





NATURE INCORNWALL ISUNDER THREAT

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EXECUTIVE SUMMARY

STATE OF NATURE

Cornwall's first State of Nature report has been compiled using the best available data for local wildlife. We have highlighted trends in the abundance and distribution of species and habitats, and identified the key pressures wildlife is facing.

The first State of Nature for Cornwall finds:

- In line with the rest of the UK, nature is in decline in Cornwall. Over the last 30 years, nearly half of terrestrial mammals and three-fifths of butterflies are found in fewer places. Almost half of breeding birds have declined. Whilst a few species have prospered, it is clear that an ecological emergency is unfolding.
- Cornwall's wildlife trends broadly mirror national trends, with habitat fragmentation and loss affecting species abundance (number of species) and distribution (where they are found).
- Species of 'Principal Importance' are those listed in Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act. Analysis of wildlife records, on average, show that species of Principal Importance have been lost from almost 40% of their range since 1988, meaning many are found in fewer places. There is evidence that the rate of decline has accelerated substantially in the last ten years.
- Our analysis shows that 12% of Species of Principal Importance, are threatened with local extinction or complete loss from Cornwall. Almost a quarter of all terrestrial mammals and butterfly species are threatened based on the evidence shown i n this report.
- There is a need to understand more about species population declines in Cornwall. There is a lot we don't know and much more systematic monitoring is required.

- Nearly 75% of Cornwall's land area is managed for agricultural use and the majority of land is experiencing a continued decline in nature.
- Approaching 8% of Cornwall's land area is urban or used for transport, although this is less than the UK average and does include gardens and small urban green spaces.
- The 'richest' sites for wildlife are too limited in number, size and quality and disconnected from each other. These include West Penwith, the Lizard, parts of the north and south coast, China Clay Area around St Austell, Bodmin Moor, the area around Bude and northern Cornwall and the Rame Peninsula.
- In 2019 27% of reported dolphin and seal strandings showed signs of being caught unintentionally by fishing activity.
- There is much we can do to reverse the declines. There are many dedicated individuals, groups and organisations already providing crucial information and evidence and taking positive action for wildlife and there are many examples of good practice in agriculture and built development. Through inspirational local case studies and by offering targeted solutions, this report shows how society can respond to the challenges and act now to support nature's recovery.







Within our own lifetimes, we have seen the natural world transform, with a few species that can live alongside humans seeming to thrive, while other species that we, our parents or our grandparents remember from our childhoods seeming to dwindle or disappear altogether.

This report presents much more than anecdotal evidence for these declines. Thanks to painstaking work over many years by those who work in the environmental and conservation sectors in Cornwall, aided by the invaluable and tireless dedication of numerous unpaid volunteers, we can present clear evidence that precious habitats are shrinking, and that both rare and common species are disappearing from our towns, villages, countryside and coastline.

Of course, nature is dynamic. Plant and animal populations naturally wax and wane according to conditions, and species that flourish in one year may fare worse in others. However, the pace and sustained direction of change we are seeing goes beyond natural fluctuation. Though some of our wildlife species can adapt to a changing climate and landscape, many cannot. Add to these the collective pressures of pollution, fishing, areas of intensive agriculture, urbanisation and disturbance, and we understand what shapes the state of nature in Cornwall today. Though gaps in local evidence exist, this report confirms what many have suspected – there is an overall decline in the abundance and distribution of many species and their habitats.

Why does this matter?

Nature, meaning all living plants and animals, is incredible – an intricate, interconnected system that has evolved over millions of years. Our living planet sustains itself and its inhabitants and it is breath-taking in its beauty and diversity. Those of us who live in Cornwall can witness this natural beauty and diversity every day. As humans, we have the ability either to increase nature's rapid decline or to allow our wildlife and wild places to flourish once more.

Every species and organism on this planet relies on a healthy, functioning natural environment. We rely upon dynamic oceans full of life, the geology beneath us, healthy soils, and fresh water. We need the bacteria, fungi, plants and the animals from the smallest invertebrate to the largest mammal. If we set ourselves apart and try to dominate and fight nature, we threaten our own food and water supplies, our own mental and physical health, and our ability to thrive and function as a society into the future.

The report summarises the state of nature in Cornwall including both positive and negative trends, pressures upon nature that we have identified, and action we can take to help put things right.





Carolyn Cadman

CHIEF EXECUTIVE CORNWALL WILDLIFE TRUST



Cornwall's stunning landscapes and magnificent seas can mask the hard truth that nature is in crisis.

This report sets out the state of nature in Cornwall using the best available evidence and environmental records. While the concept

may seem simple, a huge amount of collaborative work has been undertaken to collate the report. Investment in more structured monitoring of species in Cornwall is needed but in lieu of this, we used modelling techniques to produce some of the information on trends, this is not perfect, but it's a start. We look forward to the approach being refined over time and we hope to include analysis of habitat change in future versions of the report.

I am proud that Cornwall Wildlife Trust has led this work but I remain deeply concerned by what the State of Nature Cornwall report tells us. The Trust will use the evidence to further our vision of a Wilder Cornwall with renewed urgency, and we will take inspiration and hope from the case studies featured throughout. Thank you to everyone who contributed their evidence, environmental records, time and resources to bring this report to life. Now we must use the findings and redouble our efforts together, to bring nature back to Cornwall.

Peter Marsh

ENVIRONMENT SERVICE DIRECTOR – CORNWALL COUNCIL



Many people see Cornwall as a green and natural place where wildlife still thrives alongside us. But the beauty of Cornwall masks a very different picture and the evidence tells us that the state of nature in Cornwall is following the same worrying trends seen

nationally and internationally. Once common species are becoming rarer and there are fewer places where nature can prosper: this will limit the nature-based goods that we all benefit from, like clean water and protection from flooding.

It is clear Cornwall is facing an ecological, as well as a climate emergency. This ground-breaking report highlights the importance of long-term monitoring in helping us understand, and plan for, nature's recovery. It showcases the ways in which local people are already working tirelessly for our wildlife. In response to the findings, Cornwall Council is leading the way locally in producing Cornwall's Local Nature Recovery Strategy which will provide a vital new tool in the planning system to better protect and restore our natural place and enable 'One and All' to help bring nature back from the brink. The actions that we take now will define our future, and it is incumbent on us all to deliver a balanced world where our natural places can thrive and enhance our quality of life.

Dr Ilya Maclean

ASSOCIATE PROFESSOR OF GLOBAL CHANGE BIOLOGY- UNIVERSITY OF EXETER



The 2020 State of Nature Cornwall report is a health-check on how Cornwall's wildlife is fairing. It is made possible by the valuable contributions of volunteers who collect biodiversity data, working hand-in-hand with scientist, who analyse these data. Approximately half of all the species assessed have experienced significant declines in the last 30 years, and many are threatened with extinction from the region. Species that, within our lifetimes, where seen regularly in Cornwall, such as Corncrakes, have disappeared entirely. Nearly three-quarters of Cornwall's land area is farmed and still experiencing significant declines in nature. However, it is not all bad news. The region has made great strides in committing to wildlife recovery and I am hopeful that, over the next 30-years, we can begin to reverse these declines.

Why do we need to know the state of nature?

Understanding and evidencing the state of nature is vital in establishing any long term patterns, and can help make the case for restorative action where needed. The national State of Nature report 2019 **nbn.org.uk/stateofnature2019/reports** detailed how nature has changed in the UK, its Crown Dependencies and Overseas Territories. The State of Nature Cornwall report attempts to do the same for Cornwall, so we can see if the trends observed nationally are mirrored here. For the first time, this report draws together local information from multiple sources, providing evidence of the impacts of human activity on wildlife.



State of Nature Cornwall 2020 and local nature recovery

This report contributes to the 'Local Nature Recovery Strategy' which is being developed as part of the wider Local Nature Recovery pilot. Cornwall has been selected as one of only 5 areas nationally to trial a new approach to restoring nature - findings from this report will help the Cornwall pilot prioritise the places and species in greatest need of action within the county.

Where does the evidence come from?

Our evidence comes from a variety of sources including;

- 1. The Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS) which manages wildlife data, much of which is provided by skilled volunteer recorders.
- 2. Our partner organisations and individuals who provided information that informs their own vital ecological and conservation work.
- 3. Local case studies and publicly accessible reports which contain information about nature in Cornwall

A full list of contributors can be found at the end of the report.

How reliable is the 'State of Nature'?

This report uses best available evidence. This means some data comes from research papers produced by scientists, whilst other information has been collected by local experts and volunteers as part of citizen science projects. Together they are vital in building-up a picture of what is going on in Cornwall.

Nature is complex. There is not the resource to study every species and habitat which, inevitably, creates some gaps in our knowledge. In the future, Cornwall's State of Nature can be updated and further refined as more systematic monitoring and new research and data analysis techniques become available. In the meantime, we are confident that the information used in this report is as reliable a depiction of what is happening in Cornwall as is possible with the information available.

Drivers of Change







STATE OF NATURE

Drivers of change

This report identifies six major drivers of change for nature in Cornwall. We look at the ways in which individual **pressures** have the potential to affect wildlife, and the resultant **state** of local populations and habitats in Cornwall today. In **response**, there are clear steps each of us can take to help reverse the damage, and we have also included **case studies** to illustrate some of the fantastic local examples of nature recovery in action.

The pressures on wildlife differ on land and at sea. Agriculture and development are seen has having the greatest negative impact on Cornwall's terrestrial wildlife, whilst overfishing and pollution pose the most significant threat to our seas. Hydrological pressures link both the land and sea, whilst no habitat or species is likely to remain unaffected by the changing climate.

- 75% of Cornwall is farmed. Without improvement to **agricultural management and/or changes in the buying habits of the average consumer,** we will see further losses of birds, mammals, butterflies and other insects.
- **Climate change** means the average temperature in the county has increased by nearly 1°C in last 35 years
- From noise to light to chemicals, **pollution** takes many forms. Marine litter, weighing more than 80,000kg was removed from Cornish beaches in 2019.
- Between 2002-2019, Cornwall's human population has grown by almost 13% . People need to travel, eat and have somewhere to live, so there is a direct consequence in terms of land use change and built development.

- Our activities on land have impacts downstream.
 Freshwater management should help protect wetland areas, yet just 24% of our rivers, and 15% of lakes, are considered good for wildlife (2019).
- Harmful fishing practices and **overfishing** damage the seabed, unbalance marine food webs and accidentally kill non-target wildlife. Seven percent of our seabed is protected from damaging practices.

Nature needs us – and we need nature...

Responses and solutions

Active conservation measures, including:

- Protect and look after remaining wildlife habitats
- Nature-friendly farming
- Habitat restoration schemes
- Landscape-scale conservation projects to restore ecosystems
- Reintroduction of some lost native species
- Managing problematic non-native species
- Continued monitoring

Public understanding and cooperation, including:

- Raising community awareness
- Community engagement with nature and cooperation with the measures listed above
- Specific citizen science projects



THE STATE OF CORNWALL'S NATURE

Cornwall's nature is in decline, experiencing a set of pressures largely driven by human behaviour. Many solutions can be found through local decisions and choices. It is in our own interest to mitigate the damage we are causing to wildlife, and the natural environment and natural resources we depend upon.

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Using biological records and statistical models, we are able to outline indicators of the current state of biodiversity (living organisms) and habitats in Cornwall. The key findings of the analysis are presented in this section.

Changes to the distribution of Cornwall's Species of Principal Importance

Species occupancy modelling was used for this analysis. It is a way of measuring the change in the proportion of an area where species are found. More simply, it can be thought of as the average change in range for a given species. The species occupancy modelling in this report does not look at the abundance (total number of individuals) of particular species and could mask the true nature of species' declines. We looked at 336 species both in the long term (over 30 years, between 1998 and 2018) and in the short term (over ten years, between 2008 and 2018).

Figures One and Two show the change in distribution in the long term for Species of Principal Importance in Cornwall.

The Species of Principal Importance are those listed in Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act. Of the 942 priority species on the list for England, data is available to reliably assess changes in distribution for 132 species in Cornwall. We have also included evidence of distribution changes in species not on the Principal Importance list. This being 25 mammals, 131 breeding birds and 36 butterflies, as well as an assessment of the abundance of breeding birds from a partner organisation, the British Trust for Ornithology.



Figure One: Long term Indicator for Species of Principal Importance in Cornwall



If you would like to learn about the types of analysis used to create this report. Please download the technical summary for the detailed explanation of the species trend modelling, red list assessment and species distribution assessments.

Local extinctions and threatened species in Cornwall

Local extinction (a species no longer being present in a given location or region) can be difficult to prove in mobile species such as birds, as opposed to static species such as flowering plants. However, since the 1970s (the baseline for much biological recording and Species Atlas production) there is evidence that 21 breeding birds, four vascular plants and eight bumblebees have gone extinct from Cornwall. It is believed that other species groups have suffered extinctions from our region too, but specific evidence is lacking.

According to information from our partners the British Trust for Ornithology, Cornwall Birdwatching and Preservation Society and the University of Exeter¹, there are 21 bird species that once bred in Cornwall and no longer do so. These include some species which stopped breeding (went locally extinct) several decades ago but within living memory, like the Red-backed Shrike, Ring Ouzel, Woodlark, Turtle Dove and Corncrake. More recent disappearances of breeding records include the Wood Warbler (2000) and Pied Flycatcher (2003). It is worth noting that some breeding birds are on the brink of disappearing, including the Kittiwake, Willow Tit and Corn Bunting.

Four species/subspecies of vascular plant² have gone locally extinct since the 1970s. These include the Great Bladderwort (*Utricularia vulgaris*), Great Sundew (*Drosera anglica*), a fumitory (*Fumaria muralis subsp. neglecta*) and Crimson Early Marshorchid (*Dactylorhiza incarnata subsp. coccinea*).

The eight species of bee regarded as locally extinct in Cornwall³ include the Ruderal Bumblebee (*Bombus ruderatus*), the Broken-belted Bumblebee (*Bombus soroeensis*) and the Shrill Carder Bee (*Bombus sylvarum*).

Since the 1970s there is evidence that:



from Cornwall.

Species which stopped breeding several decades ago but within living memory:



More recent disappearances of breeding records:



Breeding birds on the brink of disappearing:



Red List assessment of Cornwall's Species of Principal Importance

The International Union for Conservation of Nature (IUCN) Red list and UK Red List assessments are some of the best conservation tools for understanding how threatened a given species is. We assessed 374 Species of Principal Importance recorded in Cornwall against the IUCN categories, using long-term and short-term modelling. *Figure three* shows that almost 13% of Species of Principal Importance are threatened and could become locally extinct in Cornwall. It is worth noting, however, that local IUCN assessments are subject to more uncertainty, especially for mobile species and when using ad hoc biological records.



12.6% (47) Species of Principal Importance are threatened with local extinction in Cornwall



Understanding shifting environmental baselines

In the absence of past environmental information, members of each new generation accept the situation in which they were raised as being normal⁴. Younger generations accept an environment that seems degraded to their parents and grandparents. Shifting baselines suppress our perception of environmental damage and, crucially, lower our ambition about what is possible in terms of nature recovery. When looking at the graphs in this report, we should keep in mind that we are looking at information from a relatively limited time-span.



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Species richness assessment for Cornwall



'Species richness' describes the number of different species present in an area, irrespective of their abundance. For information about the modelling used, see separate technical summary.

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Figures four to seven show the four species groups. The darker the colour, the higher the number of different species recorded in that area. However, it does not include any lower or higher plants, nor most invertebrates, which are vital for a functional ecosystem and nature recovery. Figure eight demonstrates the 'richest' areas, combining data for the Species of Principal Importance, breeding birds, terrestrial mammals and butterflies alongside the locations of the statutory designations and nature reserves.



An overview of species recording in Cornwall

Recent international estimates show that the total population of the world's wild vertebrates (fish, amphibians, reptiles, mammals and birds) fell by 60% between 1970 and 2014⁵. As shown in the headline of this report, according to our own IUCN Red List assessment, nearly 13% of Species of Principal Importance are threatened in Cornwall, but this does not reflect how all the different species groups are responding to the pressures brought about by human activity.

The biological records database hosted at ERCCIS demonstrates that 15,800 different species have been recorded in the last 30 years⁶. This State of Nature report is focused on the species groups that are most well-recorded: birds (over 500 species recorded: 28.2% of all records in the long term), vascular plants (over 1,750 species recorded: 27.8% of all records in the same period), butterflies (50 butterfly species: 4.8% of records, again in the same period) and, to a lesser degree, mammals (over 40 terrestrial mammals: 1.2% in the long term). It should be noted that millions of

available species records are not used in our analysis, due to computational time constraints.

There are inevitably trade-offs when preparing a report that is attempting to cover the entire breadth and complexity of Cornwall's ecology. For details on the status of specific species groups, see publications like the Cornwall Red Data book⁷ or one of the many excellent species atlases including, but not limited to, *A Flora of Cornwall; Cornwall Bird Atlas; Butterflies of Cornwall: Atlas for the Twenty-first Century; Ferns, Clubmosses, Quillworts and Horsetails of Cornwall and the Isles of Scilly; the Cornwall Bumblebee Atlas; The Mammals of Cornwall and the Isles of Scilly.*

Most of the data presented in this report is produced by analysis of our rich heritage of biological records, but does not cover a very large number of species groups⁸.

Below is a limited overview of four of the best recorded species groups.

Cornwall Red List assessment of four well-studied species groups

Figure nine illustrates data gathered from between 2008 and 2018, and shows that many species are at risk of local extinction in Cornwall including 5% of the 131 assessed breeding birds, 24% of the 25 assessed mammals and 21% of the 36 assessed butterflies. A quarter of terrestrial mammals and one-fifth of butterfly species in Cornwall are also currently threatened. These are some of the most studied and understood species groups in both Cornwall and the wider UK. The lack of evidence for the species groups that form the building block of local ecosystems, like fungi, algae and lower plants, is flagged as a concern; the state of these groups is mostly unknown. Resources are urgently needed to gather the relevant evidence.



Figure nine: Red List assessment using IUCN red list criteria for species groups in Cornwall (2008 -2018)

Birds

Birds are found in every habitat in Cornwall. This report presents occupancy trends from our analysis of 131 breeding bird species, alongside abundance summaries for 38 breeding birds. Those with a specific interest in birds can find more information from the Cornwall Bird Watching and Preservation Society, the British Trust for Ornithology or the Royal Society for the Protection of Birds⁹.

Estimated Abundance 1994 (Scaled Value) = 100 With such a broad range of ecological niches, birds are an ideal species group for monitoring changes in Cornwall's environment. We have found some general trends in groups of birds but it is a very mixed picture: those associated with the farmed environment and general countryside are declining in both number (abundance) and places they are found (occupancy). In the UK between 1967 and 2016, once-common insectivores, like Grey Partridge (-92%) and Nightingale (-93%) have declined¹⁰. In Cornwall, these species have declined alongside other specialists like Yellowhammer (-2.4% fewer places per year) and Corn Bunting (-4.9% fewer places per year). Given Cornwall's coastal geography, seabirds are particularly important. There is no Cornwall metric for seabirds, but the average 28% decline in the UK is of concern¹¹.

It is not all bad news. There is evidence that urban birds are stable, with some species increasing in abundance, but this is based on a very limited analysis. Birds associated with wetland are increasing in abundance and found in more places. Species that have increased in occupancy include Great Crested Grebe (5.3% more places per year), Black-headed Gull (4.4.% more places per year) and



Siskin (1.8% more places per year). Birds associated with woodlands are increasing overall in abundance and are found in more places. However, figure twelve shows that when these are split into specialist woodland bird species and generalist woodland bird species we can see that specialist woodland species are found in fewer places, while the generalists are increasing their distribution. This demonstrates that we must be careful when drawing conclusions from the grouped indicators.

The success of reintroductions of formerly breeding birds like the Cirl Bunting and Chough shows the potential for strong population growth (see case study on page 32) when nature is supported.



The trends around breeding birds are mixed. Over ten years (2009–2019) we can see the following trends in breeding birds.

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Mammals

Since 1988, the number and distribution of mammals has fluctuated in Cornwall. The long-term trend taking all sub-groups of mammals together is stable, but the situation is more complex than the overall indicator suggests as significant increases in some species groups mask the decreases in others.

Large herbivores are doing well in Cornwall, with species like Roe Deer found in 12.1% more places per year. Bats have seen a significant increase in the last 30-year period, strong protection is likely to have played an important part in this. Species like the Common Pipistrelle Bat (7.6% more places per year) and the Barbastelle Bat (5.9% more places per year) are noted for their long-term increase in the places they are found. However, other terrestrial mammals have not faired so well, as we see with the carnivores. Find out more from Cornwall Mammal Group¹².





Recording mammals is complex, but well-organised recording is in place for the following species, and new volunteer recorders are welcome¹¹:



Dormouse Good recording

history but monitored on a limited number of sites



A well-defined survey protocol and active monitoring in Cornwall



1.6% more places per year

A species of national concern and local survey protocol in Cornwall

Hedgehogs



Reintroduced

Water vole

A recently reintroduced species with defined locations to target



fewer places

per year

Rabbit

A species that is probably found all over Cornwall, but is under-recorded



Pipistrelle Species

8.9% more places per year

Bat detectors are a great way to start recording bats in Cornwall

Insects

Butterflies are the best-studied of all insects. Data from Butterfly Conservation's (UKBMS) United Kingdom Butterfly Monitoring Scheme Transect Data 2009–2018 – shows a declining trend for 62% of butterflies (using data for 23 of 37 regularly occurring species). Cornwall echoes many of the trends seen in the South West and the UK; this is also largely a trend of decline. However, there are several species that buck this trend.

In general, specialist butterflies are in huge decline in Cornwall, but generalist butterflies are increasing in occupancy. *Figure sixteen* shows the trends of 'generalist' and 'specialist' butterflies in Cornwall using ad hoc records from 1988 to 2018. Those with an interest in butterflies can find out more from Cornwall Butterfly Conservation and Cornwall Butterfly and Moth Society¹³.

Butterflies causing concern in Cornwall include¹⁴:

Dingy Skipper

Penhale Sands remains the best site to see the Dingy Skipper. The butterfly needs a short sward with taller vegetation nearby for shelter.

Pearl-bordered Fritillary

Found in only three main areas: Marsland Reserve in North Cornwall, west Bodmin Moor, and parts of the south-east coast. The downward trend has been partially stabilised in the last ten years in the Bodmin Moor area with support from the All the Moor Butterflies project.

Grayling

Over half the sites in Cornwall, particularly inland, have been lost.

The general picture for insect species is one of decline and this is a huge cause for concern. Overall abundance of larger moths in southern Britain fell by 40% (1968–2007)¹⁵ and 23 species of bees and flower-visiting wasps have gone extinct in the UK since 1850¹⁶. Eight species of bee are regarded as locally extinct in Cornwall³.

Insects are important in all terrestrial food webs in Cornwall, but some sites are a priority. Important Invertebrate Areas have been created by Buglife, highlighting some of the most important areas for insects and other invertebrates in Cornwall.

We need much more focus placed on structured insect monitoring, to get closer to the full picture.

Butterfly Trend category (based on amount of distribution change shown as a percentage of the 36 species analysed)







The long-term trends for butterflies show that 50% of the 36 species analysed are found in more places, but over 40% are found in fewer places.



Flowering Plants



Our entire terrestrial ecosystem is built upon vascular plants. A Flora of Cornwall² describes 3,018 species recorded in the county. Many rare plant taxa are found in Cornwall, including Cornish Heath, part of the unique floral diversity on the Lizard Peninsula, and Cornish Eyebright on heathlands. The sand dunes, coastal grasslands and heaths, plus the stunted Dizzard Woodland, of the north coast are hugely important.

Two atlases, A Flora of Cornwall and Ferns, Clubmosses, Quillworts and Horsetails of Cornwall and the Isles of Scilly¹⁷ show the status of all plants in Cornwall following systematic surveys. Those with an interest in all plants can find out more from Botanical Cornwall Group¹⁸. The status of flowering plants is complex. The areas (1km squares) with the most recorded plant species (outside of the Isles of Scilly) are all harbours: Par; Hayle and Truro, each having a high component of alien introductions, whilst Kynance is the richest area for native plants². Much of



Cornwall has rare and threatened plant species; figure eighteen: the 1km hotspot map using IUCN criteria, and figure nineteen: Plantlife's Important Plant Areas¹⁹, show the locations of these.

Plant species trends are not modelled for this report. However, *A Flora of Cornwall* shows that since 1999, 51% (441 species) of native plant species have declined (having been recorded in fewer squares using systematic surveys). The majority of declining species are typical of wetland, moorland and heathland areas². However, the greatest losses have occurred on cultivated land due to the use of agricultural chemicals (herbicides, pesticides, fungicides and artificial fertilisers) over the last fifty years. In Cornwall in these five decades there has been a 90% reduction in the number of native plants affecting an area larger than that of West Cornwall². Since 1999, over 242 new neophytes (a plant newly introduced to an area) have been recorded. The impacts of these introductions are not yet known.

Some plants are endemic and found only in Cornwall and a few other UK locations. These include the following:









Fungi, lichens, lower plants and algae

Fungi are found everywhere in Cornwall, especially in undisturbed areas. Fungi are either parasitic (living off other species), saprophytic (breaking down material), or mycorrhizal (existing in symbiosis with plant roots). Those with an interest in fungi can find out more from Cornwall Fungus Recording Group⁶. Fungi, lichen and lower plants, alongside vascular plants, underpin our entire terrestrial ecosystem; the same can be seen with micro algae and macro algae in the marine ecosystem. The overall status of these vital species groups is not understood in Cornwall. Since 1988, over 875 different lichen species and around 2,500 fungi species have been recorded in Cornwall⁶. Cornwall is nationally important for its bryophyte (mosses and liverworts) and lichen species, including many rare species found in both the West Cornwall Bryophyte and North Cornwall & Devon Coastal Woods Important Plant Areas. More research is vital to understand the importance of subsurface fungi and the plethora of interconnecting food chains that rely on these groups.

Cornwall's Local Nature Recovery Strategy

Cornwall is one of five Local Nature Recovery pilot projects chosen by Defra in England. Work on the Cornwall Local Nature Recovery Strategy started in September 2020. Cornwall Council is the lead responsible organisation delivering the Local Nature Recovery pilot. It is being created with the Cornwall and Isles of Scilly Local Nature Partnership (LNP). The Cornwall Local Nature Recovery Pilot will specify how Cornwall will achieve a target of 30% of the land and seas of Cornwall and Scilly being positively managed for nature by 2030. The pilot will help us to

understand where the best places are for nature in Cornwall, and where there is the most potential for nature to recover and provide communities and businesses with enhanced nature-based solutions, such as carbon drawdown, pollination and reduced flood risk. A prototype Nature Recovery map has been created www.lagas.co.uk, which displays the existing nature network and opportunity areas for biodiversity and nature-based solutions. This work will guide local policy initiatives such as Biodiversity Net Gain and biodiversity offsetting and will

strengthen other local ambitions for nature-based solutions, including the Forest for Cornwall, natural flood risk management and coastal adaptation to climate change. You can get involved or follow progress of Cornwall's Nature Recovery Plan Strategy https://letstalk.cornwall.gov.uk/ nature-recovery-plan, and see how the ground-breaking Environmental Growth Strategy provides the foundations for long term nature recovery in Cornwall https://letstalk.cornwall.gov.uk/ environmentalgrowth



An overview of habitats in Cornwall

Cornwall has approximately 354,699 hectares of land (terrestrial habitat), to mean high water (average levels at high tide). This extends to 361,073 hectares to mean low water (average levels at low tide). There are 199,369 hectares of estuarine, intertidal and marine areas (to three nautical miles) from mean high water.

The mapping used as a baseline for this report includes over 60 habitat types⁶.

Almost 75% of Cornwall's terrestrial land is in agricultural production, which is both a pressure and an opportunity. Historically and currently, Cornwall has relatively low levels of woodland (9.9%) and built environment (5.5% including gardens) compared to other parts of the UK. It also has 430 miles of intertidal habitats (697km of coastline) and five large estuarine complexes.



Wildlife habitats in Cornwall – both historic and modern – fall under a wide array of forms of protection. The statutory protections (*figure twenty-two*) for nature covering the largest area are 137 Sites of Special Scientific Interest (SSSI), which cover nearly 6% of Cornwall (21,146 hectares⁶). There are also 505 County Wildlife Sites, covering nearly 10% of Cornwall (33,000 hectares) in *figure twenty-three*.

Cornwall's natural environment is complex, dynamic, and is not monitored to a universal standard. Our best evidence from surveys exists for the terrestrial and intertidal habitats, but marine and estuarine habitats are also a hugely important part of Cornwall's environment. Utilising information from ERCCIS and our partners, a baseline of Cornwall's terrestrial and marine environment and a range of information is presented in *figure twenty-five*.





Protect the best-County Wildlife Sites and County Geology Sites

County Wildlife Sites

In addition to statutory Sites of Special Scientific Interest (SSSI), Cornwall has a suite of non-statutory County Wildlife Sites (CWSs) covering almost 10% of the land area. These sites are in both private and public ownership. Their locations can be viewed on the Cornwall Council interactive map map.cornwall.gov.uk/website/ccmap but please note most of these sites have no public access. Protecting and enhancing our network of CWSs is vital; they are some of the most wildlife rich areas that remain in Cornwall. These core areas of semi-natural habitat that can be linked and expanded and contain the species which can spread outwards to re-populate new areas. Unfortunately, the lack of statutory protection means they are being damaged and lost at an unprecedented rate. These sites cannot be recreated, the complex network of interrelationships between habitats and species takes hundreds of years to build up but can be destroyed in an instant.

County Geology Sites

Cornwall is one of the most geologically diverse counties in England; its 500-million-year geological history has resulted in a great diversity of igneous, sedimentary and metamorphic rocks with economically important mineral deposits and rare fossil material. Geomorphological processes created and continue to shape our hills, rivers, valleys and coastal slopes. The extensive bedrock, surface sediments, soils and water constitute a non-living component on which Cornwall's terrestrial and marine ecosystems depend. Cornwall has more than 85 statutory Geological SSSIs but also 120 non-statutory County Geology Sites (CGSs). CGSs can be viewed on the Cornwall Council interactive map, but many have no public access and are at risk of damage or loss. The extensive bedrock, surface sediments, soils and water constitute a non-living component on which terrestrial biota has developed since the end of the last Ice Age, and maintain the dynamic ecosystems on which Cornwall's biodiversity depends. Geodiversity and biodiversity interact to shape ecosystems, and these links, in turn, affect ecosystem responses to climate change.

Cornwall's Terrestrial, Estuarine, Intertidal and Marine Environment

Baseline habitat assessment (not change analysis) for terrestrial habitats in Cornwall.

 $\mathbf{074.4\%}$

woodland and scrub

MOORLAND, UPLAND & HEATHLAND

3 5.7% BUILT ENVIRONMENT

4 5.5% TRANSPORT

52.4%

WETLANDS 6 1.8% WATERWAYS 7 0.3% Nearly 30% of the coast is a INTER-TIDAL MUD

13% of Cornwall is designated as either a SITE OF SCIENTIFIC INTEREST and County Wildlife Sites Nearly 29/6 of Cornwalls land area is covered by ANCIENT WOODLAND





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STATE OF NAT



With nearly three quarters of Cornwall being used for agriculture, the Influence of farming practice on Cornwall's nature is high¹. The post-war demand for increased food production, facilitated by technological advances, has resulted in a less diverse landscape and a reduction in extent of many semi-natural habitats like orchards, wetlands, hay meadows, ponds and hedgerows. Cornish agricultural land use produces food in a mix of extensive and more intensive systems. The economics of farming and consumer choices has meant farmers have needed to increase yields using fertilisers, pesticides and mechanisation². Some farmers are choosing a different approach however, reducing costly inputs and associated carbon emissions and producing food in a much more regenerative way. There are examples in the case studies of how nature and farming can both thrive.

Some land management practices have had significant impacts on wildlife. These include:

- Changes to marginal habitats, inappropriate hedge management and removal of trees, scrub, wet areas and other semi-natural habitats to make way for farmed land, resulting in **direct loss of habitat**^{3 & 4}.
- Changed timing of certain cropping practices, such as altering seed sowing times from autumn to spring, resulting in less food for wildlife in fields over winter.
- **Increased pesticide use**⁵, resulting in significant declines in pollinators and other insects⁶.
- Rapidly **altering cropping types** or practices⁷, e.g. switching from hay making to silage production; silage is generally cut much earlier in the year and more frequently than hay so is less beneficial to wildlife.
- Greater mechanisation can result in **declining soil quality and soil loss** caused by compaction and exposure. Directly affecting invertebrate species that live in soil and their predators e.g. birds⁸.
- **Soils exposed over winter** can erode leading to sediment input to rivers and lakes, negatively affecting freshwater species⁹ and creating algal blooms.
- **Intensive livestock production methods**, use of artificial fertilisers, pesticides and plastics, leading to direct contamination of soil and waterbodies, which can decrease local biodiversity¹⁰.



Cornwall's farmland species

The modelling undertaken for this report (for details please see the technical summary) shows farmland birds were found in 11% fewer places from 1988 to 2018.

The Breeding Bird Survey (BBS) for Cornwall (1994–2019) reveals an overall decline in abundance of breeding bird species associated with agricultural land, including the **Linnet** 41% decline; Rook: 31%; Yellowhammer 62%. Skylarks are a species of 'Conservation Concern' due to recent national population declines. In the UK numbers have declined by 59% (1970-2015) and in Cornwall they have declined in abundance by 40% (1994-2019). Declines have multiple causes including direct habitat loss, predation, changes to arable practice i.e. spring-sown to autumnsown cereals and the change from traditional hay making to silage production.

Specialist butterflies were found in far fewer places from 1988 to 2018, a decline of 73%. Species like the **Small Pearl-bordered Fritillary** has decreased by nearly 5% a year and **Grayling** declined by around 3% a year in Cornwall. It is likely that some of this decline is due to changes in agricultural practice.







Cornwall's farmed environment

Much of Cornwall's agricultural land is permanent or semi-permanent improved grassland with over 20% of the agricultural land used for arable & horticulture.

Of the arable land the NFU estimate that 66% (33,887 Ha) is cereal crops (2019).



One way to mitigate the impacts of agricultural management is to encourage more regenerative methods of farming that seek to maximise biodiversity, prioritise soil health and reduce impacts on water by reducing fertiliser and pesticide use. This can be done voluntarily by farmers or encouraged through consumer demand and entry into government agri-environment schemes.



Environmental Stewardship

Many farms in Cornwall are in Environmental Stewardship schemes. At the end of 2017 Cornwall has 42,650 Ha of land (12% of land area) were covered by an entry level or higher agreement.





High Nature Value

High nature value farming¹¹ describes low-intensity farming systems which are particularly valuable for wildlife and the natural environment. There are three main types: farmland with a high proportion of semi-natural vegetation (like heaths, downs and moors); farmland with a mosaic of low intensity agriculture and natural elements, e.g. patches of woodland or scrub and farmland supporting a rich assemblage of rare species¹².

With the UK's departure from the EU and the Common Agriculture Policy, the future of farming is at a crossroads. Now is the time to capitalise on the valuable work of many of our local producers who are already farming with nature. The recent Agriculture Act and forthcoming Environmental Land Management Scheme have the potential to deliver food production alongside environmental growth. As consumers we need to to support nature-friendly farmers. Making ethical choices about the food we buy, and being prepared to pay more for it, will enable farmers to invest in a more sustainable future.

Here's what you can do

Individuals

- Think about where the food you purchase comes from and re-introduce the concept of seasonality into your shopping basket
- Buying from farms practising regenerative agriculture ensures your food is produced with nature, not against it
- Reduce household food waste buy what you will eat and eat what you buy

Land owners

- Seek advice on how your farming can take nature into account – follow economic and environmental best practice to reduce pesticide use; look at how hedges and boundaries are managed; protect water quality and soil health; and create wildlife friendly habitats.
- Prepare your farm for improved environmental performance as part of your long term business strategy

Decision makers

- Implement environmentally responsible food procurement across Cornwall
- Lobby Government to implement new agriculture policy and ELMs which deliver for nature
- Ensure environmental best practice is maximised across the 10,800 acre county farm estate



The Pascoe Family, Lower Boskenwyn and Godolphin

The Pascoe family are organic mixed farmers, managing two farms in west Cornwall - Lower Boskenwyn, near Gweek, and land around the Godolphin Estate. With a holistic approach to farming, their livestock is fed with home-grown forage and grain. They practice minimum tillage techniques to protect their soils and their organic arable production incorporates wide field margins, cover crops and over-winter stubbles in rotation, benefitting pollinators and farmland birds. Woodland edges and hedges have widened into scrub corridors, and herbal leys improve

soil health and biodiversity. Working closely with the National Trust, the Pascoes use cattle to graze the heathland around Godolphin and manage the mosaic of scrub and bracken to improve the habitat. The pastures and traditional hay meadows are awash with bees, butterflies and bats, and the grazing land is particularly beneficial for invertebrates which in turn attract farmland birds. This is an excellent example of delivering nature recovery alongside sustainable, high-quality food production.

Cirl Bunting Re-introduction project

During 2006–2011, an ambitious project by the RSPB to return Cirl Buntings to Cornwall saw over 300 hand-reared fledglings released on the Roseland Peninsula. A vital component of any reintroduction is to address the reason why the species was lost in the first place. A bird of farmland, they need seed-rich winter foraging such as cereal stubbles, grasslands full of invertebrates in the summer for foraging for chick food, and thick hedges or scrub to nest in. Being a sedentary species this all needs to be available at a farm scale. In this case there was a receptive local farming

community which supported the project by creating suitable Cirl Bunting habitat. A reintroduction of this type had not been attempted for a songbird elsewhere in Europe, so when released birds bred in 2007 it was fantastic news, but it took five further years of releases before the population established. There are now around 65 territories, and with further habitat improvements the future looks hopeful for our Cornish Cirl Buntings.

For further information: www.rspb.org.uk/our-work/conservation/ projects/cirl-bunting-reintroduction/

The Cornish Chough

Paloresow kernewek -Cornish Chough

The natural return of the Red-billed Chough (Paloresow Kernewek in Cornish) in 2001 was of great significance for Cornwall. The population is soaring now (over 100 birds), with the public and land managers helping to secure its future. Dependent on extensively grazed coastal strip along with flowerrich arable for food, the chough was under pressure from both abandonment and intensification of farming. Sympathetic land managers and owners, supported by face-toface advice and government agrienvironment schemes, means that suitable habitat now occurs along the coast of Cornwall, allowing the chough to spread. Population monitoring and species protection has been carried out by dedicated volunteers, with passionate individuals providing invaluable information to support the conservation work. Whilst the return of the chough to Cornwall is a success story, with 24 pairs spread between the Lizard and Padstow in 2021, their long-term future is still dependent on nature-friendly farming, requiring government support and good monitoring. The ultimate ambition is linking up the existing populations in north-west Europe, which we hope will be achieved in the future.

www.rspb.org.uk/our-work/conservation projects/cornwall-chough-project

Moor Butterflies project (2017-2020)

The Marsh Fritillary is amongst the UK's rarest butterflies. In Cornwall, its distribution is limited to damp grassland in three core areas, one of which, Bodmin, was home to the All the Moor Butterflies (ATMB) project. Here, ATMB undertook practical work to safeguard butterflies and engage people with their conservation. Staff and volunteers collected data to better understand butterfly distribution and abundance. They found that threequarters of the Bodmin Moor sites inhabited by Marsh Fritillary were under agri-environment schemes which can improve habitat suitability through reduction of livestock

grazing pressure. Evidence showed that where farmers were managing Bodmin Moor sensitively, this helped to establish the most important area for the Marsh Fritillary in Cornwall. Now a UK stronghold for the species, recent improvements to land management and habitat connection on Bodmin Moor enable population groups to interconnect with each other naturally. With ongoing challenges ahead, such as climate change and uncertainty around farm subsidies, the continued dedication of landowners, farmers, conservation organisations and volunteers is vital for the survival of this butterfly.

www.butterfly-conservation.org/our-work/ conservation-projects/england/all-the-moorbutterflies



CLIMATE

Since the last Ice Age (which ended about 11,500 years ago), the wildlife of Cornwall and the rest of the UK has experienced relatively stable climate conditions¹. Cornwall's climate differs slightly from that of much of the UK, however; our coastal position, with its mild winters, heavily influences our land-use choices, which affects where semi-natural habitats are found. Additionally, our low-lying coastal areas have experienced sea level rising more than 20 metres in the past 10,000 years, with a very significant rise between 4000 and 5000 years ago, associated with the loss of significant coastal forested areas, marshland and dunes and drowning of river valley habitats. Human-driven climate change is having an escalating impact globally², and will increasingly become one of the most significant threats to biodiversity in Cornwall^{3 & 4 & 5}. Climate change already has the second largest impact on the UK's wildlife, behind land management⁶.

Cornwall's wildlife has adapted to – and in some cases thrived – in the face of a changing climate, but this has previously taken place over thousands of years¹. The speed of human-driven climate change exerts huge pressures on Cornwall's habitats and the species they support. Five of the top six habitats found to be highly sensitive to climate impact are found in Cornwall'. Coastal saltmarsh, saline lagoons, standing water, lowland fen, rivers and streams all play a crucial part in many species' life cycles . The scope of the future impacts of climate change on Cornwall's habitats is unknown⁸, but reports suggest that if global temperatures rise by 2°C, one in 20 species worldwide will be threatened with extinction. In recognition of the threat, Cornwall Council declared a climate emergency in 2019, and is committed to net zero carbon by 2030.

Cornwall's natural environment faces a plethora of different – but interconnected – climate change pressures:

- Increasing temperatures as we experience more extreme weather events, such as longer periods of hot, dry weather, lead to increased mortality and local extinctions.
- A **direct loss of food, water and places of refuge,** as hotter and drier summers are likely to increase drought.
- Sea level rise and 'coastal squeeze', resulting in the loss of coastal habitats and wildlife. For example, rising sea levels ultimately destroy intertidal and estuarine habitats and the species they support.
- **Increased stratification** of inshore waters (the inability of warmer, less salty surface water to mix with the colder, saltier water below), caused by a warming climate, resulting in the collapse of marine food webs. Many species, such as phytoplankton, depend upon a mixing of waters, oxygen and nutrients in the water column.
- Increased frequency and intensity of storms is likely to lead to the **death and reproductive failure** of many species including marine mammals and birds, both on land and in coastal waters.

- Wider ocean acidification, causing species that rely on calcium for their shells or other protective structures, such as oysters, scallops, reef-building worms and coldwater corals, to suffer or die out⁹, although other species, such as squid, lobsters and shrimps, may benefit.
- **Decrease in frosts** may result in the **spread of invasive non-native species** into new areas.
- Altered seasonal rainfall patterns and altered water table levels, resulting in a loss of wetland and freshwater habitat and species. Lower river flows can lead to increased pollution and enrichment (leading to problems such as deoxygenation and increased algal growth, which also result in a loss of species).



Temperature on Land and at Sea

Cornwall's annual mean temperature has increased by nearly 1°C in the last 34 years, with another 1°C predicted by 2050. This is compared to a 5°C rise in the last ~20,000 years¹⁰. Between 1983 and 2017, the average number of frost days in Cornwall has fallen from ten to threeⁿ.

The South West's seas are also rising in temperature¹². Cornwall's maritime environment has seen an average 0.6C increase in average sea temperature since the 1940s¹⁰.

Rising sea temperatures affect currents and increase acidification, which in turn affects the distribution and abundance of all groups in the marine food web, e.g. the Little Tern¹³. Species have fewer places to shelter and tolerance ranges are reduced, meaning that local extinctions are possible.



A changing county?

Cornwall's species are adapted to a seasonal weather pattern, with July as the average hottest month (16°C) and February as the coldest (5.5°C). However, human-driven climate change is predicted to result in more rain and strong winds from the South West, and the jet stream is likely to become 'locked' into position, causing extreme weather to affect areas for longer. Frequent, intense rainfall and hotter and drier summer are predicted.

Rising sea levels

Since 1946 the South West has seen an increase of 125mm in sea levels^{10 & 14}. The impact on the intertidal habitats and species is currently unknown.

Species

Due to the complex interactions within all ecosystems and the fact that climate interacts and exacerbates other pressures, it is not currently possible to present an indicator showing the effect of climate on species in Cornwall.

Cornwall's topography (land forms), microclimates¹⁵ and coastal influence all play a role in determining the distribution of habitats and species. It is mostly unknown what effect a rapidly altering climate will have on Cornwall's wildlife, but it will impact many species' life cycles and ability to survive¹².

The Kittiwake has seen a 57% decline in breeding pairs in Cornwall between the two survey periods¹⁶. Climate could be a factor in their decreased breeding success and the decline of sandeel (*Ammodytes tobianus*) stocks.

Climate winners?

The prevalence and spread of invasive non-native marine species like Wireweed (*Sargassum muticum*), which outcompetes native species, and the Pacific Oyster (*Magallana gigas*) is a potential sign of changing local conditions.



Protected areas provide important areas of semi-natural habitat that give species a better chance of surviving changes in climate. They also provide new colonists moving in response to climate change with more suitable conditions than surrounding areas.

The Protected Areas Network

In Cornwall 6% of the terrestrial land area and 34% of inshore waters have been given protected area status. These include Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA), and Special Conservation Areas (SAC). In 2019, over 85% of these sites were in good or recovering condition¹⁷.

These areas of high quality habitat are crucial for many species, especially vital sites like the West Cornwall Bryophytes SSSI, which hosts nationally rare liverworts including *Cephaloziella integerrima* and mosses including *Scopelophila cataractae*. As the climate alters, protected area networks will be critical^{18 & 19} in allowing Cornwall's wildlife to move and survive.



100% 98% 96% 25% 62% 94% 92% Condition 90% status of SSSI in Cornwall 88% 2019 Favourable 86% Declining Not assessed 84% Recovering Partially Destroyed 82% No Change % Sites favourable or recovering Destroyed % Areas 80% Figure four 0% 2010 2011 2012 2013 2015 2016 2017 2018

Many policies are being developed at a local and national scale for biodiversity mitigation, in-line with the 2010 'Making space for nature' report²⁰ led by Sir John Lawton. The report suggested that sites for wildlife needed to be:

many MORE, much BIGGER, much BETTER & more JOINED UP

Combating the effects of climate change on Cornwall's habitats and species involves actions on differing scales – each of us has a responsibility to take positive steps.

Here's what you can do

Individuals

- Calculate your carbon footprint and take steps to reduce it www.carbontrust.com/resources/ carbon-footprinting-guide
- Demand Government, politicians and local leaders prioritise the climate and ecological emergency
- Make sure your outside spaces, big or small, offer food, water and shelter for wildlife
- Lobby to get more protected sites on land and at sea and get directly involved in enhancing them by volunteering for local organisations.

Land owners

- Seek advice on how to create buffers on your land so it offers more space for more species to forage, nest and seek refuge.
- To achieve positive change on a landscape scale, work with neighbouring land-owners to create and connect habitats
- Get involved with practical projects focused on natural climate solutions

Decision makers

- Prioritise resources to better understand local nature-based risks, benefits, needs and recovery opportunities in response to a changing climate
- Ensure the ecological emergency is given equal status to the climate emergency
- Uphold, enforce and strengthen existing guidance, policy and legislation which offers protection for species and sites of wildlife importance

Cumulative percentage of sites (and area % of those sites) judged to be favourable or recovering

Forest for Cornwall



In 2019, Forest for Cornwall was launched – an ambitious project to increase tree cover by 2% in the county by 2030. The first phase, from 2019 to 2022, is core funded and coordinated by Cornwall Council. As well as creating new areas of woodland, many smaller copses and individual trees are being planted, on carefully selected sites, along with connecting hedgerow corridors. The programme also supports opportunities for natural regeneration of trees by landowners, businesses and community groups and, importantly, will also increase the protection of existing trees and hedgerows. Forest for Cornwall is a practical response to both the climate and ecological emergency. As well as mitigating the impacts of climate change, expanding tree cover will provide much needed habitat for woodland species in Cornwall.

www.cornwall.gov.uk/environment/ countryside/forest-for-cornwall-programme/

Protecting seagrass meadows

Seagrass meadows are crucial in the fight against climate change – they are a vital part of the marine ecosystem and provide an impressive range of ecosystem services. They are a nursery ground for fish, a haven for rare and protected species, a coastal defence and a significant carbon sink – in fact, they capture and store 35 times more carbon per unit area than rainforests. However, 92% of seagrass beds have disappeared in the UK, with mooring damage and vehicles contributing to that loss. The Tevi Challenge Network

Habitat creation at Cotehele Ouay

Ambitious plans are being developed to create wildlife rich intertidal habitat by Cotehele Quay. This project is part of a much larger programme of improvements which aim to increase resilience to climate change and to boost environmental growth along the River Tamar.

The site was originally wetland but was drained and contained by an artificial bank (or bund) more than 100 years ago. Nowadays it is a wet field with little ecological or agricultural value. Rising river levels and degradation of the bund mean that the area frequently floods and will do so more often as the impacts of climate change take hold. Since the bund now requires regular and expensive maintenance, the plan is to reverse the works of the Victorians and allow the area to flood with the tides once again. Work to shape topography and dig the internal channels and new bund will begin in Spring 2021. The final breach of the riverside bund to allow water ingress will take place later this year. In time, the area will develop naturally into a thriving habitat for wildlife. This is a great example of how climate change challenges are being transformed into an opportunity to make more space for nature.

www.nationaltrust.org.uk/cotehele/features/ working-with-and-for-nature-creating-newhabitat-at-cotehele-quay

(www.tevi.co.uk) looked at supporting the regrowth of seagrass meadows by replacing conventional moorings that scour the seabed with solutions that minimise the mooring's environmental impact. Tevi's practical recommendations are an important step in identifying specific challenges in protecting seagrass from mooring damage in Cornwall.

https://tevi.co.uk/wp-content/ uploads/2020/06/Tevi-Advanced-Mooringsand-Seagrass-Report-compressed-1.pdf

Wildlife thrives at RSPB Marazion Marsh Nature Reserve

As part of the Long Rock Coastal Improvements project to improve climate change and coastal erosion resilience of Mount's Bay, Marazion Marsh has been given a new lease of life.

Marazion Marsh is the largest area of reed marsh in Cornwall. It is a Special Protection Area (SPA) and a Site of Special Scientific Interest (SSSI). However, restricted freshwater input and siltation has threatened habitat and rare bird species in this internationally important site. The project involved installing a new outflow weir and replacing two failing structures to help control water levels within the marsh. Partfunded by the European Regional Development Fund and Defra, Cornwall Council led the project in partnership with the Environment Agency (EA), Natural England (NE) and the RSPB. The EA and NE have also been working with landowners in the catchment to reduce sediment input into the marsh. Sediment and targeted areas of reeds and willow were removed to create open water channels, improving 3.9ha of habitat for fish and amphibians.

- 3.9ha of habitat improvements
- Clear water channels improve water habitats
- Year round wetland habitat for birds, fish, eels and other wildlife
- Up to 90% reduction in future silt build up

www.cornwall.gov.uk/environmentand-planning/countryside/estuariesrivers-and-wetlands/flood-risk/ flood-risk-management-projects/long-rockcoastal-improvements-project/



DEVELOPMENT

Although the primarily agricultural and rural nature of Cornwall means that pressure from urbanisation is lower than that of many other UK counties^{1&2}, built development does put pressure on wildlife. Population change³ and the way in which we consume and live increases the need for homes, infrastructure, food and services. Cornwall is a tourist hotspot and high visitor numbers⁴ place additional pressure on wildlife populations. It is imperative that people are able to live well and thrive, but our impact can be minimised if development and travel is well planned through land use strategies, if land and buildings are reused and if the quality of new development is high.

For those parts of Cornwall that are undergoing urban expansion, infill or local development, the pressures on nature include:

- **Habitat fragmentation** and associated loss of habitat connectivity⁵, where removal of habitat can impact a species' ability to move freely or complete aspects of its life cycle.
- **Loss of habitat** from an expanded **transport** network and the increased risk to large, slow-breeding species by direct collision with vehicles, as seen around urban centres⁶.
- **Local-scale removal** of nests, roosts and of other small, but diverse habit patches during development.
- **Loss** of **breeding** and **nesting** sites where trees or sections of hedgerow and Cornish hedge are removed.
- **Increased predation** from domestic animals this has a large impact on songbirds in the South West⁷.

- **Garden design preferences**, such as increases in driveways, decking and paving, can reduce beneficial garden habitat and increase run-off.
- Increased flow into rivers from urban run-off from development around St Austell and Truro will impact migratory and non-migratory fish in Cornwall⁸.
- Developments may **remove** or **damage soils** and lead to an increase in below-ground and above-ground pollution, resulting in **impacts** on fungal and plant communities that are, as yet, poorly understood.
- **Rapidly altering human populations**, as a result of tourism, can increase disturbance to wildlife and cause pollution in rivers from inadequate septic tanks⁹.



ALDRIDG

Cornwall's Urban Species

No metric is presented for urban wildlife in Cornwall. The relatively small size of settlements in Cornwall means it is difficult to determine if species are truly urban or otherwise.

The Red Fox is often championed in other parts of the UK as an urban success, but in Cornwall, more than a 30% decrease in occupied sites was recorded between 1988 and 2018. However, the same period saw other urban specialists increase their distribution, such as Grey Squirrel with an almost 10% increase in occupancy over 30 years.

Breeding birds in the urban environment are often supported by supplementary feeding in gardens^{10 & 11}. The Breeding Bird Survey (BBS) for the South West longterm trends (1995–2018) show successes like the Goldfinch increasing by nearly 130% and Wood Pigeon increasing over 50% in the 23 years surveyed.

Cornwall's Towns, Villages and Roads

Nearly 6% of Cornwall's land area is made up of the built environment¹². The impact on Cornwall's nature is unknown.

Cornwall's population is rural² and dispersed, with 47% of people living outside of towns³. Cornwall has over 4.600 miles of roads (2019). This transport network is additional to the 4,421km network of public rights of way, 257 car parks and 1,563 bridges¹³. These may present danger and habitat fragmentation, but also habitat and foraging opportunities for wildlife. Hot Spot Analysis⁶ of 2,149 mammal road deaths (1988 – 2018) shows the most deaths around mid-Cornwall, but this is probably due to reporting rates.

Urban gardens can be very rich in wildlife¹⁴, but certain aspects of the built environment discourage it. More research is needed to understand the risks posed to wildlife by the large number and range of non-native plants found in Cornish gardens and urban environments. The I-Tree urban canopy cover shows that around 12%¹⁵ of Cornwall's urban area is covered by tree canopy.









Cornwall's ecological footprint

The geography and lifestyles in Cornwall have resulted in a high ecological footprint. Ecological footprint is a measure of the impact of a person or community on the environment, expressed as the amount of land required to sustain their use of natural resources. This is influenced by the rural nature of Cornwall, as it means people have greater distances to travel to facilities and are likely to make those trips by car.

It is not possible to demonstrate the direct impact on Cornwall's nature, but Cornwall's population has a higher footprint than elsewhere in both national and global comparisons¹⁶.



From best-practice urban planning and infrastructure design, to wildlife friendly gardens and urban greenspace managed to enhance wildlife, nature can return to our towns and villages.

Here's what you can do

Individuals

- Create a nature friendly garden which offers food and shelter for wildlife (www.wildlifetrusts.org/gardening)
- Personal choices matter look at how you might reduce your ecological footprint
- Get involved with local conservation groups through donating money or volunteering

Land owners

- Look at how ELM might enable more space on your land for nature to regenerate
- Connect with other landowners on projects to deliver nature recovery in the wider landscape (www.LandHubCornwall.org.uk)
- Manage your land using environmental best practice to support the return of wildlife

Decision makers

- Base decision-making on sustainable solutions and working with nature.
- Ensure that opportunities for wildlife are maximised throughout the planning process



Biodiversity net gain

Since February 2020, and ahead of the national roll-out, Cornwall has been applying a 10% net gain requirement to all major planning applications (ten dwellings or more). BNG requires developers to submit a biodiversity calculation as part of the standard application, encouraging features with high nature value to be retained and enhanced. Developers must demonstrate an evidenced increase in habitat value compared to the pre-development baseline. All major planning applications must also follow the mitigation hierarchy and detail how their plans will integrate into the wider green infrastructure network.

https://www.cornwall.gov.uk/environment-and-planning/ planning/planning-policy/adopted-plans/planning-policyguidance/biodiversity-net-gain/

Instances of seals being disturbed in their haul out areas by human activity more than doubled between 2011 and 2019, and reported disturbance incidents were up from 80 to 253^{17 & 18}.



Cornwall Marine & Coastal code – responding to recreational pressures

In response to a rise in incidents where local dolphins and seals have been disturbed, harassed, injured and even killed, local organisations have joined forces to produce the Cornwall Marine and Coastal Code. This guides recreational sea users through the best ways to enjoy encounters whilst minimising their impact on coastal wildlife. Although far more must be done to stop disturbance, educating locals and visitors is a step in the right direction.

www.cornwallwildlifetrust.org.uk/sites/ default/files/2019-03/CMCCG%20Leaflet.pdf





Making Space for Nature

Spearheaded by Cornwall Council and part-funded by the European Regional Development Fund, the Green Infrastructure for Growth programme has brought naturerich and climate-resilient habitats closer to urban areas in Cornwall. By making space for nature, the project has increased biodiversity on 420,000m² of urban green space by creating new habitats, such as ponds and wildflower meadows, and minimising pesticide use on sites in seven Cornish towns. Wildlife and communities now enjoy 32 local green spaces where insects like the tree bumblebee, wasp beetle and rare spiders have been recorded for the first time.

Building with nature

Cornwall Council and Cornwall Wildlife Trust are working together to pilot the 'Building with Nature' benchmark. This is an innovative standard for the design and maintenance of green infrastructure in new housing and commercial developments. The tool helps to deliver high quality green infrastructure features, allowing opportunities for nature to flourish through the planning and development process.

buildingwithnature.org.uk



Helping urban insects

Buglife's 'Urban Buzz Cornwall' has worked with the Eden Project, local town and city councils and their communities to improve pollinator habitats in Falmouth, St Austell, Truro and Wadebridge. Focusing on parks and public open spaces, 58 Buzzing Hotspots were enhanced for pollinators by increasing food, nesting and sheltering opportunities. Thanks to the enthusiasm and hard work of over 500 volunteers. Urban Buzz Cornwall ran workshops and bug hunts, sowed wildflower meadows, planted trees and pollinator-friendly flower beds, and built insect hotels.

www.buglife.org.uk/projects/urban-buzzcornwall/

Langarth Park and ride

Opened in 2008, Langarth Park and Ride, is a great example of nature and development co-existing side-byside. Located on the A391, the scheme provides 1,200 parking spaces and a bus service that runs into Truro. Adopting an innovative approach, site selection and the design process were informed by the environment and. unusually, engineering considerations were fitted around ecological and landscape opportunities and constraints. Surveys in 2016 found that bat activity had increased on site, with four additional bat species recorded, compared with 2006 records. There has been a sevenfold increase in biodiversity value from 5.22 to 37.68 biodiversity units, which means that the site has more species present now than when it was

farmland – comparable, in terms of species richness, to a mixed woodland. Langarth shows how nature can flourish alongside new infrastructure.

1.3ha of native woodland planting
2.26ha of meadow areas
2,000 trees
30,000 shrubs
65,000 grasses, herbaceous and

climbing plants



FRESHWATER MANAGEMENT

A complex network of water bodies is essential to nearly all of Cornwall's wildlife. Water bodies include groundwater, streams, ten (main) river networks, 13 lakes, and eight estuaries¹. The water cycle and its wildlife connections are intricate, and Cornwall's historical land use still has an impact on many of its waterbodies and associated wildlife². Historically, huge areas of wetland have been drained across many parts of Cornwall, for agricultural and housing needs³. The historical network of ponds^{4 & 5} is also now significantly diminished (nationally it is estimated that three-quarters of ponds have been lost in the last 100 years). For species relying on a wetland habitat, these changes have been devastating. Hydrological pressures take many forms⁶. They can be physical, like weirs or hard engineering structures to tackle flooding and areas of sediment dredging or chemical. Chemical inputs can be diffuse like contaminant-loaded water and soil washing off fields and roads, or point source for example the 3,800 discharge consents and 2,750 abstraction licenses^{4 & 6}. In combination these cause changes to natural river and estuary processes and affect birds and mammals, as well as species found in the water itself including fish, invertebrates⁵ and aquatic plants. Fortunately, we are now beginning to understand the value of working with natural processes.

For nature, hydrological pressures can lead to:

- **Loss** and **fragmentation of habitat** such as wetlands³ and ponds, and their associated species richness, due to pressure of drainage, pollution and isolation.
- Indirect sediment and chemical input to rivers and lakes (**diffuse pollution**) can affect freshwater species⁵ and create algal blooms, which kill fish and other species.
- Direct input of sewage (there are over 330 sewage treatment works^{3 & 7} in Cornwall), chemicals and plastics can all lead to waterbodies being directly **contaminated (point source pollution)**, which can **decrease local biodiversity**. It also affects human health; for example, at the 87 monitored bathing waters⁸ in Cornwall (designated in 2018).
- Loss of **places where species can feed** and **raise young** through direct habitat loss due to unsympathetic waterway management such as dredging, bank clearance, and certain flood alleviation methods (often called hard engineering) which increase flow and remove natural vegetation.
- Altered groundwater levels and rivers **running low** through over-abstraction⁷, affecting certain **species' survival**.

- Excess water input into rivers through run off from fields, and urban run off, can radically alter local water levels and increase peak flows, also affecting certain **species' survival**.
- Certain riverine and fisheries management techniques harm habitats, increase **risk** of disease in wildlife and alter species' **population genetics**, with poorly understood consequences.
- Increase in introduction of non-natives, e.g. Himalayan Balsam (Impatiens glandulifera), Signal Crayfish (Pacifastacus leniusculus) and Zebra Mussel (Dreissena polymorpha). Water courses are a conduit for rapid spread and these species can predate or outcompete native species.



Cornwall's Freshwater Species

We are able to present statistics for freshwater species in several ways. Using occupancy modelling, wetland, river and estuarine birds were found in more places from 1988 to 2018. However, birds associated with wet grasslands are on average declining.

The Wetland Bird Survey (WeBS)^{9&10} for Cornwall (1966–2019) shows no identified overall trend at the county level. Species like Black-tailed Godwit suffered a 67% decline (over 25 years) on the Lynher Estuary SSSIⁿ and the Little Egret on the Tamar Estuaries SPA has suffered a 30% decline long term. However, at Amble Marshes SSSI the 25-year water bird assemblages trend is up by 255%.

Using modelling, **Kingfisher** are stable, increasing at a rate of 0.2% per year (1988–2018) and **Grey Heron** are increasing at a rate of 1.3% per year. The reintroduction of European **Water Vole** in North Cornwall and Eurasian **Beaver** in several sites, plus the continued stability in **Otter** numbers (2% decline over 30 years), are cause for hope.

Salmon¹²

In the UK just ten of the 64 principal salmon rivers have sustainable spawning levels (conservation limits)¹³. Cornwall's Atlantic Salmon are found in the east and south of the county. A stable pattern is found in fry (very small fish) and parr (over 1 year old) recruitment. Salmon exploitation by nets in rivers has been all but removed and many anglers now release fish. Despite this, numbers of salmon caught by rods or nets shows a declining trend over 29 years.

Brown and Sea Trout¹²

There is no clear trend for Brown Trout either as juveniles or adults, although rod catches are falling slightly. However, like salmon, some trout will have a migratory life cycle as a Sea Trout, but can be resident as Brown Trout, potentially making them a more resilient species to human-driven pressures.





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Figure four

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There are great examples of catchment partnership projects in Cornwall where landowners, regulatory bodies, and charities are working together to improve riverine and wetland habitats through river restoration and nature-friendly farming practices.

Monitoring of the freshwater environment

In 2019 the status of many UK rivers, lakes and estuaries (*see pie charts*) was suddenly changed due to better monitoring techniques of their chemical status. The map below (produced for ecological status only) shows a better picture of freshwater ecosystems and the species within them than previous monitoring did.



Cornwall's historic water environment

Long term monitoring Cornwall's water bodies has been undertaken by the National Rivers Authority then the Environment Agency¹⁴. The status of many water bodies has improved dramatically since historic industrial pollution. Migratory fish, like Salmon have returned to nearly all of Cornwall's major river systems.





Here's what you can do

Individuals

- To help prevent water runoff, reduce the amount of paving, tarmac and slabs at your property, replacing them with permeable material
- To prevent soil loss to rivers reduce the amount of bare soil, especially over winter when rain is heavier.
- Be water efficient reduce and reuse in the kitchen, bathroom and garden

Land owners

- Look at options to hold water back, like blocking ditches that are no longer required and create or reinstate wet areas and ponds on your land
- Increase trees, hedges, cover crops and vegetated buffer strips to slow and capture rainfall
- Join initiatives which support landowners in delivering natural flood management
- Explore DEFRA's Farming Investment Funds to improve slurry management, slurry application and adjust fertiliser use.

Decision makers

- Strengthen and uphold existing policy which can contribute to good outcomes for nature in the freshwater environment
- Consider the impacts any individual activity has across the whole catchment
- Invest in natural solutions to challenges- they can be more cost effective in the long term

Beavers are back!

From helping to reduce flooding and improving water quality, to boosting populations of fish, insects, amphibians and birds, beavers are a keystone species of wetland habitats re-introduced to Cornwall in 2017. In 2021, Woodland Valley Farm is home to a large family of Eurasian Beavers which have already made remarkable changes along Nankilly Water stream. Scientists have been closely monitoring how the presence of these beavers influence water flow and the trapping of sediment and pollutants. Whilst currently limited to this 2-hectare site near Ladock, the Cornwall Beaver Project hopes to see more beavers returning to their rightful home in Cornwall, more than 400 years after being hunted to extinction in the UK.

www.cornwallwildlifetrust.org.uk/what-wedo/our-conservation-work/on-land/cornwallbeaver-project



N HICKS

Water Voles return to Cornwall

For the first time in 25 years, a breeding colony of Water Voles has been established in Cornwall. Once widespread, water vole numbers crashed in the 1990s due to loss of riverside habitat and predation by escapee farmed American Mink. Bude Marsh, and its surrounding river systems, provide complex riparian habitat which is ideal to support a reintroduced population. The project by Westland Countryside Stewards and the Environment Agency focussed on restoring a viable Water Vole population and keeping the whole catchment free of breeding mink. Since 2013 more than 500 captive bred voles have been reintroduced to the Bude Marsh area, providing a lifeline to this species in Cornwall.

www.westlandcs.co.uk/projects/water-volerelease-programme/

Upstream Thinking

Upstream Thinking is a catchment management scheme to reduce diffuse agricultural pollution, improve catchment resilience and improve natural capital on a landscape scale. Funded by South West Water and delivered in Cornwall by Cornwall Wildlife Trust and the Westcountry **Rivers Trust, Upstream Thinking** uses farm advisers, ecologists, practical officers, and a water quality scientist to work with farmers and land owners. The programme is endorsed by industry regulators and is centred on the catchments that provide our drinking water. By taking a catchment-based approach, this project has been enhancing habitats by improving soil and water quality since 2008. Simple measures like reducing nitrogenous fertilisers have improved spawning grounds for Brown Trout and reduced harmful algal blooms in Loe Pool. Now in its third phase (2020–2025) landowners are adopting more sustainable and regenerative practices, and the amount of land shared with nature continues to grow.

www.cornwallwildlifetrust.org.uk/ upstreamthinkingproject

River restoration on the Camel

River restoration on the River Camel SSSI at Grogley Gauging Station was completed by the Environment Agency in 2020. The project continues the River Camel and Tributaries SSSI Restoration Strategy by removing artificial structures from the river, improving fish passage and enhancing floodplain habitat. At Grogley, a sheet pile and concrete weir has been removed, as have granite bank protection and gabion baskets. Installation of large tree deflectors create river features and improve the river habitat. Removal of invasive species is ongoing, whilst Forestry England's recently felled conifer plantation will be replanted and wet woodland enhanced.

This important work also provides significant match funding for the European-funded Water For Growth Project, a £2.2 million project to restore freshwater fish habitats in the Camel and Fowey. The project will remove up to 20 more barriers to fish migration, improve spawning habitats and open up over 150 kilometres across both rivers to migrating fish.

www.gov.uk/government/news/ successful-restoration-of-cornwall-s-rivercamel?utm_source-df0e6b23-6dca-4fce-89f7-8cbf12dac26f&utm_medium=email&utm_ campaign=govuk-notifications&utm_ content=weekly

Hessenford road scheme to benefit wildlife (EA, Cormac, Cornwall Council)

The first phase of the River Seaton Valley restoration has been completed as part of a highways improvement scheme on Hessenford Road (B3247). Requiring a temporary diversion of the river, the works were designed and constructed to enhance the environment and provide longterm resilience for the road. The project has improved important wet woodland habitat by removing a historic embankment that blocked the floodplain, as well as by raising water table levels. It has created over 150m of enhanced Trout river habitat and 25m of backwater channels - ideal for eels and aquatic plants, and as a refuge for fish and invertebrates. This wetter, slower section of the valley will also store

more floodwaters, to reduce flooding in Seaton. Soft engineering and reuse of on-site material have enabled the road scheme to deliver significant benefits for wildlife at no extra cost – a win-win situation for infrastructure delivery and the environment.



FISHING

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Cornwall's coastal waters face many pressures including shipping, military exercises, disposal, dredging and extraction. All of these have an impact on marine wildlife to a greater or lesser extent, but fishing (fish and shellfish harvesting) is the most widespread direct pressure on marine species¹. Local fisheries provide essential food security to many, and small-scale fisheries underpin the economies of communities who rely on the ocean to survive. For centuries², fishing thrived within a healthy marine ecosystem in Cornwall. Recent advances like bigger engines, more targeted gear, and better technology have resulted in more fishing success³, but have had a dramatic effect on both habitats and species. Modern synthetic fishing gear like monofilament (nylon) line and braided polyethylene nets are highly effective, but are highly persistent in the environment⁴. Lost or abandoned lines and nets called 'ghost gear' can survive for hundreds of years and kill both target and non-target species. In addition, unquantifiable numbers of fish, cetaceans, seals and seabirds are incidentally injured or killed as 'bycatch' during active fishing⁵.

It is possible to fish more sustainably, however. Cornish fishermen are already leading the way in landing high quality seafood using lower impact methods⁶, but it is too soon to tell how the Fisheries Act (2020) will influence nature recovery in the future. The next few years will be critical, but in the meantime, each of us can help marine wildlife by making sustainable seafood choices.

Non-sustainable fishing can lead to the following impacts on the natural world:

- The collapse of wider food webs from historic and, in some cases, ongoing over-exploitation of fish populations (**overfishing**) has **devastated** many stocks of species found in Cornish waters¹.
- Death and injury to marine mammals, birds and other non-target species entangled in active or 'ghost' fishing gear⁴.
- **Loss of habitats and animals** as bottom trawls and dredgers damage the seabed⁷. Dredging activity can disturb sediments, re-suspend pollutants, release stored carbon from sediments and kill sea life responsible for complex natural cycles.
- **Unknown impacts** of fishing, military and recreational activities, as monitoring the marine environment is logistically complex and expensive⁸.
- **Increased marine pollution** due to the release and disposal of discarded fish, chemicals, oil, and litter, associated with the fishing industry.
- Removal of the largest fish, which **alters the stock genetic viability** and **decreases** the **average** size of the population². Overfishing reduces the diversity in the marine food chain³.





STATE OF NATURE

Cornwall's fishing

This report uses metrics from fisheries landings into Cornish ports⁹. It is not possible to present a graph on the direct impact on Cornwall's marine wildlife over the last 30 years¹⁰.

The fishing industry in Cornwall is complex, with 14 regularly used commercial fishing methods utilised on a day-to-day and seasonal basis^a. Newlyn is one of the largest ports in the UK, and 31 ports in Cornwall are recognised as 'landing ports', landing over 40 species^a. The largest tonnage catches are brown crab and sardines, seen in *figure two*.

Figure three shows the location of towed-gear fishing effort¹². It shows the effort from fishing of certain gear types and the location where pressure is highest, but impacts to species and habitats from fishing is currently not quantifiable⁷.

The UK has a legal commitment to fish sustainably, the measure used is the maximum average long-term catch that can be taken from a population without reducing its ability to reproduce itself, termed the Maximum Sustainable Yield (MSY). The official UK Government indicator shows that the percentage of fish stocks fished at or below levels considered to be capable of producing maximum sustainable yield was 49% in 2017.

Top 10 species to Cornish port by tonnes 2018





Top 25 species landed by Cornish ports by tonnage 2018 (MMO)

ordered by commercial value

Trawl intensity



Figure three

Cornwall's Marine Protected Areas

A Marine Protected Area (MPA) is any area of the sea and coast where species and habitats are protected from damage and disturbance. There are a number of different types of MPA, which result from different pieces of legislation, but all share the same basic aims. The UK has committed to establishing an ecologically coherent network of MPAs¹³.

In Cornwall we have the following types of MPA:

Marine Conservation Zone (MCZ)

MCZs aim to protect a range of nationally important marine wildlife, different habitats and seabed features. MCZs were created under the Marine and Coastal Access Act 2009.

European Marine Sites are areas at sea designated to protect wildlife and habitats that are important at a European level, created under EU Legislation. There are two types:

Special Areas of Conservation (SACs)

There are six Special Areas of Conservation in Cornwall (designated under the EU Habitats Directive), and

Special Protection Areas (SPAs)

There are two Special Protection Areas in Cornwall (designated under the EU Birds directive and forming part of the European-wide Natura 2000 network of internationally important sites).





Figure four: The percentage of bycaught cetaceans against the total number reported as to the Marine Strandings Network from 2005 to 2019. The blue bars illustrate the number of cetacean strandings. The red line illustrates the proportion of those which were bycaught.

Cornwall's Marine Strandings Network

For over 25 years Cornwall Wildlife Trust's Marine Strandings Network has monitored dead animals washed ashore on our Cornish coastline. In 2019 a total of 245 cetacean (dolphin, porpoise and whale) strandings and 246 Atlantic Grey Seals (*Halichoerus grypus*) were recorded in Cornwall. There is no increasing or decreasing trend in strandings, despite some EU and UK regulation to reduce bycatch in specific fisheries, suggesting that this is an ongoing issue that needs addressing.

The Short-beaked Common Dolphins (*Delphinus delphis*) represented the majority of cetacean strandings (52%) in 2019 and 27% of the assessed cetacean strandings were determined to have died as a result of bycatch or probable bycatch. Seal strandings followed a similar seasonal pattern as in previous years, with peaks during the autumn and winter months. 2019 seal strandings were more than double the 8 years average (2010 to 2018).



Winners and Losers?

Cornwall Good Seafood guide, run by Cornwall Wildlife Trust, is a website that helps people and businesses make good seafood choices.

All seafood species caught and farmed in Cornwall are analysed for sustainability using the MCS good fish guide methodology.

Species doing well in Cornish waters currently include Hake, Sole and Monkfish. All have benefited from effort limitations, recovery plans and quotas set by the EU Common fishing policy. Sardines are also abundant currently.

Species which are not faring so well include colder water species such as Cod, Whiting and Herring.

Species with the best sustainability ratings are rope-grown Mussels, farmed and wild Pacific Oysters, sail-harvested and oar-harvested Fal Oysters, seaweed and line caught Mackerel. Visit CGSG website for a full list of recommended species.

Here's what you can do

Individuals

- If you consume fish regularly, consider reducing your consumption and switching to seafood sourced locally
- Only eat fish from sustainable fisheries recommended by the Cornwall Good Seafood Guide
- Demand that government ensures our fisheries are properly managed to protect the marine environment

Fishermen

- Switch or modify gear to reduce environmental impact and improve selectivity
- Provide detailed catch, bycatch and fishing areas information so industry impacts and solutions are better understood
- Get involved, be proactive, and support initiatives which progress sustainable fisheries management

Decision makers

- Support the expansion of the Marine Protected Area network to include areas closed to fishing activity, to allow species' numbers to increase, supporting both the marine environment and fisheries in the long term
- Invest in effective fisheries management and enforcement, including setting shared quotas and catch limits
- Commit to more research on fish stocks in the South West, and the impacts of fishing on the wider marine environment

The National Lobster Hatchery (NLH)

The National Lobster Hatchery is a marine conservation, research and education charity focused on the European lobster. The Padstow-based team combine cutting-edge science with traditional fishing know-how to hatch young lobster for eventual release. By improving the survival rate of the young, the NLH can raise and release 53,000 juvenile lobsters in a single year – an effective way to restock wild populations and take pressure off the local commercial fishery. Established as a centre for excellence in lobster science, the NLH also hosts a public education centre on site. Over 45,000 visitors are welcomed each year, where they learn about key sustainability issues affecting lobsters and other marine species.





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Pingers

To combat the number of dolphins, whales and porpoises killed in fishing nets, Cornwall Wildlife Trust has been trialling devices to deter animals away from gear. Strandings data show that as many as 250 dolphins and porpoises can wash up dead in Cornwall in a single year – about 30% die as a result of being caught in fishing nets. As the number washing ashore is <10% of all deaths at sea, the true death toll in nets could be thousands each year.

One possible solution is an acoustic deterrent device, or 'pinger'. Pingers emit a randomised sound to alert dolphins to the net so they can avoid it. These devices are effective for some cetacean species in certain situations and do not adversely impact their behaviour. Ongoing trials with local fishermen aim to prove that this technology can work for the fishing industry and prevent the deaths of many dolphins and porpoises in the future.

South West Handline Fishermen's Association (SWHFA)

The SWHFA represent over 150 fishermen who use traditional handlining as an ethical, sustainable alternative to fish farming and net fisheries. Hook and line fishing has a minimal impact on the seabed and non-target species. No bait fish are used, and bycatch of other species is negligible. Targeting Bass, Mackerel and Pollack, small individuals are rarely caught but can be returned alive immediately. All fish landed are traceable back to the individual who caught them. In 2000, the South West Handline Mackerel Fishery was amongst the first to receive accreditation from the Marine Stewardship Council (MSC). The fishery is now recognised in the Cornwall Good Seafood Guide.

www.linecaught.org.uk





Cornwall Good Seafood Guide

Over 60 species of fish and shellfish are landed in Cornwall, but until recently it was difficult to find accurate information on the sustainability of local seafood. To tackle this, Cornwall Wildlife Trust worked in partnership with local businesses to score the sustainability of fish landed to Cornish ports by Cornish boats. The Cornwall Good Seafood Guide now gives buyers and consumers all the information they need to ensure they make the right seafood choices. By using the distinctive logo on menus, packaging and fish counters, local businesses are helping to highlight the sustainable seafood on offer. In addition, a userfriendly app, printed recipe cards, and an informative website detailing where to source and how to cook local seafood, make selecting sustainable seafood easy.

www.cornwallgoodseafoodguide.org.uk



Pollution is the damage caused by harmful substances or waste to the land, water or air. Pollution takes various forms: gas, liquid, solid, chemical, noise and light¹. Many factors will influence the type and extent of pollutants found in Cornwall. Much of the land is farmed (74.4% of terrestrial land); excessive use of fertilisers and poor animal waste management can contaminate the soil or enrich the water. Water from road run-off can contain toxic heavy metals, whilst our waste-water systems² can flush effluent containing hormones, medications and plastics into water bodies. The legacy of our mining past is still evident in soils and sediments containing high levels of tin and arsenic.

Nature can recover quickly from some visibly catastrophic pollution events such as oil spills, but small-scale types of pollution are likely to be having a combined effect on wildlife; these can include artificial light from our homes¹, cleaning products disposed of down drains^{2&3}, and chemicals that control garden weeds and pests. Understanding and tackling the long-term and combined effects of pollutants on our wildlife remains a key challenge.

Pollution can impact wildlife and habitats in many different ways:

- **Ingestion of**, or **entanglement** with, plastic and nondecomposable waste can cause **malnutrition**, **injury or death** to individual animals³.
- Noise pollution on land and at sea can cause injury, strandings and deaths. Excessive decibel levels affect many species, including breeding birds and dolphins.
- Excessive night-time light affects nocturnal species including moths⁴, and can cause **reduced feeding and breeding** in bats.
- Plastic pollution is proliferating, poisoning mammals and birds⁵, but legislative controls and public concern are beginning to lead to positive change.
- Species higher up the food chain suffer from chronic health problems from **bioaccumulation**, in which toxins increase in concentration within their bodies⁶.

- Chemical pollution from **neonicotinoid** and other **pesticides** is causing **large-scale population declines of bees and other pollinators**⁷.
- Chemical pollution from **rodenticides and pesticides** causes the unintended **deaths of mammals and birds** through ingestion.
- Where vegetation is cleared by the use of **herbicides**, species suffer the **loss of their habitat and food**.
- Excessive nutrient levels, called **enrichment**, occur in some rivers and on the coast², affecting marine and freshwater ecosystems.
- **Diffuse pollution**, in which various pollutants from the land leach or run into watercourses, has a significant **impact on freshwater species**. This can be exacerbated by **point source pollution** (direct pollution from identifiable sources) adding to the loads⁷.



48

removed from

Cornish beaches in 2019

STATE OF NATURE

Cornwall's species

Outside of direct known pollution events, it is not currently possible to demonstrate the overall impact that the wide variety of pollution has on Cornwall's wildlife and habitats.

Chemical pollution and nutrient enrichment in Cornwall's rivers and lakes from excessive phosphate and nitrogen compounds is part of the reason that just 24% of our rivers and only 15% of our lakes had a good status in 2019 (see the Fresh Water Management Pressures section of this report for more details). The effect on a variety of fish such as Atlantic Salmon and Brown Trout, as well as other freshwater life in those localities, is unclear but potentially damaging.

Most semi-natural habitats and two-thirds of wild-flower habitats require low levels of nitrogen⁹. Nitrogen enrichment changes the make-up of plant communities; between 2014 and 2016 nearly all sensitive habitats in England exceeded the recommended 'critical nutrient load', above which they are at risk of harmful effects¹⁰.

There are concerns about the accumulation of persistent organic pollutants in food webs; one particular group of chemicals, polychlorinated biphenyls (PCBs), have been reported at toxicologically significant levels in 80% of bottlenose dolphins, 71% of common dolphins and 42% of UK stranded harbour porpoise. A figure is not yet known for the hundreds of dolphins and porpoises recorded as stranded in Cornwall.

Litter

In 2019 104 seals surveyed by the Cornwall Seal Group Research Trust were found to be entangled with marine litter. The impact of entanglement on each individual animal's survival is unknown. In other locations, entanglement has been shown to reduce seal survival rates¹¹. On average from 2004 to 2008, 3.6–5% of seals in Cornwall became entangled each year¹¹. Cornwall has the world's second highest rate of entanglement for any of the 18 phocid ('true' or 'earless', as opposed to fur seals, sealions and walruses) seal species¹¹.

The Cornwall Plastic Pollution Coalition reported in 2019 that 80,000kg of rubbish (80 tonnes) from 7,995 sackfuls was removed from Cornish beaches¹². Hundreds of volunteer hours provided by the Marine Conservation Society's Beachwatch groups from 2016 to 2019 are shown in *figure two*. Dead birds, marine mammals or seals were found during 17.4% of the beach-cleaning events.

Light

*Figure one*⁸ shows that excess light emissions in Cornwall focus around Cornwall's towns. Glow-worms are widespread in Cornwall in grassy areas, especially sheltered valleys, and on the coast on cliffs and in dunes, although they are thought to be less common than they used to be. The flightless females climb vegetation at night in summer to signal to males using green lights at the end of the abdomen¹³.





Landfilled Waste	2016 tonnage	2017 tonnage	
Household waste	171,742	115,839	
Commercial & Industrial waste	54,102	17,898	
Waste Usage	2016 tonnage	2017 tonnage	
a) Recycled (Metal Recycling Sites and MRFs)	142,454.611	146,375	
b) Composted	63,819.79	71,013	
c) Used in energy production	0	190,644	
d) Transfer Stations	344,499.72	365,270	

Cornwall Council monitoring on waste 2016-2017

Glow-worms occurring on heathland at St Agnes Head were found to be clustered in one area and completely absent from the adjacent area. The obvious difference was more human use and car headlights sweeping across the vegetation. Lights have been shown to have an effect on the ability of males to find females¹⁴.

Here's what you can do

Individuals

- Consume less, buy second-hand, use well and then recycle
- Look at switching to organic or eco-friendly food, clothing and cleaning products
- Join clean-up projects to tackle pollution in your local area
- Dispose of waste properly never dump, burn, or wash waste down drains

Land owners

- Look at inputs of harmful substances including fertilisers, pesticides, slurry and livestock treatments to see if reductions can be made.
- Apply, store and dispose of all materials and products properly
- Plant more trees, extend hedges and plant buffer strips of vegetation to trap and filter pollutants

Decision makers

- Develop clear environmental policies for your organisation Undertake an environmental
- audit of your business
- Support research into the combined and cumulative effects of pollutants



In addition to the six pressures detailed in this report, there are other pressures which have the potential to cause significant impacts on local wildlife. However, more research is needed before this can be confirmed.

Potential pressures include:

Invasive Non-native Species

Non-natives are increasingly becoming established, either deliberately or accidently, through human activity. Across the UK, 12% of established non-natives are known to have an adverse impact¹. A variety of pressures caused by invasive non-natives include the ability to outcompete or predate native species, or to cause the death of native species by carrying disease. The financial costs to human society from increased flood risk, property damage and disease (e.g. Ash Die-back) is high.

Since 1988 over 100 new non-native species have been reported in Cornwall (1988-2018 shows an increase from 241 to 341 non-native species recorded). There are over 2,000 known sites which have had or still currently have Japanese Knotweed across Cornwall Council's assets², and many more sites on private land. Pacific oysters have been recorded on the south coast estuaries and bays in Cornwall impacting protected intertidal ecosystems by forming reefs. Monitoring work is ongoing along with trials to attempt to control numbers.



Disturbance and Persecution

Human activity can cause deliberate or accidental disturbance to the movement, feeding or habitats of Cornwall's wildlife. The effect on individual species can be fatal, and small incremental losses can effect overall viability and survival.

In Cornwall, since 2016 over 1,200 disturbance events involving seals and cetaceans have been reported, and over 30 have been reported to a legal authority because of their severe effect on the animals concerned. Seal disturbance by humans more than doubled between 2011 and 2019. See the Development Pressure section for a graph and further details. Reported Disturbance event in the marine environment 2016-2020 from the Cornwall Marine and Coastal Code group

Year	Number	Number	er Number per taxon group				Number
	reports	probable cases of criminal offence	Seals	Cetaceans	Birds	Other	cases referred to the authorities
2016	216	98	95	2	0	1	3
2017	157	88	66	5	14	1	6
2018	330	74	71	3	0	0	6
2019	341	97	85	8	3	1	10
2020	205	45	30	11	4	0	3



Bodmin Moor designated as an International Dark Sky Landscape

Following a successful bid by Cornwall Council and the Caradon Observatory, the International Dark-Sky Association has officially designated Bodmin Moor as an International Dark Sky Landscape. As part of the designation, people who live/work in the area are encouraged to manage lighting better to reduce unnecessary and harmful light pollution. Many outside lights, especially LED floodlights and security lights, can be too bright and are installed in such a way that much of the light is directed up into the night sky. Using tips on how to reduce light pollution, residents and businesses can save energy and protect local bats, birds, mammals and insects.

- Install lights that point down, not up
- Use a timer or motion sensor and turn off lights when not needed
- Use lighting that is no brighter than necessary
- Avoid LEDs emitting bright white/blue light

www.cornwall.gov.uk/darksky





Marine mammals and litter

Specialising in the rescue of live-stranded and entangled marine mammals, British Divers Marine Life Rescue (BDMLR) is a dedicated team of volunteers, trained medics and vets. In Cornwall, reports handled by their 24-hour hotline include sightings of distressed seals, dolphins and porpoises caught up in marine litter/fishing gear. Using specialist equipment, the primary purpose of the BDMLR team is to remove the litter or gear, administer medication, and release/refloat animals as quickly as possible. Seals may be taken for further treatment in a rehabilitation centre, whilst the gravest cases are euthanised to relieve further suffering. With such important populations of cetacean species and grey seals in Cornwall, work to save the lives of individual animals is critical in the fight against local extinctions.

https://bdmlr.org.uk



Wadebridge goes pesticide-free

To reduce the environmental and health impacts of herbicides, rodenticides and insecticides, Wadebridge Town Council has become a pesticide-free town. Since 2016, they effectively manage their parks, verges, cemetery, roads and pavements using chemical-free alternatives such as hand tools, brush weeders, strimmers and gas flame weed burners. Combined with a reduced mowing regime and leaving some areas to go wild, a pesticide-free approach means that insects, birds and mammals now have more places to feed, nest and find shelter within the town. Moreover, Wadebridge Town Council have reduced maintenance costs and found that local people appreciate a more natural approach - a win-win situation for all.

www.wadebridge-tc.gov.uk/wadebridge-thetown/pesticide-free-wadebridge.html

Cornwall Plastic Pollution Coalition

Cornwall Plastic Pollution Coalition (CPPC) is a dedicated group of over 50 environmental organisations and conservation groups, scientists and community volunteers who care deeply about Cornwall's wildlife, coast and countryside. Although each of the member groups carry out their own distinctive work, they also work collaboratively to maximise the benefits in Cornwall and beyond. Together, they combine



practical solutions to tackling plastic pollution with improving research and information exchange. In 2019 alone, CPPC members contributed 103,509 hours of environmental work in Cornwall, and removed, recycled or disposed of 80 tonnes of rubbish. Through their marine conservation and plastic pollution workshops, delivered free of charge to schools, colleges and community groups, CPPC is also inspiring the next generation to do more for wildlife.

https://cppccornwall.org.uk/



Bringing nature back

The findings in this report are stark. Within our lifetime, there has been unprecedented change in Cornwall. An increasingly wealthy, consumer society has caused wildlife, for the most part, to retreat into smaller, fragmented habitats. Some changes may be reversed through species reintroduction and rewilding programmes whilst others, caused by climate change and plastic pollution, will still be evident in hundreds, even thousands, of years' time.

For nature to recover, not only must the existing drivers of change be tackled, but we must also address future challenges as they emerge and interact.

Key recommendations from State of Nature Cornwall 2020

- 1 Encourage everyone in Cornwall to help deliver the Local Nature Recovery Strategy (see page 23); individuals, landowners and decision makers all have a shared responsibility to act
- 2 Agree a plan to address key gaps in evidence and source funding to support it, particularly marine data, landcover change and structured monitoring of species abundance & distribution
- 3 Improve understanding of the impacts of current and future pressures on nature (including cumulative and incombination effects)
- 4 Encourage landowners, scientists, organisations and citizen scientists to record, monitor and share information
- 5 Increase collaboration between landowners, organisations and individuals to deliver practical nature recovery solutions

- 6 Target investment into species and landscape scale nature recovery programmes
- 7 Develop nature based Key Performance Indicators to track the changing state of nature and repeat this report every five years

To discover more about what Cornwall Wildlife Trust is doing to protect and enhance nature please visit **www.cornwallwildlifetrust.org.uk/what-we-do**





Thank you

a home

This report would not have been possible without the support of countless organisations, groups and individuals. In particular, we thank the many volunteers who work tirelessly to monitor and protect nature in Cornwall.



A South West Water Initiative

Vadebridge Town Council

Vestland

Countryside Stewards

THE STATE OF NATURE IN CORNWALI

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Acarines (mites and ticks), Actinopterygii (bony fish), Algae, Amphibians, Annelids (segmented worms), Araneae (spiders), Bryozoans, Centipedes, Chondrichthyes (cartilaginous fish), chromists, clubmoss, Cnidarians (jellyfish) and Ctenophora (comb jellies), Collembola (springtails), Conifers, Crustacean, Echinoderms, Echiura (spoon worms), Ferns, Ginkgos, Hornworts, Horsetails, Insects (22 major groups excluding Butterflies), Lichens, Liverworts, Marine Mammals, Millipedes, Molluscs, Moss, Nematoda (roundworms), Nemertea (ribbon worms), Opiliones (harvestmen), Phoronida (horseshoe worms), Porifera (sponges), Pseudoscorpiones (false scorpions), Pycnogonida (sea spiders), Quillworts, Reptiles, Rotifers, slime mould, Stoneworts, Turbellaria (flatworms), Urochordata (tunicates).

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The State of Nature in Cornwall report is a collaboration between Cornwall Wildlife Trust, Cornwall Council and the University of Exeter.

Information shown in this document is taken from best available evidence.



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