comparison of cetacean strandings by year (1995 to 2021)

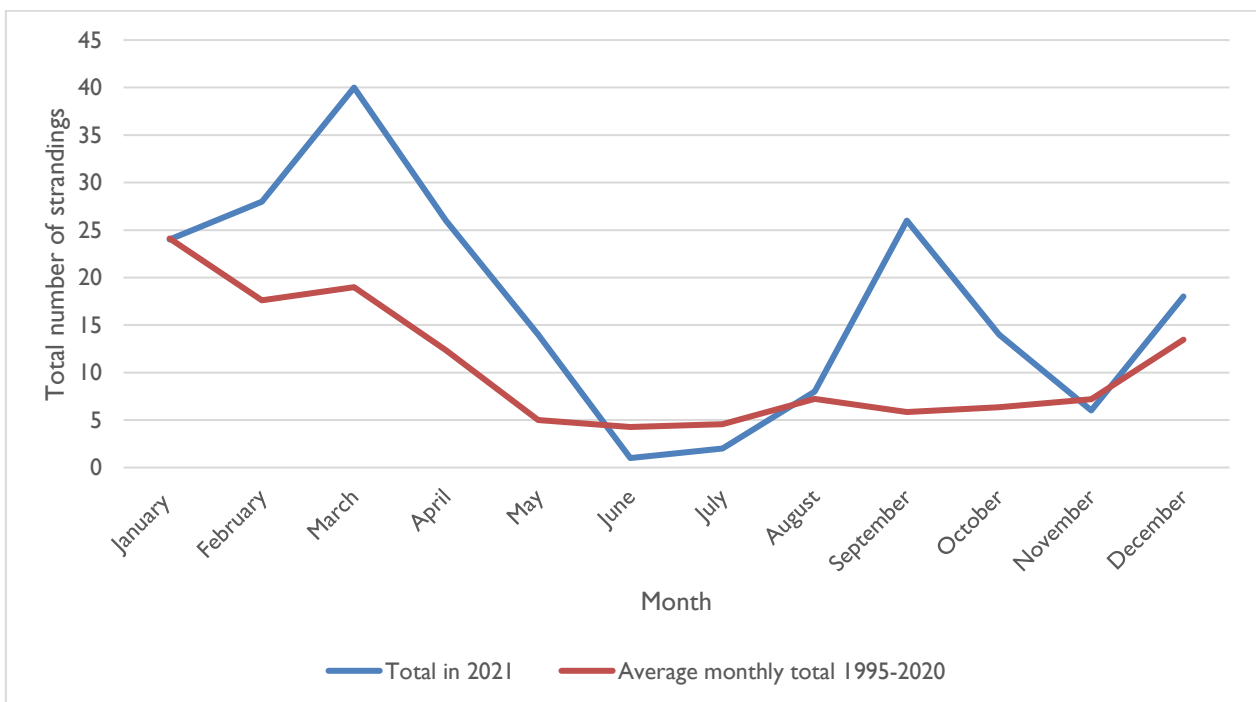


Figure 5: Seasonality of cetacean strandings for 2021, in comparison to average seasonality between 1995 and 2020

Common dolphins and harbour porpoise are the most reported cetacean species to MSN. 2021 was again a notable year for a high number of short beaked common dolphin strandings in Cornwall and the Isles of Scilly (Figure 6). Since 2016 common dolphin strandings numbers have been more than double that of harbour porpoise.

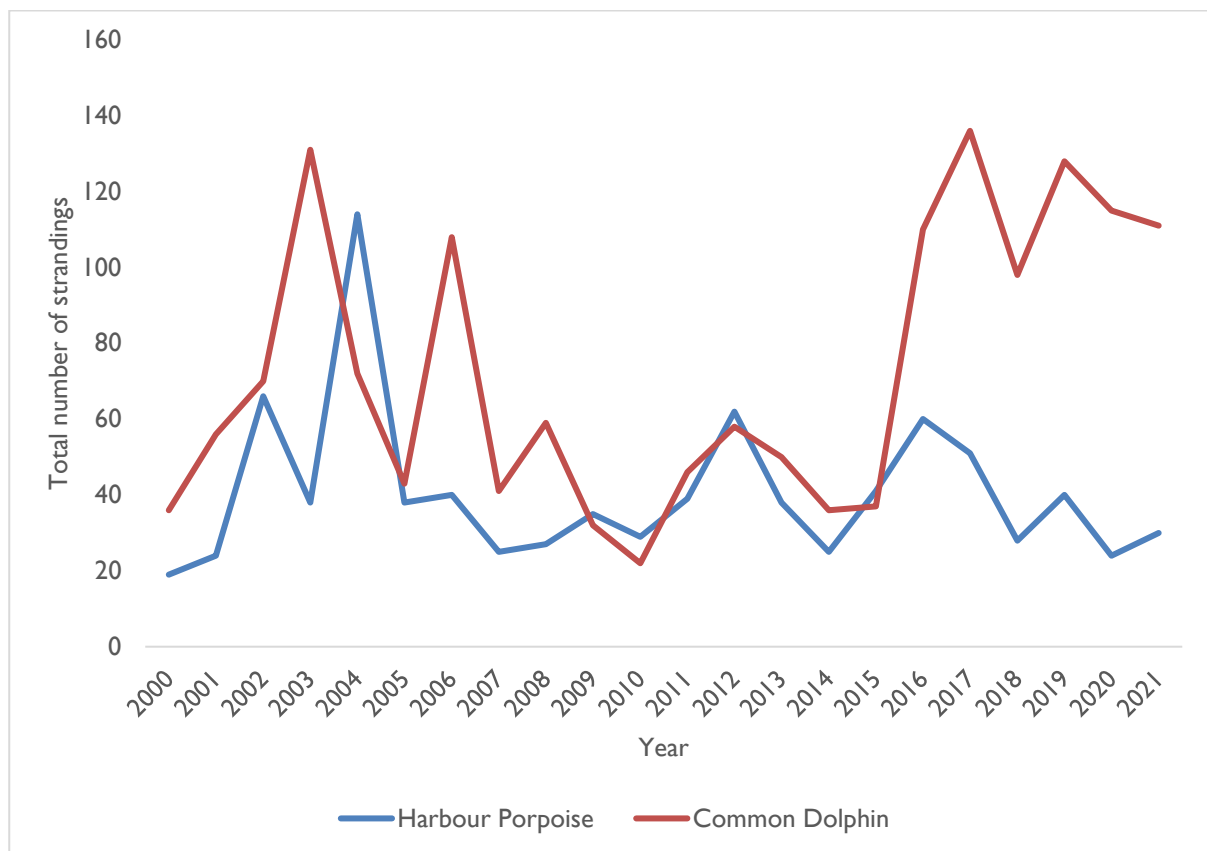


Figure 6: numbers of common dolphin and harbour porpoise strandings from 2000 to 2021

3.1.2 Cetacean post mortem examinations

Of the 207 cetacean carcasses that stranded during 2021, 14% (n=28) were suitable and accessible for retrieval by the CWT MSN team for *post mortem* examination, under licence and on behalf of the Defra-funded Cetacean Strandings Investigation Programme (CSIP) (Figure 7). Necropsies were performed by James Barnett, the veterinary pathologist for the Marine Strandings Network.

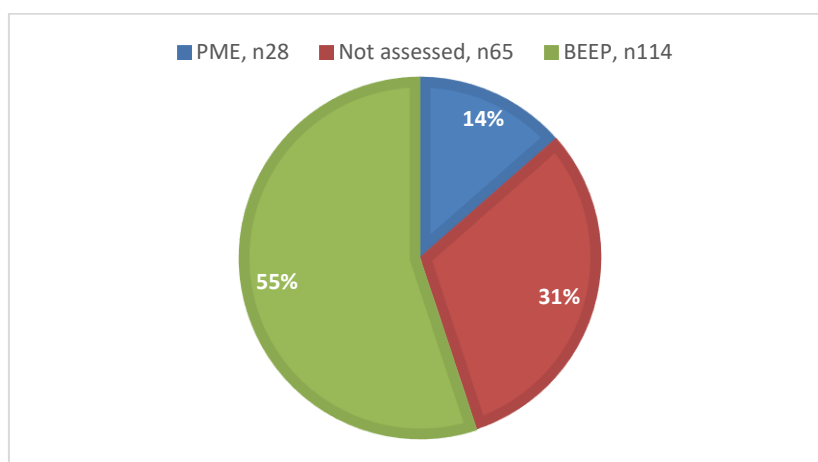


Figure 7: Percentage of stranded cetaceans retrieved for post mortem examination (n=28), BEEP assessment using in-situ data (n=114) and the remaining 65 were reported but had insufficient data for more detailed assessment

Post mortem examinations (PME) concluded that accidental entanglement in fishing gear, known as bycatch, was the cause of death for 10 (36%) of the cetaceans examined including 9 common dolphins and one harbour porpoise (Table 1). Of note, boat strike was the cause of death in one common dolphin which stranded on the Lizard in February 2021, and live stranding was the cause of death of a common dolphin which stranded in Falmouth in October 2021.



Photo 3: Bycaught subadult female common dolphin 20th February 2021, taken for post mortem examination. Photo by James Barnett



Photo 4: Common Dolphin, Crinnis Beach, 23.03.21, PME asymmetry of lungs reported in several bycaught dolphins - photo James Barnett

A summary of *post mortem* findings can be seen in *Table 1*. The findings of these examinations are published with kind permission of CSIP. Please note these may be amended subject to verification and the results from any tests, such as histopathology and bacteriology that are pending.

Date Found	PM Number	Species (common)	Location	Cause of Death
03/01/2021	EX/C02/21	Common dolphin	St Ives	Infectious disease
13/02/2021	EX/C03/21	Common dolphin	Coverack Cove	Boat/Ship strike
20/02/2021	EX/C04/21	Common dolphin	Colona Beach, Mevagissey	Bycatch
25/02/2021	EX/C05/21	Striped dolphin	Great Western Beach, Newquay	Infectious disease
01/03/2021	EX/C06/21	Harbour porpoise	Gorran Haven	Physical trauma, acute
07/03/2021	EX/C07/21	Common dolphin	Porthmeor beach	Bycatch
10/03/2021	EX/C08/21	Harbour porpoise	near Penlee Point	Starvation
23/03/2021	EX/C09/21	Common dolphin	Crinnis beach	Bycatch
24/03/2021	EX/C20/21	Common dolphin	Seaton	Bycatch
27/03/2021	EX/C11/21	Common dolphin	Talland	Bycatch
27/03/2021	EX/C12/21	Common dolphin	Portwrinkle	Bycatch
11/04/2021	EX/C13/21	Common dolphin	Porthtowan	Bycatch
20/04/2021	EX/C14/21	Common dolphin	Maenporth	Infectious disease
18/05/2021	EX/C15/21	Common dolphin	Millook Haven, Bude	Infectious disease
22/05/2021	EX/C16/21	Striped dolphin	St George's Cove, Padstow	Infectious disease
26/05/2021	EX/C17/21	Harbour porpoise	Peters Point, Upton, Gwithian	Starvation (neonate)
04/07/2021	EX/C18/21	Common dolphin	Hayle Towans, Hayle	Infectious disease
14/09/2021	EX/C19/21	Common dolphin	Silver Steps, Pendennis,	Infectious disease
14/10/2021	EX/C20/21	Harbour porpoise	Widemouth Bay	Bycatch
17/10/2021	EX/C21/21	Common dolphin	Castle beach, Falmouth	Live stranding
26/10/2021	EX/C22/21	Common dolphin	Little Petherick Creek, Padstow	Infectious disease
03/11/2021	EX/C23/21	Common dolphin	Porthkidney	Infectious disease
10/11/2021	EX/C24/21	Common dolphin	Praa Sands	Infectious disease
16/12/2022	EX/C25/21	Harbour porpoise	Porthleven	Infectious disease
17/12/2021	EX/C26/21	Common dolphin	Carne beach, Roseland	Bycatch
18/12/2021	EX/C27/21	Common dolphin	Pentewan	Bycatch
22/12/2021	EX/C28/21	Common dolphin	Gyllyngvase beach, Falmouth	Others
27/12/2021	EX/C29/21	Common dolphin	Long Rock	Physical trauma, acute

Table 1: Cetacean *post mortem* reports (2021) – gross *post mortem* and bacteriology findings (source: CSIP)

3.1.3 Bycatch Evidence Evaluation Protocol (BEEP)

The MSN Bycatch Evidence Evaluation Protocol (BEEP) is an invaluable tool to assess bycatch on cetacean species, which has been developed by CWT MSN. BEEP assessments can be done *in situ* on the beach and provide data on external injuries to help identify possible causes of death from bycatch for all animals, not just those that undergo post mortem examination. The process involves cetacean strandings reported to CWT MSN undergoing rigorous external examination by trained volunteers on the beach. Detailed photographs of the carcasses are taken, and these are then assessed to identify, and record, signature injuries and features identified as being associated with bycatch and entanglement in fishing gear. This protocol has been developed from 25 years of experience and is continuously tested and developed to improve the accuracy of bycatch detection.



Photo 5: Live stranded male juvenile striped dolphin, Great Western Beach, Newquay 25th February 2021, taken for PME.

Photo by Daisy May Harris

Of the remaining 179 cetaceans which were not retrieved for post mortem examination, 65 cases were reported to MSN but either a volunteer was not able to attend for a wide range of reasons or we had insufficient data to assess the animal through BEEP. Therefore, these cases have not been included in the BEEP and bycatch analysis for this report.

114 (55% of the 207 total) cetacean strandings were examined and recorded *in situ* by MSN volunteers using the BEEP protocol, and photos examined in detail by experienced BEEP assessors within the Environmental Records Centre for Cornwall and Isles of Scilly (ERCCIS). It was found that 18% of the 114 (n=20) showed features consistent with definite or probable bycatch or entanglement in fishing gear (Table 2). These features are based on recognised net entanglement marks such as fin edge cuts/slices, encircling net marks and severed appendages. A further 17.5% of the 114 total (n=20) cases showed possible signs of bycatch.


33.3% (n=38) were cases where BEEP assessment was inconclusive based on the data available. 2.6% (n=3) deaths were found to show features consistent with trauma and likely bottlenose dolphin attack.

Beep Conclusion	Total number of animals	% Beep Assessed Cases
Definite Bycatch	16	14.0
Inconclusive	38	33.3
No features	33	28.9
Possible bycatch	20	17.5
Probable bycatch	4	3.5
Trauma	3	2.6
Grand Total	114	100.0

Table 2: A summary of BEEP conclusions from cetacean cases assessed in situ in 2021

Examples of BEEP assessed cetacean strandings are below in 3.1.4 Other Cetacean Strandings (below.) For the full BEEP analysis and report, please see Appendix 1.

3.1.4 Notable Cetacean Stranding Cases

Harbour Porpoise C/2021/006	Perranporth SW779559	11/01/2021	Thick impression encircling behind blowhole. Tail amputated.
			

Common Dolphin C/2021/201	Porthkerris Cove, St Keverne SW806227	17/12/2021	Linear marks across melon crease and melon. Notches on the beak. Clean cut edges to flank and tail stock, no abdomen. Flukes amputated. Haemorrhage to LHS eye. Shark scavenged.
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Harbour porpoise C/2021/048 EX/C06/21 SW2021/157	Gorran Haven, Mevagissey	01/03/2021	<p>I understand that this adult male porpoise was found alive on the beach but died very quickly afterwards.</p> <p>Although the recent wound over the left caudal mandible was relatively superficial, the haemorrhage found in the thalamus of the brain was sufficient to explain the death of this animal. As can be seen from Mark's histopathology report, there was no evidence of a predisposing condition to explain the haemorrhage and therefore it is concluded that this occurred as a result of cranial trauma.</p> <p>Many other gross and histopathological lesions observed were likely to be related to the stranding event itself. There was also evidence of a significant parasitic bronchopneumonia, a not uncommon finding in this species. However, there was no evidence of a suppurative (bacterial) component to the pneumonia and therefore the Salmonella species isolated from lung and also from brain is likely to be an incidental finding in this case. Again, this is not uncommon in this species. Conclusion – Acute cranial trauma</p>
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Common Dolphin C/2021/139	Portmellon, Mevagissey	02/09/2021	This female adult common dolphin was first recorded 02/09/21 with a bulge at the genital slit. The recorder (Rob Wells) returned 06/09/21 and discovered the bulge was actually a calf stuck in the birth canal emerging in the breach position. Conclusion – Trauma giving birth
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<p>Common Dolphin C/2021/173 EX/C22/21 SW2021/817</p>	<p>Little Petherwick, Padstow</p>	<p>26/10/2021</p>	<p>This common dolphin was found stranded in a creek off the River Camel and it is clear that the animal had not been dead for long, judging by its fresh condition and the presence of live ascarids in the cardiac stomach 24 hours after the stranding was first reported. This, coupled with bruising in the blubber layer and slight asymmetrical congestion of the lungs, was consistent with the dolphin having live stranded.</p> <p>This animal was in suboptimal body condition with little evidence of recent feeding. The most significant finding, as Mark has indicated, is of a meningitis/ventriculitis/ choroiditis with secondary hydrocephalus and this is likely to have had a significant impact on the animal's health and affected its ability to feed. Furthermore, it may well have caused disorientation and precipitated the live stranding. There were also several series of deep rake marks in the skin, and it is interesting to speculate whether the animal was exhibiting abnormal behaviour that precipitated aggressive interaction. The heavy gastric ascarid burden is also likely to have had a significant impact on the dolphin's nutritional state.</p> <p>As Mark has indicated, Brucella (ceti) is the most likely cause of the meningitis /ventriculitis/choroiditis. The failure to isolate this on culture may have been because no cerebrospinal fluid was submitted. As a precaution, those who handled the animal and attended the post mortem have been advised of the potential zoonotic risk. Conclusion - Meningitis//choroiditis/periventriculitis</p>
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Common Dolphin C/2021/176	Northcott Beach, Bude	07/11/2021	This female adult common dolphin is very unusual because it is missing its dorsal fin. There is no visible scarring or evidence of injury so believed to be a birth defect.
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Photo 6: Common dolphin stranded on Upton Towans, Hayle. 7th March 2021, examined and photographed by Mick Dawton.

3.2 Grey seals

Dead grey seal strandings have been recorded in detail on the CWT MSN database since 2000. Numbers of seal strandings have been increasing year on year since MSN started recording. There were 291 seal strandings reported during 2021 (Figure 8), the highest number of stranded seals since recording began. CWT MSN continues to work closely with the Seal Research Trust (SRT) to monitor this trend more effectively and analytically by improving data collection (using the Seal Evidence Evaluation Protocol, SEEP), assessments of age class, gender, individual identification, and reporting.

Figure 9 shows the gender of these 291 seal strandings, with 21% (n=62) males, 14% (n=41) females and 65% (n=188) of unknown gender due to either limited or no supporting photos, or because the animal was too decomposed and/or had genital scavenging. Please note that only adult seals are sexed as the process is difficult in juvenile animals.

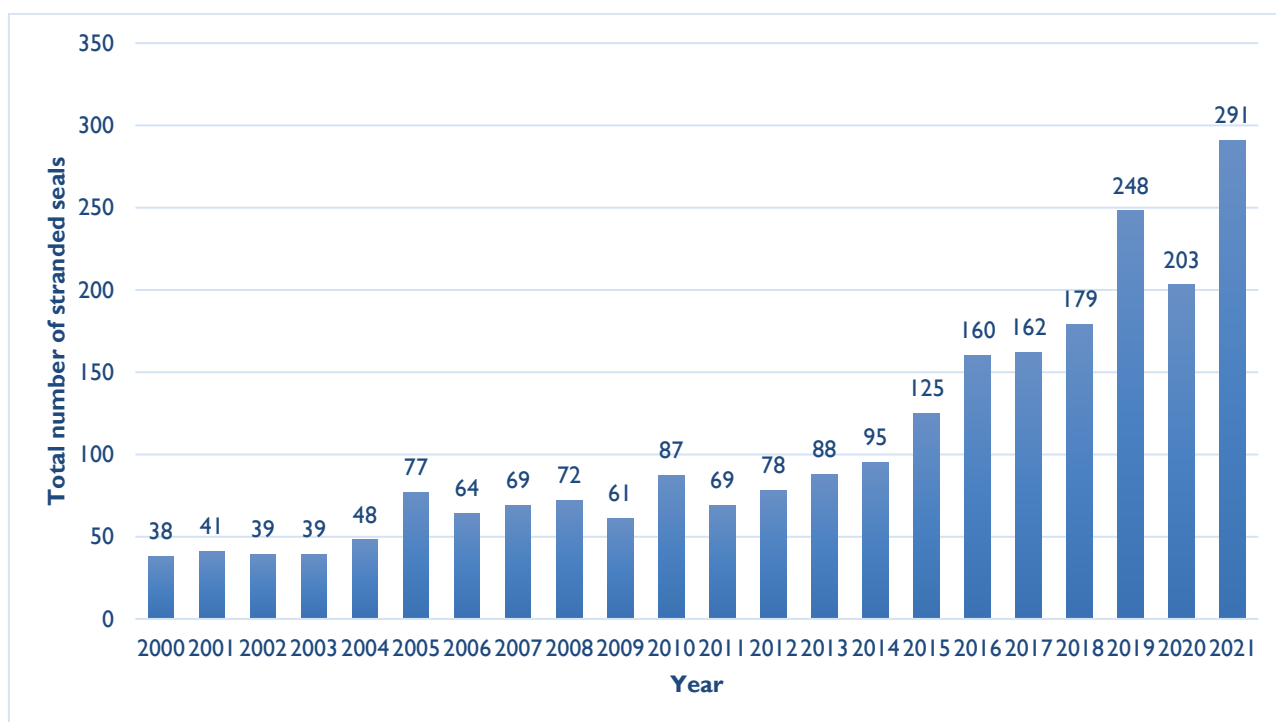


Figure 8: Comparison of grey seal strandings by year (2000 – 2021)

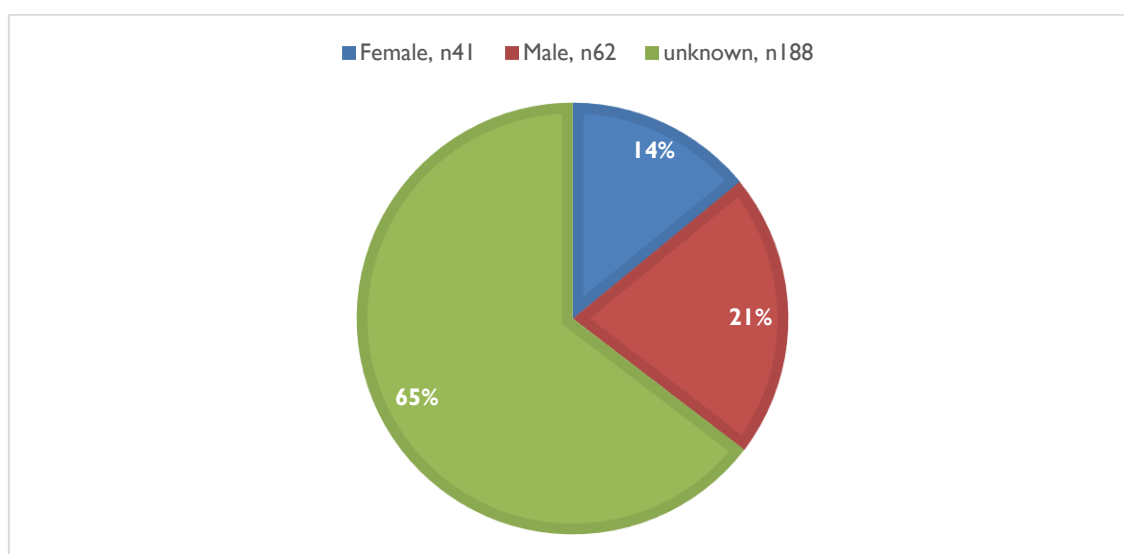


Figure 9: Grey Seal strandings gender classes (2021)

Age Category	Count
Adult	33
Juvenile	31
Pup	138
Unknown	57
Whitecoat	32
Total	291

Table 3: Seal Age Class for 2021

Of the 291 seal strandings, 32 were categorised as whitecoat/maternally dependent pups under three weeks old, 138 were categorised as moulted pups measuring less than 120cm nose to tail, 31 were juvenile (measuring between 120cm and 160cm), 33 were adult, and 57 were unknown due to lack of data (Table 3).

Figure 10 shows the age category proportions each month to identify seasonal patterns. Whitecoat strandings start in June 2021 and continue through to November 2021. The early whitecoat stranding in June 2021 may indicate a shift in the Atlantic grey seal pupping season in Cornwall. Published data by SRT shows that peak pupping has moved from October (2010 to 2016) to September (2017+). August was the quietest month for seal strandings in 2021, with only one dead moulted pup.

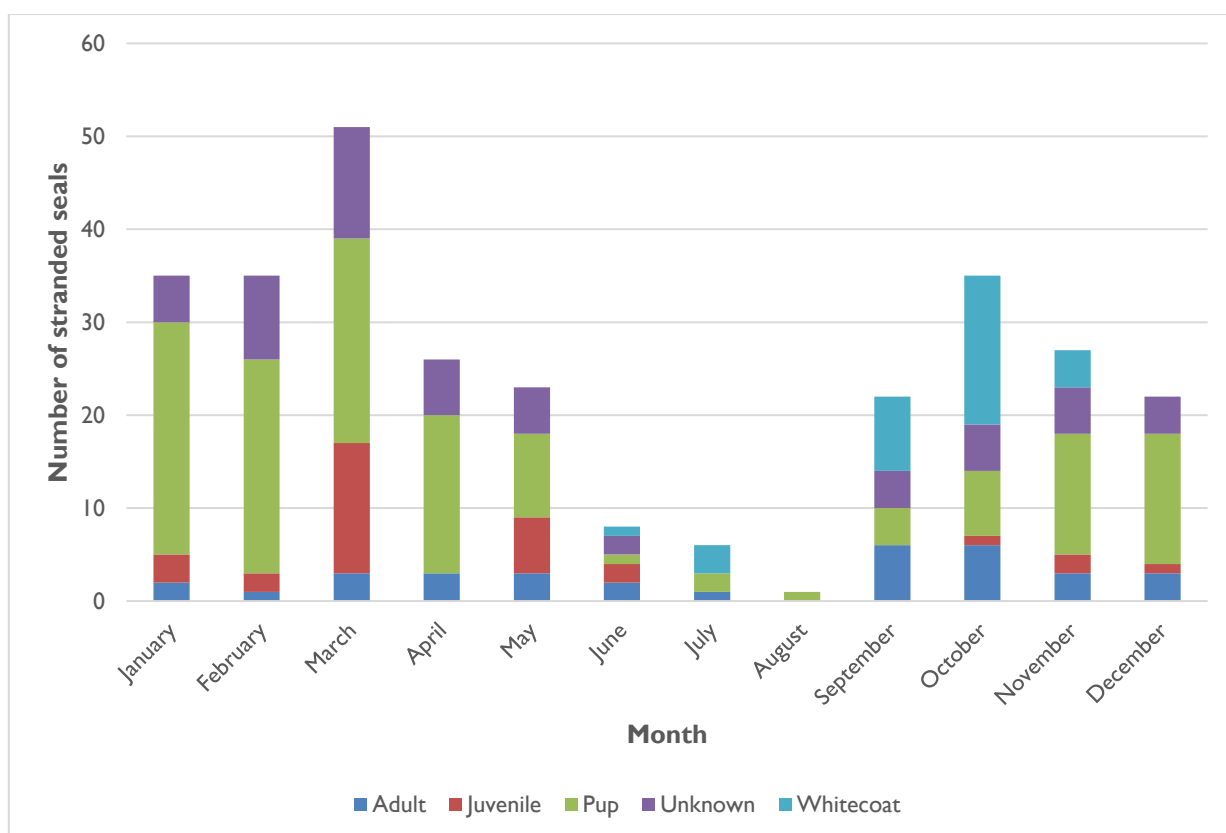


Figure 10: Age and sex of Atlantic grey seal strandings per calendar month in 2021 (n=291)

According to SRT, peak seal strandings coincide with key seal life cycle activities when energy reserves may be at their lowest for different demographics: moulting season for adults (winter/spring); post weaning dispersal for moulted pups with their fat reserves at their lowest ebb (spring); juvenile moulting season (spring/summer) and peak pupping months for mums and beachmasters (September and October).

Whitecoat pup deaths in June and July correspond with SRT's observations of white coat pups and reflect the outliers for the start of the grey seal pupping season in Cornwall. SRT's data shows the live pupping season started in August, peaked in September followed by October with later outlier pups born in November and December. This likely reflects an obvious delay between whitecoat births and subsequent deaths for grey seal pups.

Seal strandings exceeded the ten-year average in all months apart from August. (Figure 11). The reason for this considerable increase is unknown. This appears largely driven by whitecoat and moulted pup deaths (n=170 Table 3, equating to 58%). This is the highest proportion of pup (whitecoat and moulted) deaths recorded by CWMT MSN since 2005. There is a significant peak in seal strandings in March 2021 (n=51) which is over six times the monthly average. This is a concerning statistic and would benefit from further investigation. Post-mortem and SEEP results suggest that infection, trauma (potentially in storms) and entanglement are key contributing causes of death that may go part way to explaining the increased seal mortality being recorded. The lowest strandings being recorded in August suggests that the increased number of seal deaths is unlikely to be an artefact of increased awareness and reporting as more people are around the Cornish coast in August.

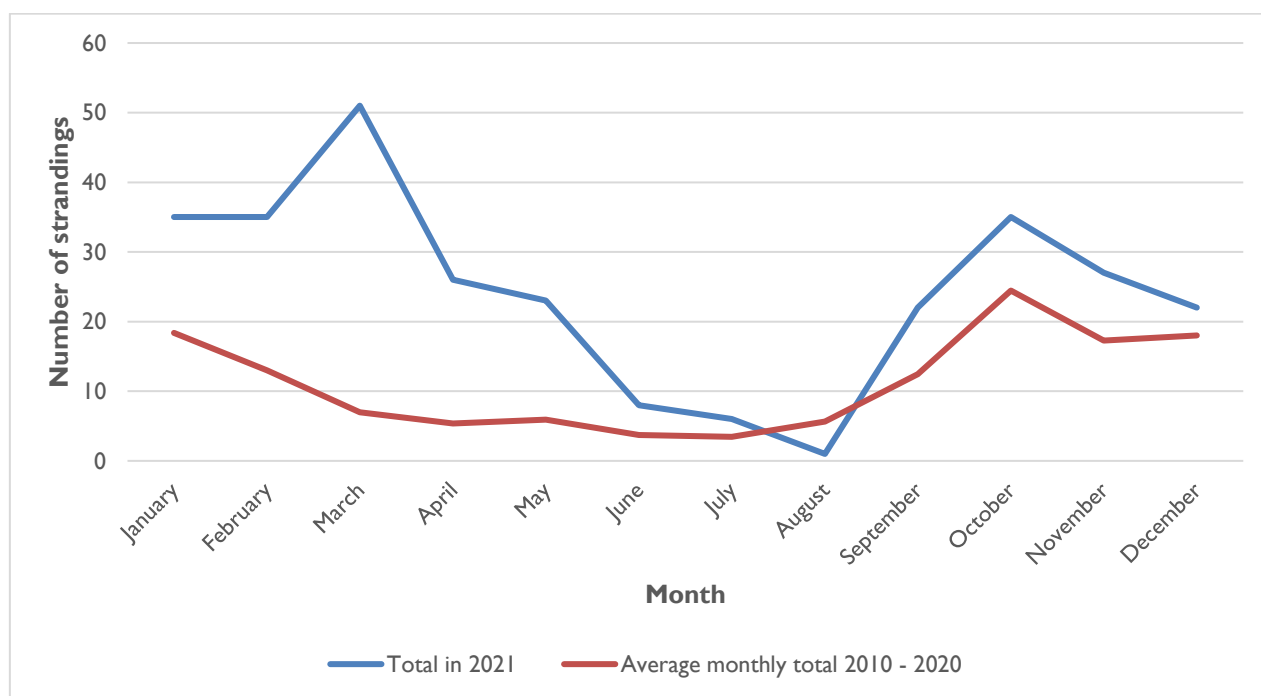


Figure 11: Atlantic grey seal strandings per calendar month in 2021 (n=291) compared to average monthly totals for 2010 – 2020

Figure 12 shows the locations of all seal strandings in 2021 and highlights the geographical spread during the year. There are a great number of whitecoat strandings along the north coast of the county, likely linked to the geographical locations of key pupping sites. On the south coast, there are a few whitecoat pups and a lot of moulted pup strandings. SRT recorded an increased number of births on the south coast in 2021 which could be indicative of grey seals recolonising pupping sites on the south coast of Cornwall.

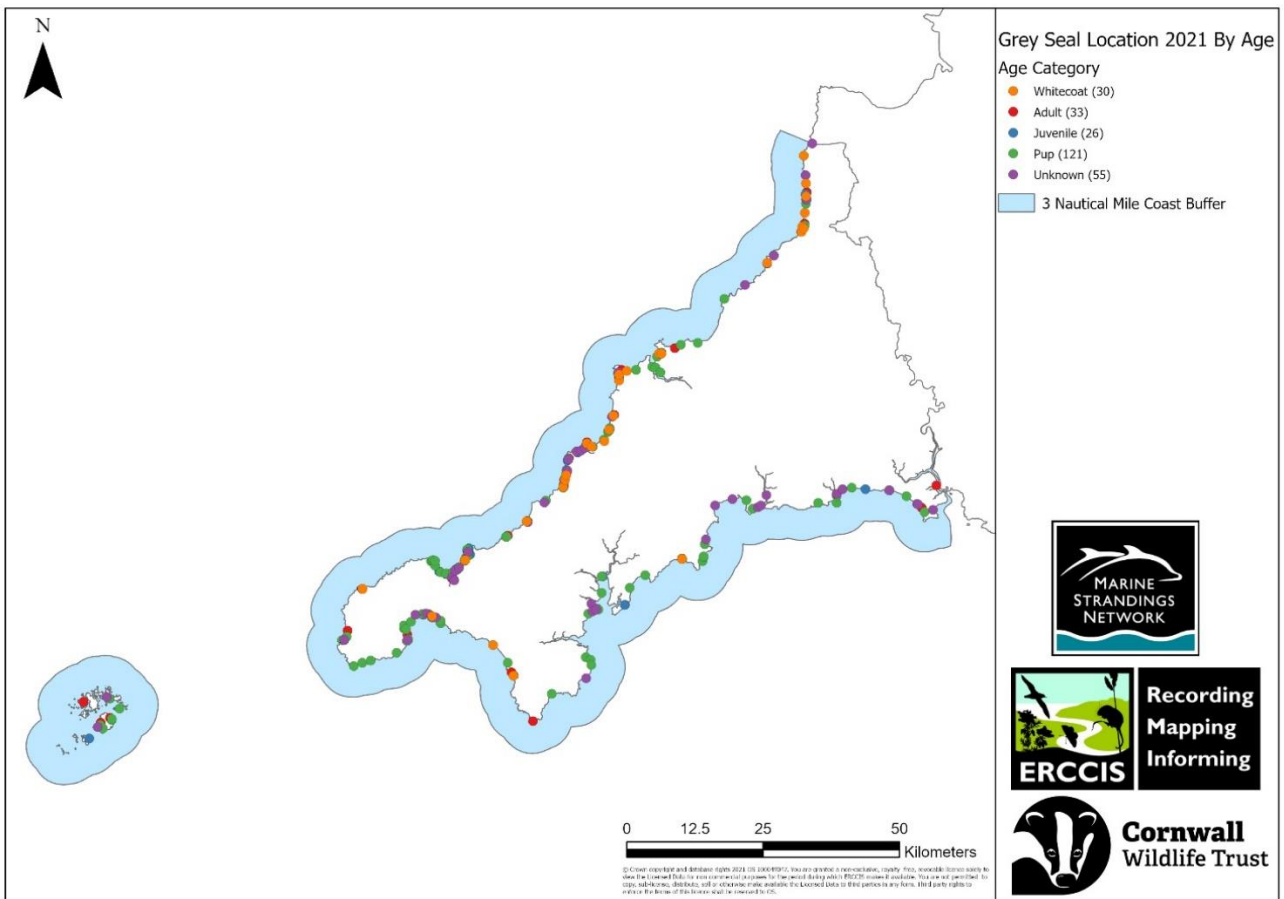


Figure 12: Locations of Atlantic grey seal strandings in 2021 (n=291)



Photo 7: Adult male grey seal stranded Dropoy Nose Point, Bryher Isles of Scilly, 14th September 2021. Photo by Vika Bundy

Thanks to collaborative work with SRT, seal strandings, where possible, are checked against individual identification catalogues of seals in Cornwall. In 2021, SRT volunteer Photo ID Catalogue holders assessed 101 sets of dead seals photos for identification purposes.

Three matches were made between the SRT and MSN datasets;

An entangled seal, identified as LP631 'Bird feeder', stranded dead in Portreath on the 31st January 2021 and was recorded by MSN volunteer Mick Dawton (*Photo 8*). SRT had first identified this seal alive in February 2019 and without an entanglement. The seal was then sighted repeatedly in the autumn and winter of 2020 (from the 5th October) at the West Cornwall SRT survey site with entanglement. The entanglement therefore appeared at some point between February 2019 and October 2020. LP631 was last seen alive on the 1st January 2021 with significant injuries apparent due to the entanglement. IDs suggest he died 3 months to 2 years after becoming entangled in monofilament net with a mesh size of 140mm.



Photo 8: Net sample taken from LP631 'Bird Feeder', photos by Mick Dawton and Sue Sayer (Inset)

An adult male seal stranded on the 21st September 2021 at Porthkidney beach, near the Hayle Estuary, and was recorded by MSN volunteer Mick Dawton (*Photo 9*). The seal was subsequently identified as DP525 'Left JX', an individual which was first sighted alive by SRT on the 21st April 2012 at their West Cornwall survey site. He was regularly sighted along the north coast at eight different seal haul out and pupping sites over the 9-year period. This seal was the Beachmaster at three different pupping sites between 2014 and 2020 including one site where he reigned for at least four years. He was likely to have been approximately 17 years old at the time of his death.



Photo 9: DP525, or 'Left JX', which stranded on Porthkidney on 21st September 2021 and was identified by SRT

A third identification (S-2021-080) was found to be StAB546 'Glasses swan neck'. This young female only ever had one live identification from a survey by Rob Wells on 01/02/21. Once dead, she was re-identified by SRT volunteer Emma Woolfenden.

S-2021-080 is StAB546 added to StAB 2021 02 01



Photo 10: Identification information stranded juvenile S-2021-080 'Glasses Swan Neck' identified by Emma Woolfenden. Photo credit Seal Research Trust

Whilst not a seal identified in life, SRT used their Photo ID skills to track the movement and decomposition of a stranded juvenile on Rock Beach in December 2021. These photos show how an intact carcass can be naturally scavenged through facial orifices resulting in a substantial transformation in less than a week.



Photo 11: Identification information of stranded juvenile. Photo credit Jules Dyer Seal Research Trust

MSN continues to work in partnership with SRT for seal identification work in 2022. For more information about grey seal photo identification work in Cornwall, please contact SRT www.cornwallsealgroup.co.uk. Please email live seal records and photos to sightings@cornwallsealgroup.co.uk.



Photo 12: Seal - 13.01.21 - Castle Beach, Falmouth, Photo Mick Dawton

3.2.1 Seal *post mortem* examinations

Seals that were found dead on the coast, as well as those which were euthanised or died in the wild or within a 7-day window after being rescued, were considered for *post mortem* examination and inclusion in this report. Seals which have been taken to rehabilitation and died or are euthanised within their first week of rehab are most likely to have died from conditions picked up in the wild.

A summary of the *post mortem* examinations results is outlined in Table 4.

35 of the 291 seals reported were retrieved for *post mortem* examination in 2021, representing 12% of seal strandings. *Post mortem* examination was carried out by veterinary pathologist James Barnett.

Of those examined at *post mortem* infection was the leading cause of death in 23 of the seals. Trauma was the second highest cause of death, impacting six seals. Six further seals cause of death was 'Other' (four starvation/ hypothermia, one Hepatic amyloidosis* and one anaesthetic death). *This seal who was entangled and identified by SRT will feature in a peer reviewed paper by James Barnett - J.E.F. Barnett, J.A. Gilbertson, N. Arrow, J. D. Gillmore, P.N. Hawkins, L. Larbalestier, D. Jarvis, S. Sayer and M.E. Wessels (In Press). Hepatic amyloidosis in a chronically entangled grey seal (*Halichoerus grypus*). Journal of Comparative Pathology.

Some detailed examples of *post mortem* assessed seal strandings are found on the following pages of this report.

Of note, Cornwall Marine Pathology Team, British Divers Marine Life Rescue and SRT have a project funded by the Debs Foundation to assess PCBs in adult male seals to see if levels could be high enough to increase male mortality (females being able to pass these lipid-based toxins to their pups).



Photo 13: Male adult grey seal at Little Fistral, Newquay on 31st July 2021. Photo by Emma Louise Gallagher

Date found	ID	Species	Location	Age	Sex	COD category
02/01/2021	EX/S01/21	Grey seal	Holywell Bay	Moulter	M	Infectious, other
02/01/2021	EX/S02/21	Grey seal	Perranporth	Moulter	F	Infectious, respiratory
11/01/2021	EX/S13/21	Grey seal	Mawgan Porth	Moulter		Infectious, respiratory
13/01/2021	EX/S03/21	Grey seal	Gwithian	Moulter	M	Infectious, respiratory
15/01/2021	EX/S04/21	Grey seal	Sandy Cove, Newlyn	Moulter	F	Infectious, respiratory
15/01/2021	EX/S05/21	Grey seal	Sennen Cove	Moulter	M	Other
16/01/2021	EX/S06/21	Grey seal	Lamorna Cove	Moulter	F	Infectious, respiratory
21/01/2021	EX/S07/21	Grey seal	Hayle	Moulter	F	Other
31/01/2021	EX/S08/21	Grey seal	Porthgwithden, St Ives	Moulter	F	Infectious, respiratory
01/02/2021	EX/S09/21	Grey seal	Penberth Cove	Moulter	F	Infectious, respiratory
02/02/2021	EX/S10/21	Grey seal	Godrevy	Moulter	F	Infectious, respiratory
03/02/2021	EX/S11/21	Grey seal	Godrevy	Moulter	M	Infectious, respiratory
03/02/2021	EX/S12/21	Grey seal	Porthgwarra	Moulter	M	Trauma
04/03/2021	EX/S14/21	Grey seal	Porthminster, St Ives	Moulter	M	Infectious, other
11/03/2021	EX/S15/21	Grey seal	South Fistril, Newquay	Moulter	M	Infectious, respiratory
12/03/2021	EX/S16/21	Grey seal	Godrevy	Moulter	M	Infectious, respiratory
28/04/2021	EX/S18/21	Grey seal	Gwenver	Adult	F	Other
02/05/2021	EX/S17/21	Grey seal	Whipsiderry, Newquay	Juvenile	M	Trauma, entanglement
05/06/2021	EX/S19/21	Grey seal	Tregonhawke, Whitsand	Moulter	M	Infectious, other
31/07/2021	EX/S20/21	Grey seal	North Fistril, Newquay	Adult	M	Infectious, other
17/09/2021	EX/S21/21	Grey seal	Castle beach, Tintagel	Premoult	F	Other
25/09/2021	EX/S22/21	Grey seal	Mutton Cove	Premoult	F	Infectious, other
10/10/2021	EX/S23/21	Grey seal	Gwithian	Premoult	F	Infectious, respiratory
20/10/2021	EX/S24/21	Grey seal	Constantine Bay	Adult	M	Infectious, other
25/10/2021	EX/S25/21	Grey seal	Polpear Cove, Lizard	Adult	M	Infectious, respiratory
31/10/2021	EX/S26/21	Grey seal	Penlee, Mousehole	Adult	M	Infectious, respiratory
03/11/2021	EX/S27/21	Grey seal	St Ives harbour	Moulter	M	Trauma
05/11/2021	EX/S28/21	Grey seal	Gorran Haven	Moulter	F	Trauma
06/11/2021	EX/S30/21	Grey seal	Porthluney	Moulter	F	Infectious, respiratory
09/11/2021	EX/S29/21	Grey seal	Perranporth	Moulter	M	Trauma
11/11/2021	EX/S31/21	Grey seal	Mylor	Moulter	F	Other
12/11/2021	EX/S32/21	Grey seal	Croyde, N Devon	Moulter	F	Infectious, respiratory
02/12/2021	EX/S33/21	Grey seal	Perranporth	Moulter	F	Infectious, gastrointestinal
10/12/2021	EX/S34/21	Grey seal	Crackington Haven	Moulter	M	Other
29/12/2021	EX/S35/21	Grey seal	Sennen Cove	Moulter	M	Trauma

Table 4: Seal post mortem examination findings 2021

3.2.2 Seal Evidence Evaluation Protocol (SEEP)

Cornwall Wildlife Trust produced a new Seal Evidence Evaluation Protocol (SEEP) in 2016 to further the development of seal strandings photo collection and analysis, following similar protocols already established with the Bycatch Evidence Evaluation Protocol used for cetaceans. The protocol for assessing cause of death for seals is still in development, and there are additional difficulties in this type of assessment due to the pelt and skin structure of seals, which means external marks aren't as clear as they are in cetacean species. During 2021, 128 seals were assessed using SEEP methods. The majority of these (63%, n=80) had no features of note, 35 (27%) were inconclusive, and four had features associated with definite trauma. Six seals (5%) had definite entanglement.

SEEP conclusion	Total number of animals	% of SEEP assessed cases
Entanglement around the neck	6	4.69%
Inconclusive	35	27.34%
No features	80	62.50%
Possible entanglement	1	0.78%
Possible entanglement	1	0.78%
Possible trauma	1	0.78%
Trauma	4	3.13%
Grand Total	128	100%

Table 5: a summary of SEEP conclusions from seal cases assessed in 2021



Photo 14: Atlantic grey seal 10th March 2021, Tregears Porth St Mary's Isles of Scilly. Record and photo by Graham Cundale & Nikki Banfield

3.2.3 Notable Seal Stranding Cases

<p>Atlantic Grey Seal S/2021/013 EX/S01/21 SS/2021/1</p>	<p>Holywell Bay, Newquay</p>	<p>02/01/2021</p>	<p>This male grey seal pup was found in acute respiratory distress, with large submandibular swellings and extensive swelling of the head. The pup was euthanised due to severity of the clinical signs.</p> <p>Gross post mortem examination revealed bilateral suppurative lymphadenitis of the mandibular lymph nodes, with extensive gelatinous oedema of the subcutaneous and connective tissues of the head and neck, including around the trachea, and this is likely to have led to the observed respiratory distress. No specific origin for the infection was found.</p> <p>Conclusion – Infectious</p>
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<p>Atlantic Grey Seal S/2021/064 EX/S12/21 SS2021/79</p>	<p>Porthgwarra, Porthcurno</p>	<p>03/02/2021</p>	<p>This male grey seal pup was in poor body condition and was euthanised due to the presence of an oronasal fistula cranial to the right incisor which was likely to be difficult to repair. It was also clear from the post mortem examination that there was extensive osteomyelitis in the surrounding maxillary bone. The isolation of <i>Arcanobacterium phocae</i>, a known cause of opportunistic infections in seals, was likely to be significant in this respect. The tips of the upper incisors and canines were missing, consistent with significant wear/trauma.</p> <p>A with several other grey seal pups this winter, there was a significant lungworm burden present and there were also tracts in the liver likely to be consistent with parasitic migration.</p> <p>Conclusion - Physical trauma, chronic with secondary infection</p>
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<p>Atlantic Grey Seal S/2021/136 EX/S17/21</p>	<p>Whipsiderry Beach, Newquay</p>	<p>01/05/2021</p>	<p>This male grey seal pup was in poor body condition although there was some evidence of recent feeding, judging by the amount of faeces in the rectum.</p> <p>There was a large, encircling wound around the neck with regular edges, consistent with entanglement, and histopathology has revealed the presence of probable net fibre associated with the wound. The wound itself was at least three weeks old but it is unclear if the entanglement came way antemortem or post mortem.</p> <p>Certainly, entanglement may have been a contributory factor to the pup's malnourished state and ultimate death, and the severe gastric parasitism also may have been implicated.</p> <p>Conclusion - Entanglement</p>
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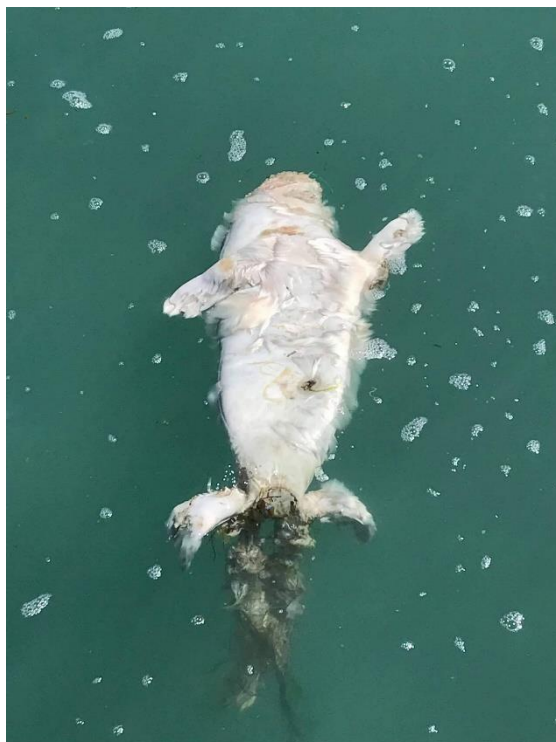


Atlantic Grey Seal S/2021/179	Porthkidney Beach, St Ives	21/09/2020	This Adult male seal appeared in good nutritional state. Areas of fur and skin loss around both sides of neck and throat. Possible bite wounds. This seal was also ID'd by Sue Sayer - SRT
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DP525 Left JX



Atlantic Grey Seal S/2021/064	Widemouth Beach, Newquay	12/06/2021	First dead stranded whitecoat pup of the year.
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Atlantic Grey Seal S/2020/011	Godrevy, St Ives Bay	27/03/2021	Mass stranding around the coast - 5 seals rolling around in the surf. Storm damage to multiple juvenile seals - varying degrees of decomposition.
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Atlantic Grey Seal S/2021/020	Portreath Harbour, Portreath	30/01/2021	This male seal was found and ID'd as LP631 Nettie bird feeder T E by Sue Sayer SRT. Extensive encircling wounds to neck. Monofilament still embedded in neck.
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Atlantic Grey Seal S/2021/178	Penhale Sands, Perranporth	19/09/2021	Badly decomposed furless carcass of seal with no head and spine exposed. A quantity of 16cm sq. mono net was cut off the rear of the neck. One square of net was encircling approx. 3cm rearward of the cut skin of the neck where the head used to be. It is possible that the animal had had two encircling lines around it.
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Atlantic Grey Seal S/2021/068	Porthminster Beach, St Ives	03/03/2021	This seal pup had previously been rescued by BDMLR on Saturday 27/02/21 and it was re-released, it was then found by a member of the public – with the green marking still visible.
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Atlantic Grey Seal S/2021/084	Gwithian, St Ives Bay	14/03/2021	This young male pup was an RSPCA West Hatch release - tag no. 80460. He was released from North Devon on 22/01/21 (Following information provided by Paul Oaten RSPCA: Jimbu (Steve Erwin) was admitted to us on 19/09/20. He came in via BDMLR and was found at Tintagel, Cornwall as an orphaned pup. He was released on 20/01/21 at Combe Martin and weighed 38 kg at release.
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3.3 Marine Turtles

Similar to 2010, there were no stranded turtles reported to the Marine Strandings Network in 2021.

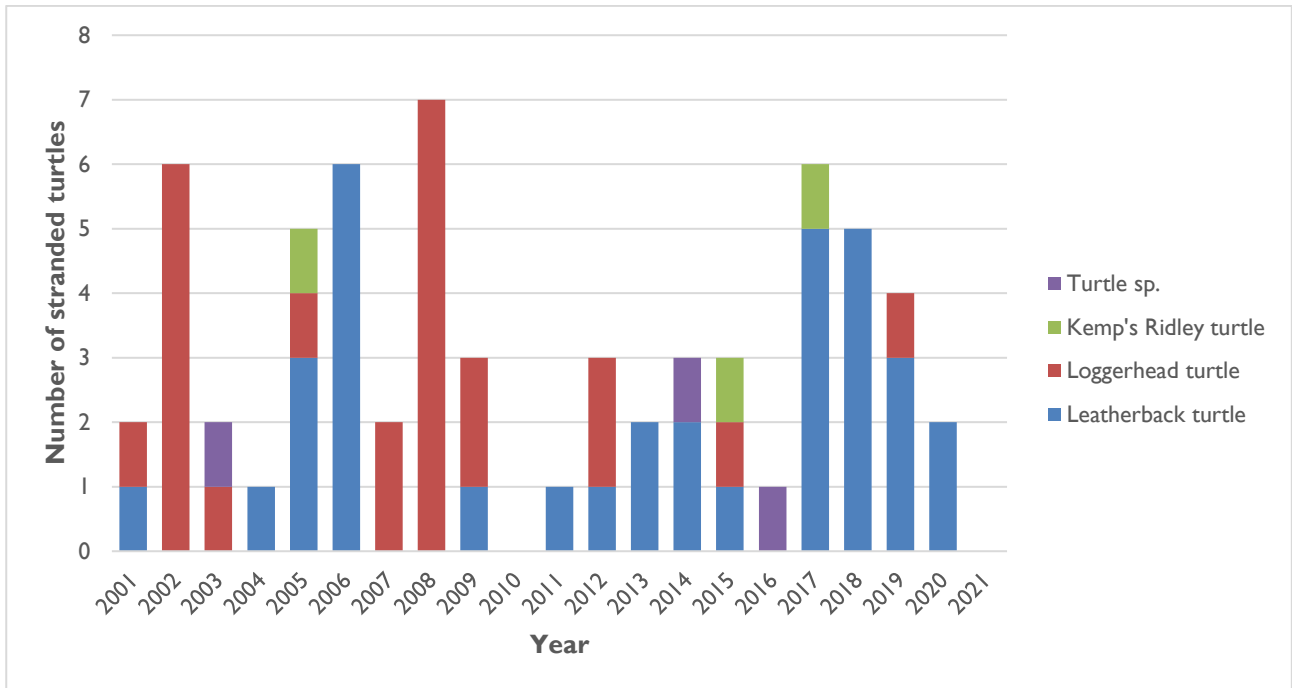


Figure 13: Marine turtle strandings 2001 – 2021



Photo 15: Lump sucker fish - East beach Marazion, 30.01.21, found on the grassy bank. Photo by Constance Morris.

3.4 Birds

CWT MSN continues to monitor bird strandings reported to us, and to work in collaboration with partner organisations such as the RSPB and BDMLR to ensure quick reactions in response to any major incidents, such as storm wrecks or as a result of pollution. CWT MSN received 79 reports of dead seabirds, involving 109 individual birds around the Cornish coast (Table 6). We emphasise that bird strandings are vastly under reported and therefore this is a gross underestimate of the true scale of bird strandings.

Species	Number of Reports	Estimated number of animals
Black Throated Diver	2	2
Black-headed gull	1	1
Cormorant	1	1
Gannet	26	39
Great black-backed gull	3	3
Great Northern Diver	3	3
Guillemot	10	12
Gull species agg.	2	2
Herring Gull	8	19
Little Egret	1	7
Manx Shearwater	3	3
Puffin	2	2
Razorbill	9	11
Shag	3	3
Turnstone	1	1
Total	75	109

Table 6: Total numbers of each sea bird species reported to CWT MSN in 2021

There were 3 cases of bird entanglement reported to CWT MSN during 2021, consisting of one herring gull and two gannets (case studies on page 33)



Photo 16: Razorbill 20th March 2021, Carbis Bay, St Ives. Photo by Andrea Hunt

Herring Gull DBID15499	Newquay Harbour, Newquay	19/02/2021	Entangled in fishing line with hook in mouth.
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Gannet DBID16088	Perranporth Beach, Perranporth	29/09/2021	Orange fishing line wrapped around neck.
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3.5 Sharks



Photo 17: Nursehound 26th February 2021, Newquay Harbour. Photo by Josh Symes.

There were 9 reports of stranded sharks reported to the CWT MSN in Cornwall in 2021, consisting of 3 different known species (Table 7).

Species	Number of Reports	Estimated number of animals
Nursehound	4	4
Shark species	1	3
Small-spotted catshark	3	3
Spotted Ray	1	4
Total	9	14

Table 7: Total numbers of shark and ray (elasmobranch) species reported to CWT MSN in 2021

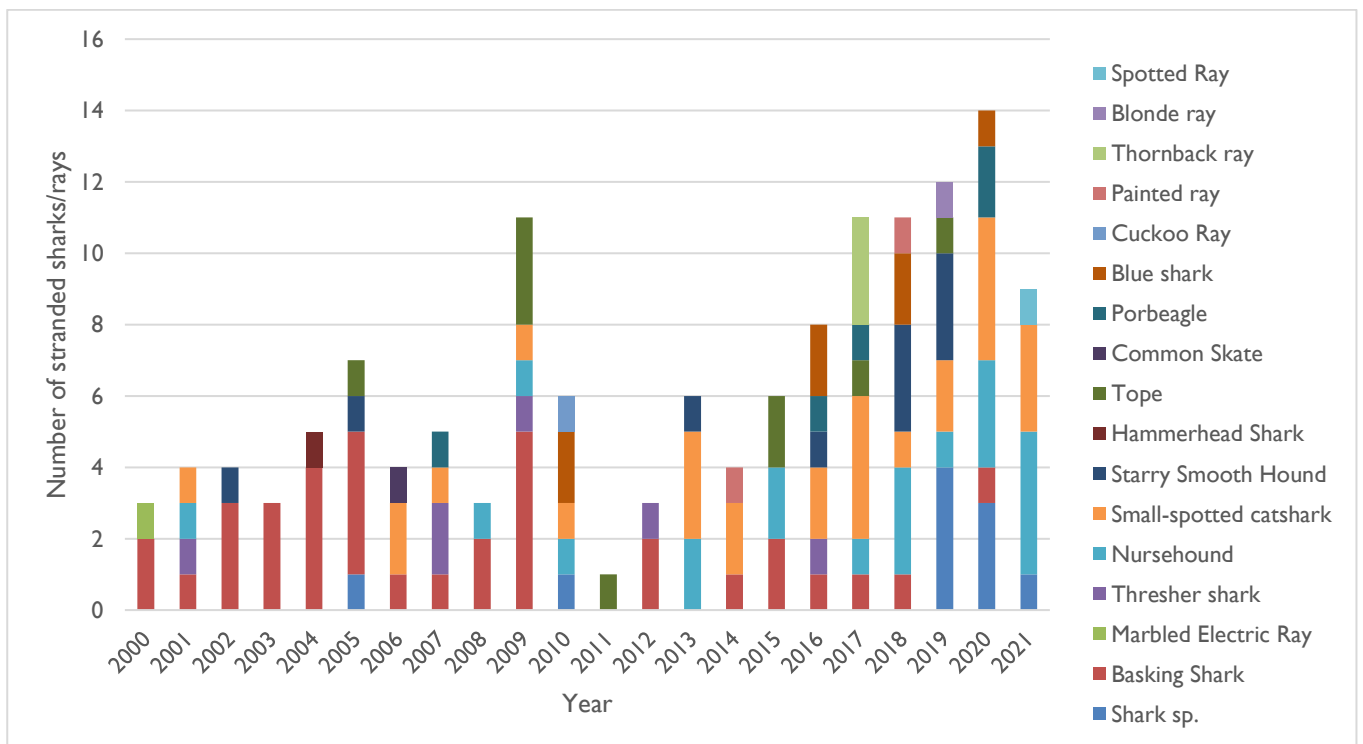


Figure 14: Elasmobranch (shark and ray) strandings 2000 – 2021

3.6 Other strandings

There were 80 reports of strandings of other species groups, comprising 34 different species and involving thousands of individual animals. As with birds, these species are highly under reported in Cornwall, so these numbers are a significant underestimate of the true scale of these species washing up around Cornwall.

Group	Species	Number of Reports	Estimated Number of Individuals
Cephalopods	Common Cuttlefish	3	125
Cephalopods	Common Octopus	1	1
Cephalopods	European squid	1	1
Cephalopods	Octopus species	1	1
Cephalopods	Orbigny's Cuttlefish	1	4
Crustaceans	Buoy Barnacle	1	70
Crustaceans	Common Goose-barnacle	1	1
Crustaceans	Goose-neck Barnacle	2	520
Crustaceans	Spiny Spider Crab	1	1
Echinoderms	Sea Potato urchin	2	2
Echinoderms	Spiny Starfish	1	100
Fish	Unknown	1	1
Fish	Ballan Wrasse	1	1
Fish	Boar-fish or Zulu	2	2
Fish	Conger Eel	6	6
Fish	Garfish	1	1
Fish	Greater Pipefish	1	1
Fish	Grey Triggerfish	4	6
Fish	Long Spined Sea Scorpion	1	1
Fish	Lumpsucker	1	1
Fish	Oceanic Puffer	1	1
Fish	Sardine	2	33
Fish	Short snouted seahorse	2	2
Hydrozoa	By-the-Wind Sailor	7	260
Hydrozoa	Portuguese Man-of-War	13	55
Jellyfish	Barrel Jellyfish	1	1
Jellyfish	Blue Jellyfish	5	19
Jellyfish	Compass Jellyfish	3	4
Jellyfish	Moon Jellyfish	3	201
Mollusca	Common Otter-shell	1	1
Sharks	Nursehound	4	4
Sharks	Shark species	1	3
Sharks	Small-spotted catshark	3	3
Sharks	Spotted Ray	1	4
TOTAL		80	1437

Table 8: Other stranded species reported to CWT MSN in 2021 * numbers of individuals are estimates for some species (indicated with '+')

4. Engagement and Events

The Marine Strandings Network facilitates a selection of outreach and engagement throughout the year, ranging from our annual conference to active social media. The events are designed to allow the Trust to train and support our volunteers and engage the wider public in the work of the Network.

4.1 Social media

The Trust supports active social media platforms, including Facebook, Instagram, WhatsApp and Mailchimp. In 2021, MSN had;

MSN Facebook: 4961 followers

MSN Instagram: 2232 followers

Mailchimp: MSN produces seasonal newsletters for our trained volunteers to update the Network on stranding records plus highlight key events and opportunities arising and share related strandings information. In 2021 MSN Mailchimp had 198 subscribers which is associated with the number of trained volunteers.

WhatsApp: MSN Hotline Coordinators use WhatsApp to manage and communicate with the MSN Callout Volunteers. Alerts about a stranding are sent out to the relevant regional MSN WhatsApp group to enable an available volunteer to respond. Regional groups include;

- North East Cornwall - Heartland Point to the Camel Estuary (Polzeath/Rock side)
- North Cornwall - Camel (Padstow side) to Godrevy
- West Cornwall - Godrevy to Porthleven
- South West Cornwall - Porthleven to Fal River (Falmouth side)
- South Cornwall - Fal river (Roseland side) to Fowey (Fowey side)
- South East Cornwall - Fowey (Polruan side) to the Tamar

This method of communication has been hugely beneficial to the Network, reducing time and effort from our Hotline Coordinators and increasing response opportunities for our Callout Volunteers. All 198 trained MSN Callout Volunteers are within at least one (some are on multiple) regional WhatsApp Group.

4.2 MSN Forum 2021

An annual Forum is organised each autumn by the MSN. Its purpose is to celebrate the success of MSN and the work of the volunteer network, share research and information, and provide an opportunity for dedicated volunteers to network. There is also the opportunity to train new volunteers, distribute equipment, ensure quality and consistency of reporting, and introduce new protocols. Its purpose Presentations on strandings-related subjects are also given by guest speakers, for example from the Institute of Zoology and Natural History Museum.

Sadly, the MSN Forum was postponed in early spring 2021 due to the uncertainties as a result of COVID-19.

4.3 MSN Callout Volunteer Training Day

The MSN has over 200 volunteers county-wide. Volunteers living in close proximity to each stranding are used wherever possible, as their knowledge of local terrain increases speed of response and enhances safety.

All MSN volunteers complete a full training session before they can be called out to record a stranding. In addition to the theory sessions, life-sized inflatable models of a whale, dolphin and seal are used during training which includes the methods for recording morphometrics and bycatch evidence.

On the 6th of November 2021, MSN coordinated the annual MSN Callout volunteer training day. It was attended by 39 members of the public.



Photo 18: 2021 cohort of MSN Callout Volunteers during the 6th of November training day at CWT offices. Photo by Abby Crosby

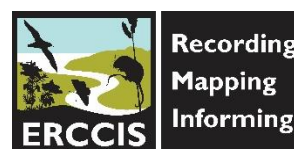


Photo 19: MSN Callout Volunteers during practical training exercise.

5. Acknowledgements

We would like to acknowledge the help of the general public in sending in their reports, and the following partners for their support;

- CWT Marine Strandings Network volunteers, who continue to enthusiastically collect vital data and retrieve carcasses, often under difficult and challenging conditions.
- Dedicated Hotline Coordinators (2021): Joyce Edmonds, Liz Clarke, Meg Hayward-Smith, Gill Peters, Anthea Hawtrey-Collier, Nigel Boddington, Paul Wraight, Emma Holland, Richard Weeks, Kate Bailey, Alyson Devonshire, Sharon Trew, Steve Cavell, Sue King, Jen King, Claire Ridley, Paul Miller, and Lauren Oliver-Friendship.
- Anthea Hawtrey-Collier, Sharon Trew, and Josh Baum, from the Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS) for all their hard work on collating, assessing, and entering records into the database.
- James Barnett, veterinary pathologist and advisor to the CWT MSN and Cornwall Pathology Team.
- Rob Deaville, Institute of Zoology, and the team of CSIP partners including the Natural History Museum, Marine Environmental Monitoring Wales, and the Scottish Marine Animal Scheme (SMASS).
- Sue Sayer for seal ID report input, and the support of Seal Research Trust team and volunteers.
- Dan Jarvis and all Marine Mammal Medics, BDMLR, Cornwall.
- Dr Nick Tregenza, cetacean expert and advisor to Cornwall Wildlife Trust and the MSN.
- Isles of Scilly Wildlife Trust and the island strandings volunteers.
- Cornwall Council and Biffa officers and beach management teams for their assistance.
- All Cornwall's private landowners who assist in reporting and removing carcasses.
- Brendan Godley, Annette Broderick and Matthew Witt from Exeter Marine and Marine Turtle Research Group.
- Chelonia Limited.
- The National Trust Rangers.





Appendix Photo 1: Harbour porpoise, Perranporth, 11/01/21. Photo by Lisa Sharman

Introduction

The Cornwall Wildlife Trust Marine Strandings Network (CWT MSN) has been collecting valuable data on stranded marine life around Cornwall for over 20 years and holds over 10,000 records. The Network is an invaluable tool to monitor the impact of bycatch on cetacean species within the region. To that end, cetacean species reported to CWT MSN undergo rigorous examinations to identify and record signature features identified as being caused during a bycatch event.

Bycatch analysis, 2021 - Post Mortem Examinations

Of the 207 cetacean carcasses that stranded during 2021, 14% (n=28) were suitable and accessible for retrieval by the CWT MSN team for post mortem examination, under licence and on behalf of the Defra-funded Cetacean Strandings Investigation Programme (CSIP). Necropsies were performed by James Barnett, the veterinary pathologist for the Marine Strandings Network.

Post mortem examinations (PME) concluded that accidental entanglement in fishing gear, known as bycatch, was the cause of death for 10 (36%) of the cetaceans examined including 9 common dolphins and one harbour porpoise (*Appendix Table 1*).

Date Found	PM Number	Species (common)	Location	Cause of Death
20/02/2021	EX/C04/21	Common dolphin	Colona Beach, Mevagissey	Bycatch
07/03/2021	EX/C07/21	Common dolphin	Porthmeor beach	Bycatch
23/03/2021	EX/C09/21	Common dolphin	Crinnis beach	Bycatch
24/03/2021	EX/C20/21	Common dolphin	Seaton	Bycatch
27/03/2021	EX/C11/21	Common dolphin	Talland	Bycatch
27/03/2021	EX/C12/21	Common dolphin	Portwrinkle	Bycatch
11/04/2021	EX/C13/21	Common dolphin	Porthtowan	Bycatch
14/10/2021	EX/C20/21	Harbour porpoise	Widemouth Bay	Bycatch
17/12/2021	EX/C26/21	Common dolphin	Carne beach, Roseland	Bycatch
18/12/2021	EX/C27/21	Common dolphin	Pentewan	Bycatch

Appendix Table 1: Cetacean post mortem reports (2021) – Bycatch (source: CSIP)

Bycatch analysis, 2021 - Bycatch Evidence Evaluation Protocol (BEEP) Assessments

The MSN Bycatch Evidence Evaluation Protocol (BEEP) is an invaluable tool to assess bycatch on cetacean species, which has been developed by CWT MSN. BEEP assessments can be done *in situ* on the beach and provide data on external injuries to help identify possible causes of death from bycatch for all animals, not just those that undergo post mortem examination. The process involves cetacean strandings reported to CWT MSN undergoing rigorous external examination by trained volunteers on the beach. Detailed photographs of the carcasses are taken, and these are then assessed to identify, and record, signature injuries and features identified as being associated with bycatch and entanglement in fishing gear. This protocol has been developed from 30 years of experience and is continuously tested and developed to improve the accuracy of bycatch detection.

Of the remaining 179 cetaceans which were not retrieved for post mortem examination, 65 cases were reported to MSN but either a volunteer was not able to attend for a wide range of reasons or we had insufficient data to assess the animal through BEEP. Therefore, these cases have not been included in the BEEP and bycatch analysis for this report.

114 (55% of the 207 total) cetacean strandings were examined and recorded *in situ* by MSN volunteers using the BEEP protocol, and photos examined in detail by experienced BEEP assessors within the Environmental Records Centre for Cornwall and Isles of Scilly (ERCCIS) (Appendix Table 2).

It was found that 18% of the 114 (n=20) showed features consistent with definite or probable bycatch or entanglement in fishing gear. These features are based on recognised net entanglement marks such as fin edge cuts/slices, encircling net marks and severed appendages.

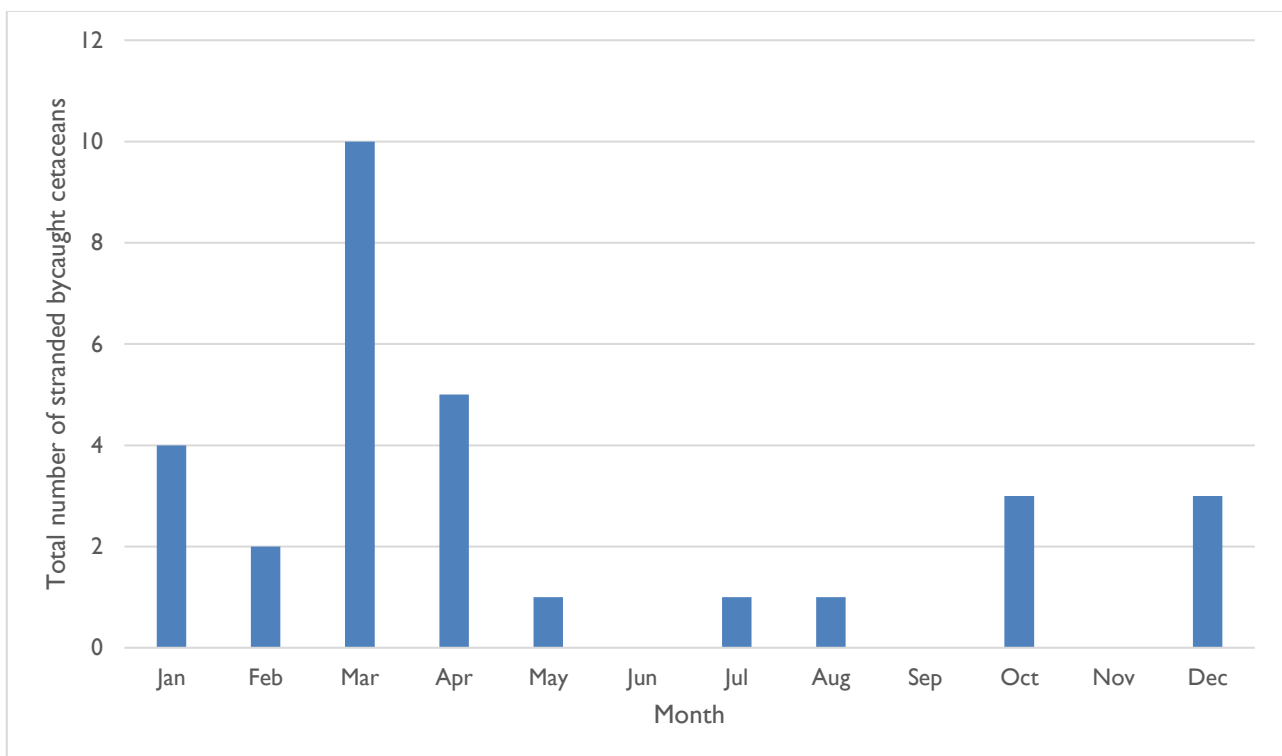
A further 17.5% of the 114 total (n=20) cases showed possible signs of bycatch.

33.3% (n=38) were cases where BEEP assessment was inconclusive based on the data available. 2.6% (n=3) deaths were found to show features consistent with trauma and likely bottlenose dolphin attack.

Beep Conclusion	Total number of animals	% Beep Assessed Cases
Bycatch	16	14.0
Inconclusive	38	33.3
No features	33	28.9
Possible bycatch	20	17.5
Probable bycatch	4	3.5
Trauma	3	2.6
Grand Total	114	100.0

Appendix Table 2: A summary of BEEP conclusions from cetacean cases assessed in situ in 2021

Bycatch cases demonstrated a significant peak in the month of March (Appendix Figure 3).

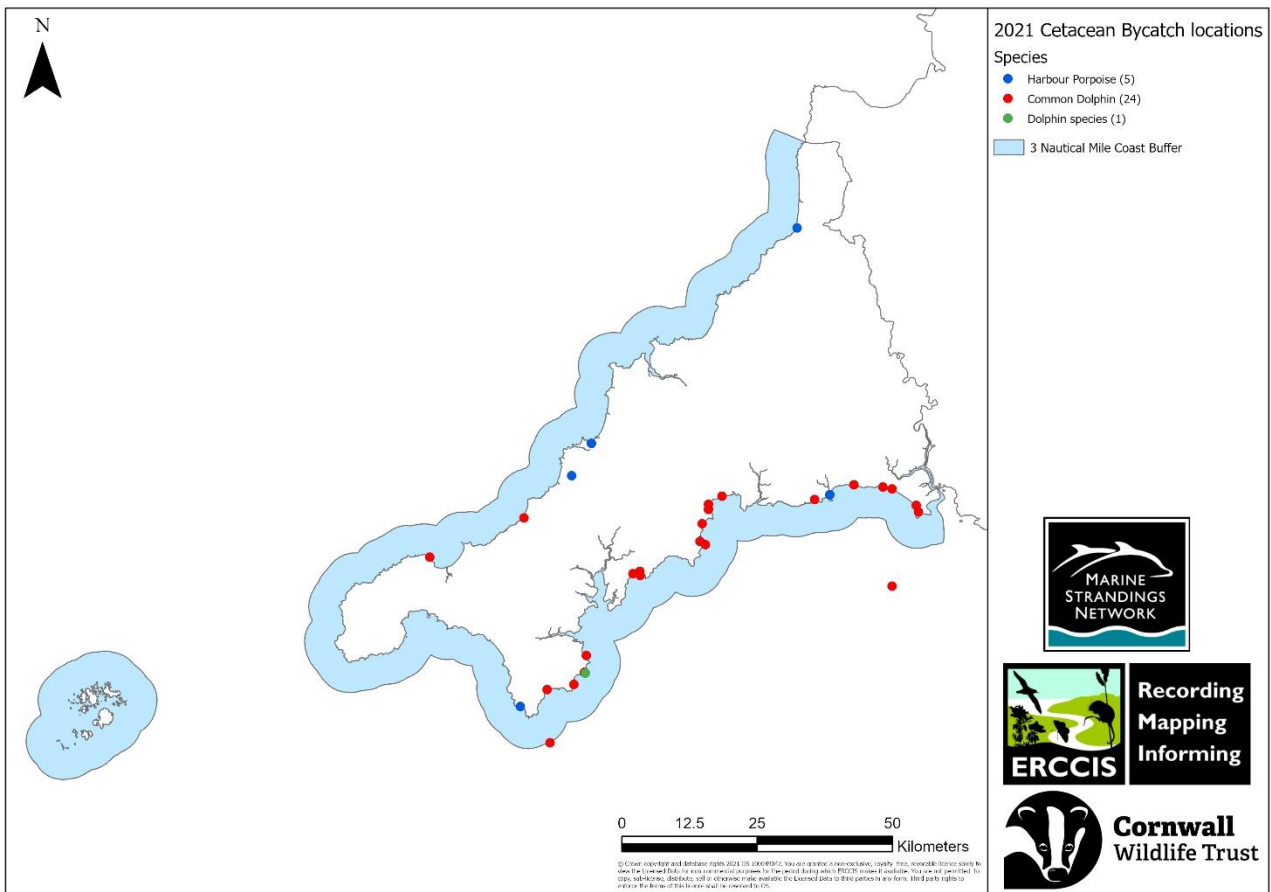


Appendix Figure 1: Number of stranded cetaceans per month in 2021 which exhibited features of bycatch

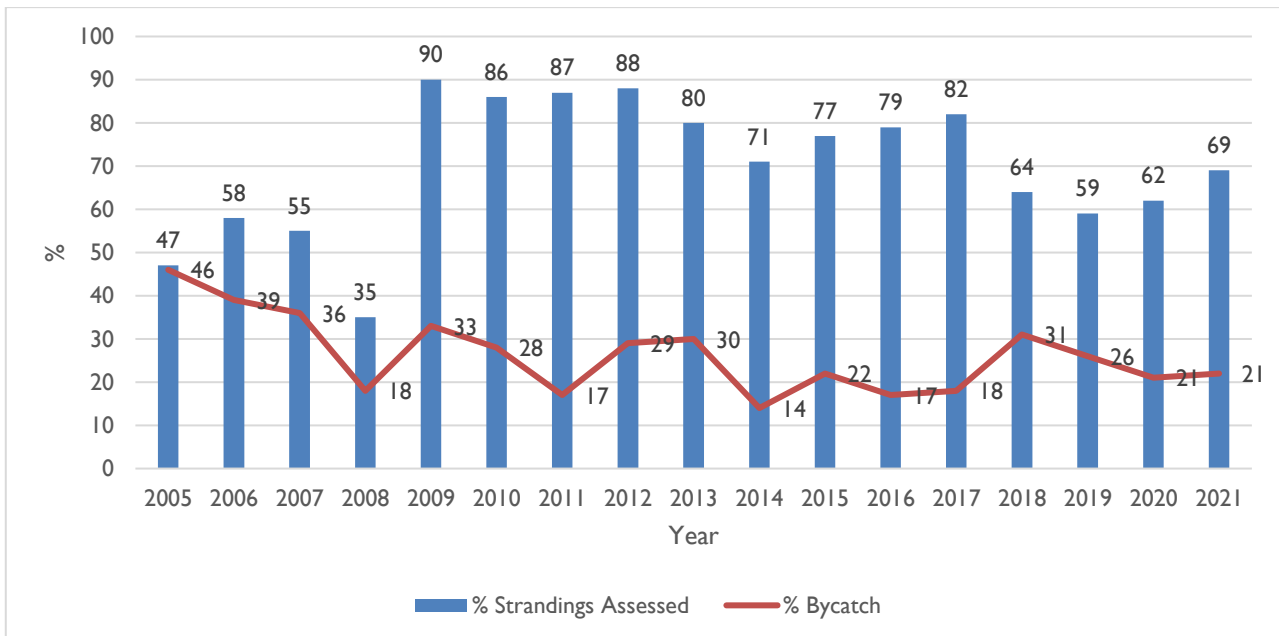
The geographical spread of cetacean bycatch cases through 2021 shows that bycatch cases were spread around the coast of Cornwall, with a high proportion reported on the south coast (Appendix Figure 3).

Bycatch Analysis, comparison with previous years

For a comparison over years, we limit the analysis to common dolphin and harbour porpoise as these are the two most recorded cetacean species in Cornwall. We have only included cases which have been assessed through post mortem examination and/or BEEP.



Appendix Figure 2: The location of 2021 stranded cetaceans with bycatch features; blue markers indicate harbour porpoise, red markers common dolphin, and green dolphin sp.




Appendix Figure 3: The percentage of bycaught common dolphin and harbour porpoise against the percentage of those assessed through post mortem examination or BEEP assessment, from 2005 to 2021.

Since 2005 the proportion of assessed common dolphin and harbour porpoise strandings which were concluded to be bycatch or probable bycatch has ranged between 14% and 46% (Appendix Figure 3). In 2021, the figure sits at 21%, which is the same as 2020 and remains a concerning statistic

Summary of all animals which exhibited signs of bycatch in 2021

Blue highlights the cases which went for post mortem examination. Photos included are a small selection that show some of the features identified during analysis, if you would like further information, please contact the MSN Strandings Data Officer.

Reference	Location	Date	Gross post-mortem examination findings / observations
Common Dolphin C/2021/001	Tolcarne Beach, Newquay SW816619	01/01/2021	Fully encircling multifilament impression behind blowhole in front of pectoral fins. Multiple notches with associated linear impressions to leading edge dorsal fin plus fin edge slice to trailing edge dorsal fin. Multiple notches to leading edge flukes. 2 x large notches to dorsal side peduncle.
			

Harbour Porpoise C/2021/006	Perranporth SW779559	11/01/2021	Thick impression encircling behind blowhole. Tail amputated.
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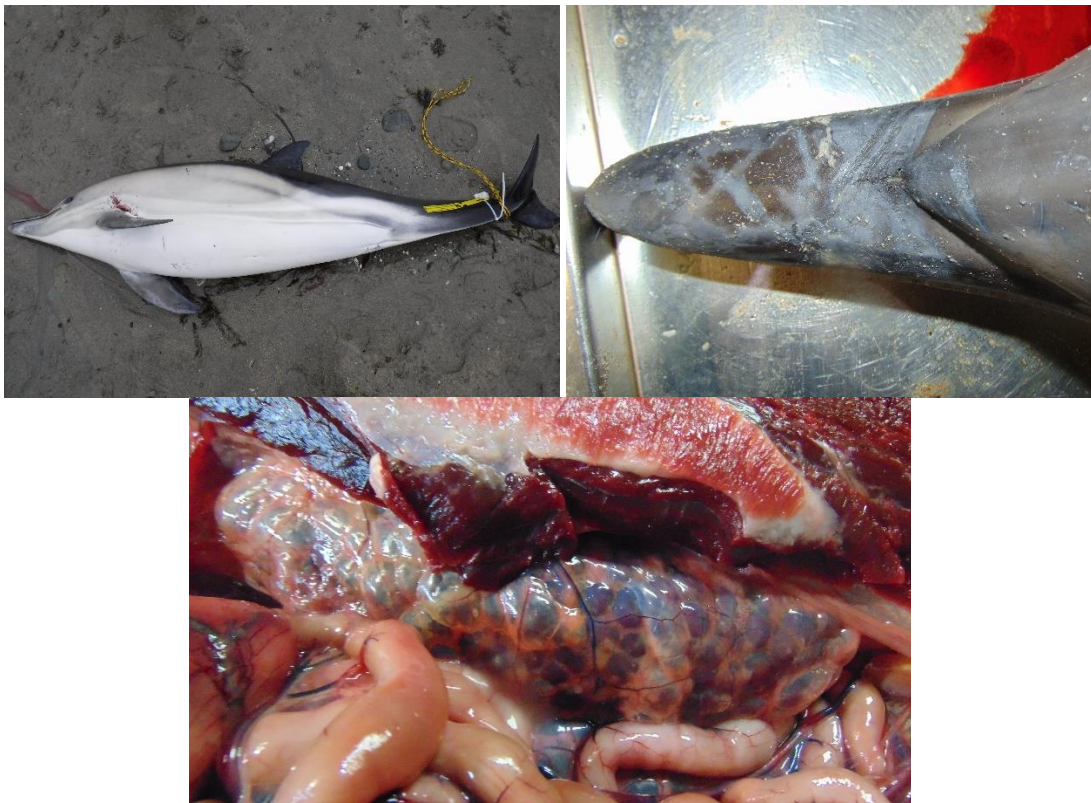
Common Dolphin C/2021/008	Porthbeer Cove, Coverack SW783174	16/01/2021	Multiple monofilament impressions along top lip RHS with associated lip cuts. Tip of beak broken. Fin edge slice to trailing edge dorsal fin. Diagonal linear impression across RHS torso in front of genital slit. Linear impression to tip of beak. Linear impression over beak at melon crease with associated wound. Thick dotted linear impression to RHS tailstock with matching impression to LHS. Fin edge slice to trailing edge fluke.
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Common Dolphin C/2021/013	Kennack Sands, The Lizard SW734164	21/01/2021	Clean cuts to dorsal fin. Linear impressions to underside LHS pectoral fin. Fin edge slice to trailing edge and notches to leading edge LHS pectoral fin. Tip RHS fluke missing with light scavenging. Linear impression across beak in front of melon crease. Linear impressions across RHS beak - lined up over upper and lower. Lip cut to RHS maxilla. Notches with linear impressions to leading edge dorsal fin. Abrasion to front of melon. Thick diagonal impression to tailstock with associated abrasion mark to dorsal side.
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Common Dolphin C/2021/036 SW2021/128	Colona Beach, Mevagissey SX026432	20/02/2021	<i>This subadult female was in good body condition and had fed recently. The linear crossing marks on the rostrum and the skin tags and fin slices on the fins and flukes are consistent with bycatch as the cause of death. The gas bubbles in the mesenteric veins and gas in the renal capsules are also likely to be secondary to bycatch. As this dolphin was relatively fresh, a full selection of tissues has been fixed for histopathology.</i>
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Common Dolphin C/2021/046	Lowlands Point, Coverack SW803196	27/02/2021	Large fin edge slice to trailing edge pectoral fin. Semi encircling impression behind LHS pectoral fin. Linear impression under mandible. Lip cut to LHS maxilla with associated linear impression. Teeth missing to LHS lower jaw.
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<p>Common Dolphin C/2021/055 SW2021/169</p>	<p>Porthmeor Beach, St Ives SW517409</p>	<p>07/03/2021</p>	<p>This adult female common dolphin was in reasonable nutritional state and there was evidence of recent feeding. The linear marks and wounds over the rostrum are, in my opinion, consistent with bycatch in monofilament net. The clean amputation of the tail is consistent with the dolphin being cut out of nets, the encircling rope mark behind the pectorals was presumably used to anchor or haul the animal and the two irregular, similarly sized, deep wounds on the thorax were potentially caused when the animal was gaffed. The lack of tooth wear and the small number of corpora albicantia on the ovaries suggest this was a young adult female. She was not pregnant at the time of death but the presence of some milk in the mammary glands suggested she may have been nursing a calf. There was also evidence of parasitic bronchopneumonia. As this dolphin was relatively fresh, a full set of tissue samples have been fixed for histopathology.</p>
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<p>Common Dolphin C/2021/067 SW2021/219</p>	<p>Crinnis Beach, St Austell SX057521</p>	<p>23/03/2021</p>	<p>This young adult male common dolphin was in reasonable nutritive state and there was evidence of recent feeding. The linear, often encircling linear marks on the head and fins and the clear evidence of deliberate amputation of the tail flukes (and partially of the tail stock) were, in my opinion, consistent with a diagnosis of bycatch in monofilament nets. The asymmetry of the lungs is a finding reported now in several bycaught dolphins. Such hypostatic congestion is typically seen in live stranded animals but potentially this may occur if the bycaught animal is hauled on board while still alive, the animal being no longer neutrally buoyant.</p>
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<p>Common Dolphin C/2021/068 SW2021/220</p>	<p>Seaton Beach, Whitsand Bay SX301542</p>	<p>24/03/2021</p>	<p>This subadult male common dolphin was in reasonable, although perhaps not optimal body condition. However, the evidence of very recent feeding coupled with linear encircling wounds on the pectorals, dorsal fin, one fluke and melon were, in my opinion, consistent with a diagnosis of bycatch. As this was a relatively fresh carcass, samples have been collected for histopathology and swabs taken for bacteriology, and a further report will follow.</p>
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<p>Common Dolphin C/2021/070 SW2021/231</p>	<p>Portwrinkle Harbour Beach, Whitsand Bay SX354538</p>	<p>25/03/2021</p>	<p>This subadult male was in reasonable nutritive state and there was evidence of recent feeding. Despite the significant amount of scavenger related damage to the carcass, the linear impressions over the thorax, encircling notches in one pectoral and the dorsal fin, and the clean amputation of the tail flukes were, in my opinion, sufficiently clear as to indicate bycatch as the cause of death. The finding of shingle as far distally in the gastrointestinal tract as the fundic stomach is typically seen in live stranded animals. This raises the possibility that the animal live stranded after being bycaught, although it seems unthinkable that the flukes could have been removed while the animal was still alive. The line of coalescing depressions along the left side of the carcass are likely to indicate where the animal was buried in the beach substrate.</p>
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Harbour Porpoise C/2021/088	Kynance Cove, The Lizard SW684133	26/03/21	Tail amputated. Semi encircling linear impression in front of RHS pectoral fin. Large fin edge slice to trailing edge dorsal fin. Multiple notches to leading edge pectoral fins.
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Harbour Porpoise C/2021/071	Hannafore Beach, Looe SX256524	26/03/2021	Thick partial encircling impressions x2 to torso in front of pectoral fins. Small notches to leading edges both pectoral fins. Multiple linear notches to leading edge flukes.
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Common Dolphin C/2021/075	Polhawn, Whitsand Bay SX420492	27/03/21	Linear impression behind blowhole. LHS pectoral fin tip missing with clean edge. Fin edge slice to trailing edge of fluke with associated notch to leading edge. Multiple notches with linear impressions to leading edge fluke. Multiple linear impression to RHS lower jaw with matching impressions to upper jaw. 2 x linear impressions under tip of beak.
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Common dolphin C/2021/074 SW2021/230	Talland Beach, Looe SX228515	27/03/2021	<i>This young adult male common dolphin was in good body condition. Unfortunately, there was extensive scavenger damage to the carcass and signs of autolysis internally. However, the linear encircling marks on the rostrum and dorsal tail stock, the clean notch in the caudal insertion of the dorsal fin, the amputated tail stock and the evidence of recent feeding were, in my opinion, consistent with a diagnosis of bycatch.</i>
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Common Dolphin C/2021/082 Found with C/2021/083	Tregantle Beach, Whitsand Bay SX371535	27/03/2021	Flukes amputated. Fully encircling linear impression diagonally at tailstock with another impression going almost perpendicular. Tip dorsal fin missing. Linear impression around RHS pectoral fin with large fin edge slice to trailing edge. Thick linear impression to RHS torso. Linear clean edged wounds to RHS & LHS tailstock.
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Common Dolphin C/2021/083 Found with C/2021/082	Tregantle Beach, Whitsand Bay SX371535	27/03/2021	Flukes cleanly amputated. Small monofilament notch to leading edge of LHS pectoral fin at the shoulder. Small lip cut to RHS upper lip. Tip of beak broken.
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<p>Common dolphin C/2021/092 SW2021/292</p>	<p>Porthtowan Beach, Porthtowan SW691481</p>	<p>11/04/2021</p>	<p>Detailed external examination of the carcass was hampered by extensive scavenger damage and associated skin loss. However, the presence of what appeared to be a multifilament net or rope mark encircling the tail stock at the level of insertion of the tail flukes, the dolphin's relatively good body condition and the evidence of recent feeding suggests that this was a case of bycatch. The damage to gingiva and teeth in the cranial arcades, the haemorrhage in the auditory fat of one mandible and the froth in the airways are also lesions potentially consistent with bycatch.</p> <p>The slight asymmetry in size and congestion of the lungs suggested that the animal was not neutrally buoyant at the time of death and may be consistent with the net being hauled while the dolphin was still alive. The regular lines of circular depressions seen on one side of the carcass were more visible on the beach than at the time of post mortem examination. Their spacing and appearance were not consistent with net marks but were more suggestive of, for example, rivet marks which could have been made when the animal was lying on the deck of a boat.</p> <p>No other cause for the animal's death was found on gross or histopathology, the granulomatous pneumonia being relatively localised and chronic in nature and of limited clinical significance.</p>
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<p>Common Dolphin C/2021/101</p>	<p>At Sea off Carne Beach, stranded at Pendower 22/04/21 SW906375</p>	<p>18/04/2021</p>	<p>Flukes amputated. Multiple encircling impressions to tailstock. Large fin edge slice to trailing edge LHS pectoral fin with notches to leading edge. Multiple notches to leading edge RHS pectoral fin. Large clean edged wound in front of RHS pectoral fin - possible gaff hook wound? Multiple linear impressions to beak.</p>
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Common dolphin C/2021/107	Silvermine Beach, Porthpean SX032497	20/04/2021	Tail amputated.
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Common dolphin C/2021/105	Pendower Beach, The Roseland SW892378	20/04/2021	<i>Multiple notches to leading edge RHS pectoral. 'V' shaped notch to trailing edge RHS pectoral. Broken tip of upper beak - thick linear impression around end. Diagonal linear impression around tip lower beak inside mouth and around tip. Linear impression across melon/beak crease. Linear impressions to leading edge fluke.</i>
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Common dolphin C/2021/109	Porthpean Beach, Saint Austell SX032506	22/04/2021	Tail amputated with second straight edged wound to tailstock. Multifilament fully encircling impression around LHS pectoral fin. Fin edge slice to trailing edge LHS pectoral fin.
			
Dolphin species C/2021/125	Ebber Rocks, Coverack SW781765	05/05/2021	Tail attached only by monofilament netting entanglement. Body cavity open and all organs missing. Linear impression to LHS torso. (Also have video footage)
			

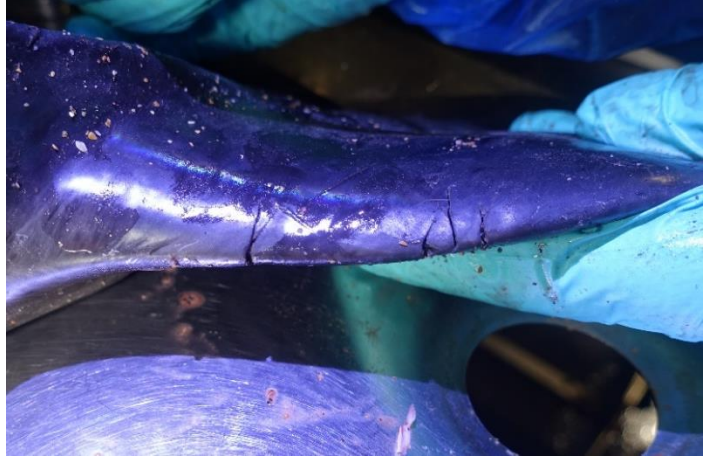
Common dolphin C/2021/133	Boiler Beach, Whitsand Bay SX406504	28/07/2021	Monofilament netting attached to head and wrapped around LHS pectoral fin. Linear impression across front of melon. Small lip cut to LHS upper beak.
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Common dolphin C/2021/137	Portmellon, Mevagissey SX016438	25/08/2021	Tail amputated. Clear, deep encircling marks around LHS pectoral fin. Clear deep encircling multifilament impression around beak. Semi encircling mark around torso RHS.
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<p>Harbour Porpoise C/2021/168 SW2021/763</p>	<p>Widemouth Beach, Bude SS196016</p>	<p>14/10/2021</p>	<p><i>This juvenile male harbour porpoise was in good body condition, although there was no evidence of recent feeding. The V-shaped notch in one pectoral and linear encircling wounds over the dorsal fin, tail stock and flukes are, in my opinion, consistent with a diagnosis of bycatch and this may also explain the hyphaema in one eye and marked pulmonary congestion and oedema. The lack of histopathological changes consistent with pre-mortem trauma in the encircling wounds do not rule out bycatch as peracute underwater entrapment typically leads to sudden death which may well occur before histopathological changes are evident.</i></p>
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<p>Common Dolphin C/2021/209</p>	<p>At Sea off Eddystone Reef SX371355</p>	<p>16/10/2021</p>	<p>Rope around tailstock - at sea</p>
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Common Dolphin C/2021/210	At Sea Inm SE of The Lizard SW739066	21/10/2021	Known Bycatch Small graze to tip of beak. Message from reporter :- I'm working at the moment as an observer on the CEFAS Peltic cruise in the English Channel which is doing sample trawls for a variety of fish. Unfortunately, this evening despite having a dolphin pinger running, we have brought up a bycaught common dolphin.
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Common Dolphin C/2021/201	Porthkerris Cove, St Keverne SW806227	17/12/2021	Linear marks across melon crease and melon. Notches on the beak. Clean cut edges to flank and tail stock, no abdomen. Flukes amputated. Haemorrhage to LHS eye. Shark scavenged.
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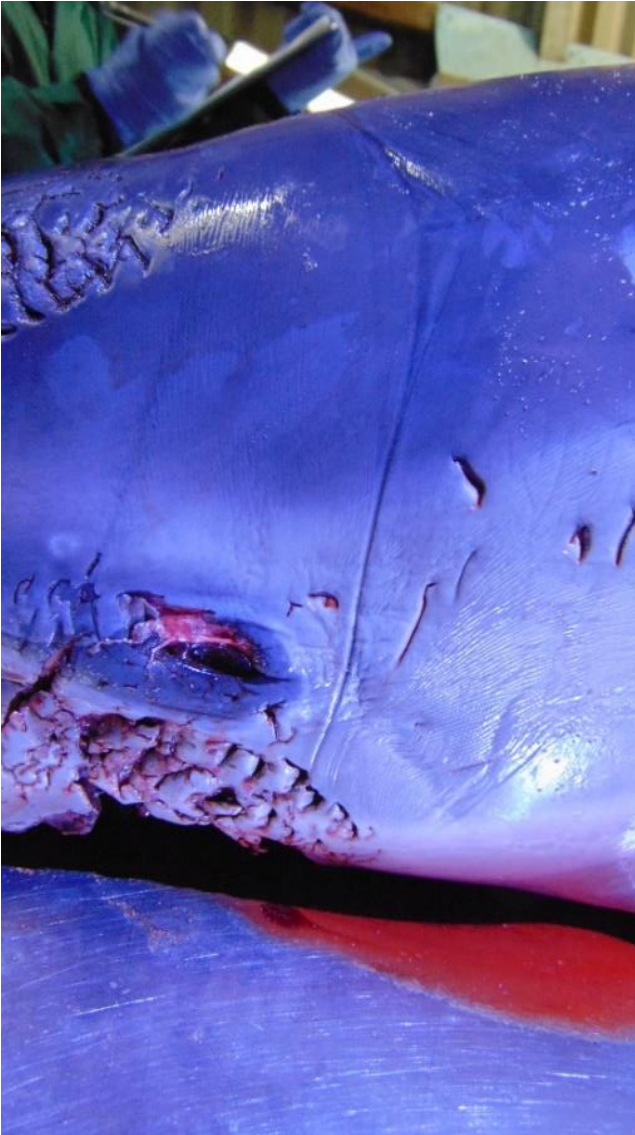


Common Dolphin
C/2021/188
SW2021/915

Carne Beach,
The Roseland
SW905382

17/12/2021

This subadult female common dolphin was in good body condition with some evidence of recent feeding. The encircling wounds on the head, pectorals, dorsal fin, and flukes are, in my opinion, consistent with bycatch in monofilament netting (i.e. likely a set net) as the cause of death. The near amputation of one tail fluke probably occurred when the animal was freed from the net and the large semi-circular wound on the right side of the melon is also suspected to be anthropogenic in origin. Unfortunately, histopathology has not added any further information due to contamination of samples with sand. Internally, the gas bubbles observed grossly in blood vessels in the visceral and parietal pleura, in coronary blood vessels and in mesenteric veins, as well as in fat overlying the heart, also have been reported in association with peracute underwater entrapment. Grossly, there was also evidence of a low-grade recent peritonitis.

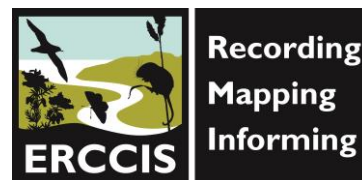


<p>Common Dolphin C/2021/191 SW2021/916</p>	<p>Pentewan Beach, Mevagissey</p>	<p>18/12/2021</p>	<p>This adult male common dolphin was in moderate body condition and had recently fed. Unfortunately, there was significant skin loss and soft tissue damage in this animal which impacted on the ability to carry out a decent external examination, although photographs from the beach did assist in this respect. However, the linear marks on the right flank, and associated dermal congestion, coupled with the pattern of skin loss on the rostrum, and underlying haematoma and bruising on the ventral left mandible, were, in my opinion, consistent with a diagnosis of bycatch in multifilament (i.e. likely trawl) net. In addition, there was evidence of a significant bacterial pneumonia which may, in the long term, have had an impact on the animal's viability if it had not been bycaught.</p>
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All photos courtesy of the MSN team and James Barnett, veterinary pathologist, and the Cornwall Marine Pathology Team.

A huge thank you to Anthea Hawtrey-Collier, Sharon Trew, James Barnett, Sue Sayer, Dan Jarvis and Kate Williams in the compiling of this report.



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The MSN was funded by the



Cetacean Strandings
Investigation Project (CSIP)

Publication Policy

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