SHELDUCK (Hwyaden yr Eithin)

(*Tadorna tadorna*)

Population & Ecology

Location

Shelducks are widely distributed from Iceland to East Asia. They inhabit intertidal muddy shores, brackish estuaries, and increasingly also freshwater sites away from the open coast, using rabbit burrows or cavities as nesting sites. In Wales, the species is a locally common breeder, a widespread winter visitor and a scarce annual migrant inland. The winter distribution of shelducks in Wales is similar to that of the breeding population. The most important sites are Dee Estuary, Severn Estuary and Burry Inlet where the shelduck is a qualifying SPA feature.

Current Population Status

The shelduck has moved from amber to red on the list of Birds of Conservation Concern in Wales (BoCCW4), owing to a longer-term breeding population decline of at least 50% and because Wales holds at least 2% of the European flyway population. It is amber listed in the UK (BoCC5) due to moderate breeding and winter population declines and localization of the wintering population. It is of least concern on the European and global IUCN red lists.

The Welsh breeding population of shelducks was estimated to be 1,250 (750-2,250) pairs in 2016, around 16% of the British total.

There is little information about the impacts of Avian Influenza on shelducks and how this may have affected recent breeding and wintering numbers.

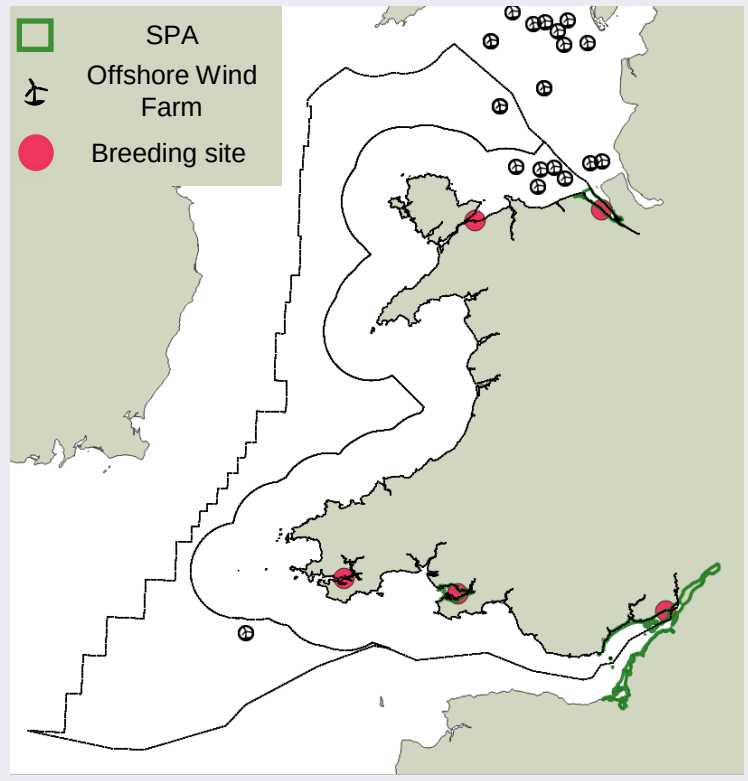
Historical population trends

The long-term pattern of shelduck numbers in Wales is complex due to overlapping breeding and wintering ranges. The Wetland Bird Survey (WeBS) indices for Wales show a significant increase from the late 1960s to the early 1990s, but since then the indices have trended downward. A medium WeBS warning has been issued for the Dee Estuary due to a decline of 27% over 25 years. However, this trend contradicts other long-term observations nearby, demonstrating the complexity and need to monitor populations for this species. Due to different survey locations and timescales, as well as an unknown proportion of locally breeding and non-breeding individuals, there is currently no clear picture of the population status of breeding shelducks in Wales.

Areas of use & human activity

Shelduck are vulnerable to a range of pressures, such as loss of foraging habitat as a result of coastal development and disturbance from recreation and other human activities. They are particularly at risk during moulting periods when aggregations of flightless or near flightless individuals occur.

Although a large proportion of shelducks in Wales are located within protected areas (Dee Estuary, Severn Estuary, Burry Inlet) an overlap with human activity is very likely due to the proximity of their nest sites, moulting sites and foraging habitat to coastal infrastructure.



Activities in areas of use and predicted risk

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

Current Impact status: Red

The shelduck is currently red listed in Wales, owing to substantial breeding population declines, and because Wales holds at least 2% of the North-western European flyway population.

Whilst Avian Influenza is not known to have impacted shelduck populations, this has not been quantified at a Welsh or UK scale.

Sensitivity score: Red

The sensitivity score for Welsh shelduck populations is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development and climate change.

Lack of food	**Shelducks require foraging habitat of high biological productivity. In northwestern Europe, the species depends largely on mud snails, supplemented by other molluscs and small crustaceans that are "sieved" from the mud surface. Loss of foraging habitat due to coastal developments, including tidal lagoons and barrages, or shifts in prey quality and availability due to climate change could cause breeding and wintering populations in Wales to decline.**
Nest predation	**The reproductive success of shelducks is generally low, primarily due to the high levels of predation of ducklings by mammals and birds. The effects of American mink, a non-indigenous predator, on ground-nesting birds in coastal and wetland habitats can be profound.**
Human disturbance	**Shelducks are vulnerable to human disturbance (e.g. dog-walking, water sports), potentially resulting in reduced foraging activity and displacement from foraging and roost habitat. Human disturbance may also increase the risk of offspring predation. Nest sites of shelducks can be up to 1 km away from suitable foraging habitat, so ducklings may be exposed to many man-made obstacles (roads, fences) on their way from the nest to the relative safety of the water. During moult periods, shelducks are flightless and thus unable to move away from disturbance sources**
Habitat loss	**Coastal erosion and climate change driven sea level rise may result in a loss of both foraging and nesting habitat for this species.**

Evidence gaps

- **Migratory flyways and seasonal patterns, including moult-migrations. The extent to which moulting birds occur in Wales is unclear as there are large moulting flocks on the Mersey and Severn estuaries, outside Wales. Most British shelduck moult in the Netherlands; where Welsh breeding birds moult is unknown.**
- **Factors limiting breeding and wintering numbers including the potential impacts of climate change, particularly on the key prey of this species**
- **Influence of introduced predatory species, such as American mink on breeding birds.**
- **Effects of the recent Avian influenza outbreak.**

Opportunities

- **Analysis of the spatial and temporal use of shelducks along the coast and inland, e.g. through colour-marking or telemetry, to understand population connectivity and interactions with human activities, particularly at key periods such as during the post-breeding moult.**
- **A better understanding of the current extent of nest predation and development of measures to minimize this impact.**
- **Modelling of the impacts of climate change on *Hydrobia ulvae*, the small snail which is the key prey item of shelduck.**
- **Consideration of mitigation measures for human related disturbance and public access to nesting sites.**

EIDER (Hwyaden Fwythblu)

(*Somateria mollissima*)

Population & Ecology

Location

Eider are regular winter visitors to Welsh coastal waters (mainly Burry Inlet, and the Gwynedd coast from Tremadog Bay southwards). Localized breeding occurs in North Wales, on Puffin Island and around the coast of Gwynedd. The latter represents the southernmost regular breeding location of eider in Britain and Ireland.

Inland records of eider in Wales are scarce.

Current Population Status

Eider are amber listed in the Birds of Conservation Concern in Wales (BoCCW4) and in the UK (BoCC5). The species is amber listed in Wales due to the small, localised breeding population size (no more than twenty pairs). The species has disappeared from most of south England. The wintering population has declined across the UK, although in Wales a recovery has been recorded with numbers close to 1990 levels.

Although eider are Europe's most widespread seaduck species, eider are classified as vulnerable and near-threatened on the European and global IUCN red lists respectively, due to a drop in breeding numbers, most notably in south England and France.

The effects of the recent outbreak of Highly Pathogenic Avian Influenza (HPAI) on the eider population in Wales and the UK are not known.

Historical Population trends

Numbers of wintering eiders in Wales remained low in the first half of the 20th century, but from 1950 there was a marked increase, with mean winter peaks in the Burry Inlet, Gower/Carmarthenshire, reaching 140 birds by the 1980s. Numbers declined sharply in the early 1990s and the 5-year mean WeBS count between 2013/14 and 2018/19 was 66 birds. A WeBS High Alert was issued following a 63% long-term and a 61% short-term decline.

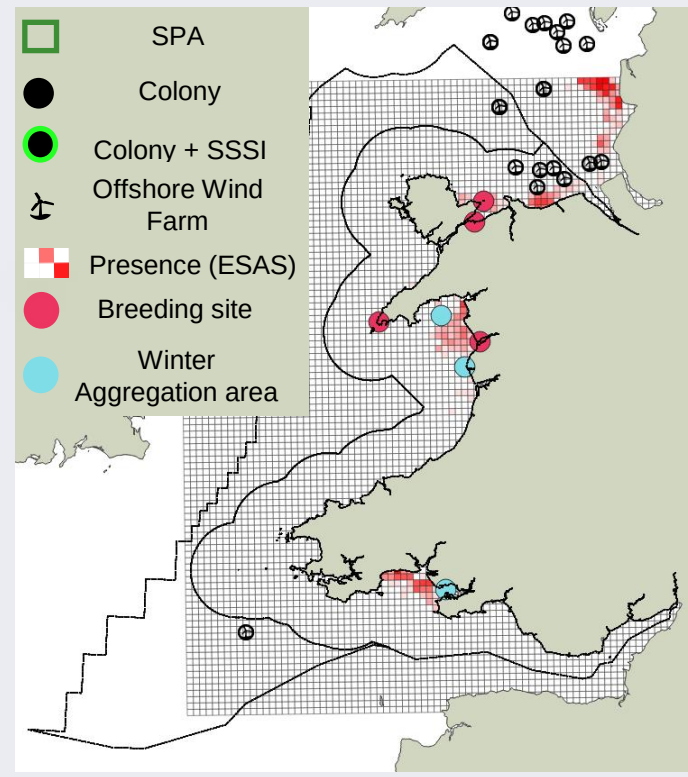
The first confirmed breeding record of eiders in Wales was in May 1997 on Puffin Island, Anglesey, which is still a regular breeding site. Since 2000, eiders have bred regularly near Llandygai, Gwynedd, with the peak site count of at least five females with young in 2014. Eiders may also breed within the Mawddach Estuary and around the Llyn Peninsula.

Areas of use & human activity

The Burry Inlet, Gower, is the most important site for wintering eiders in Wales, followed by the Gwynedd coast from Aberdysynni to Llangelynin, with counts of over 150 birds in several years since 1973. Tremadog Bay, Gwynedd, also supported 150 eiders in May 2002. There are currently no SSSIs or SPAs designated for eider.

As a benthic-foraging species preferring shallow waters of less than 10 m depth, eider are particularly vulnerable to disturbance and displacement caused by shipping traffic and marine infrastructure developments.

Regular presence of humans and accompanying dogs at nesting sites are a risk for this ground-nesting species.



Activities in areas of use and predicted risk

Ports & dredging (A) | Shipping (R) | Oil & Gas (A) | Fishing (A) | Recreation (A) | Aquaculture (G) | Offshore Wind (A)

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

Current Impact status: Amber

Winter counts of eiders in Welsh waters are declining to a greater extent than across the UK, while breeding records in Wales are highly localized and generally low (currently no more than 20 pairs). It is important to note that eiders breeding in Wales are at the southernmost distribution limit of this species in Britain and Ireland, with breeding on the south coast of England having ceased. This reflects a withdrawal north of the breeding range and the species has been lost from most of its breeding range in France.

Sensitivity score: Red

The sensitivity score for Welsh eider populations is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development and climate change.

Climate change	**The availability of benthic food in shallow water is possibly the most important factor governing eider numbers. The distribution and abundance of wintering eiders is related to the presence of benthic prey (mainly mussels and cockles) on which they depend. Seasonal oxygen depletion during summer and autumn due to ocean warming caused by climate change may limit these food resources for eiders. Climate change forecasts suggest that suitable eider habitats will contract northwards beyond Wales.**
Nest predation	**The effects of American mink, on ground-nesting birds in coastal and marine habitats can be profound. Eider nests are also predated by native mammals and birds, for example large gulls and corvids. Rats have also been known to have an impact on breeding populations as demonstrated by a recent invasion of rats on Puffin Island.**
Human disturbance	**When foraging at sea, eiders are reported to be sensitive to disturbances from shipping and marine infrastructure, resulting in reduced foraging activity and displacement from foraging habitat. At the nest, human disturbance can reduce the breeding success of eiders and increase the risk of avian nest predation.**

Evidence gaps

- **Little is currently known about the movement patterns of eiders along the Welsh coast. The source populations of wintering birds in Wales are not well-known, though a small number of ringing recoveries suggest most may come from the Baltic region and Denmark.**
- **It is not known what factors are currently limiting the number of Welsh breeding eiders, although they are at the southern edge of a retracting range.**
- **It is unknown what the impacts of tidal lagoon developments will be on this species, particularly with access to food.**
- **It is unknown whether eider were effected by avian influenza, nor its impacts at a population level. While there are studies showing low levels of infection in eiders, none are related to the current outbreak. However the risk to the eider population is likely low due to their small group sizes limiting disease transmission.**

Opportunities

- **Analysis of the spatial use of eiders at sea, e.g. through telemetry, to assess human-caused impacts and the extent of habituation.**
- **Localised studies of breeding locations to understand possible limitations to the breeding population.**
- **A better understanding of adult survival, productivity, phenology, and prey selection at various Welsh colonies.**
- **A better understanding of connectivity among Welsh, UK and Irish eider populations.**
- **A better understanding of the current extent of nest predation and development of measures to minimize it.**
- **Studies on the impacts of climate change on prey availability in Wales for eiders**

Common Scoter (Môr-hwyaden Ddu)

(*Melanitta nigra*)

Population & Ecology

Location

Common scoters do not breed in Wales, although there have been counts of several thousand individuals in summer. In winter, they concentrate off the Welsh coast in three main areas—Carmarthen Bay, Cardigan Bay and Liverpool Bay.

They are found in shallow coastal waters with soft inshore sediments that support communities of molluscs such as blue mussel and razor clam, on which they feed.

Current Population Status

Common scoters are amber listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) due to the international importance of the wintering population and the localization of this, whereas they are red listed in the Birds of Conservation Concern 5 (BoCC5) in the UK due to severe breeding range and population declines. Common scoter are classified as least concern on the global IUCN red list.

The population of common scoters in Wales appears to be increasing. In 2019, the British population was estimated to be 135,000, up from 25,000-30,000 for Britain and Ireland in the Winter Atlas 1981-84. However, the counts in 1981-1984 may be an underestimate. This may also be true of a recent estimate of 80,000 (in an average year) in Wales, as surveys of Carmarthen Bay in 2017 and Liverpool Bay in 2019 yielded counts of 36,314 and 74,000 respectively. This is a significant increase from a previous estimate of 40,000-50,000 in Welsh waters from 2001-2006.

Common scoter is not known to have been affected by the recent Avian Influenza outbreak and the ecology of this species places it at a lower risk.

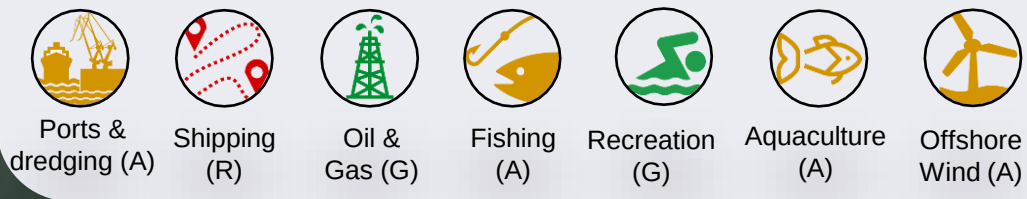
Historical population trends

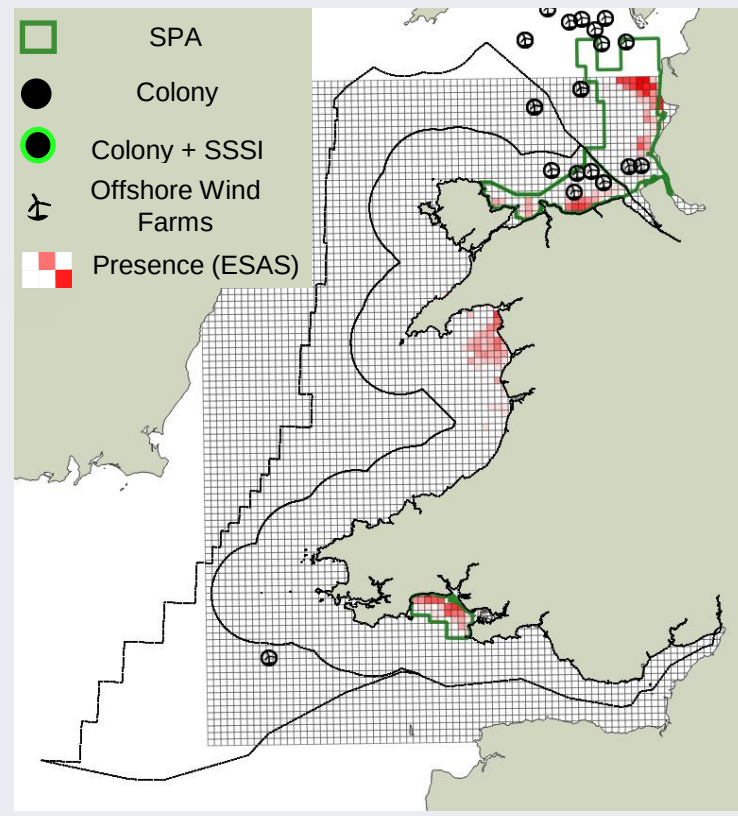
Common scoter populations in Wales have historically been affected by oil spills. In 1950 and 1973-1974, 300 common scoters were found stranded on the Pembrokeshire coast due to oil spills. Another spill of 72,000 tonnes of crude oil at the entrance to Milford Haven Sound in February 1996 caused much greater mortality—4,571 oiled common scoters were collected onshore, of which 1,818 were found dead. Approximately 8,000 scoter wintered in Carmarthen Bay during this period so the majority of the population were affected and the suitability of their feeding area was compromised.

Areas of use & human activity

Common scoter are a protected feature of two SPAs: Carmarthen Bay (Bae Caerfyrddin) and Liverpool Bay (Bae Lerpwl). Liverpool Bay is considered particularly important in late winter/early spring for the north-eastern European and Icelandic breeding population, although tracking studies are required to confirm this. They are commonly observed all along the Welsh coastline, with further large aggregations occurring in Pembrokeshire. Wintering numbers in Wales have increased in recent years although it is unknown if this is due to more effective monitoring. Common scoter are capable of diving to around 30m though typically stay in areas with a depth of up to 15m. Foraging occurs in a mixture of areas of rock and sand or gravel. This brings them into conflict with ports and harbours as well as the growing offshore wind farm (OWF) sector, especially in the Liverpool Bay area where the proposed developments are closer to shore.

Activities in areas of use





Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

Current Impact status: Amber

Despite the increase in the Welsh common scoter population, it winters in relatively few locations with three main centres, rendering it vulnerable to impacts such as oil spills. Common scoter are sensitive to disturbance and the development of offshore wind farms in Welsh waters have the potential to displace this species, which occurs in internationally important numbers. It is also important to consider the decline of wider UK populations of common scoter and possible transboundary impacts that may later affect Welsh populations although it is thought that common scoter wintering in Wales come from North-eastern Europe, as they have been tracked on migration crossing the UK at night.

Sensitivity score: Amber

The amber sensitivity score for common scoter is primarily based on the uncertainty around the risk from the rapidly growing offshore sectors which has the potential to increase disturbance and displacement.

Disturbance and displacement	**Common scoters also appear to be strongly displaced by offshore wind farms, avoiding foraging in waters around and between turbines, and altering their flight routes to avoid sites. During the non-breeding season when foraging at sea, common scoters are highly sensitive to disturbance by shipping activities showing the longest flush distances recorded among marine duck species. In Liverpool Bay, they have been known to fly off when boats were up to 2 km away. Increased traffic as industry diversifies to improve sustainable practices, such as the introduction of seaweed farms and aquaculture, may cause further displacement.**
Pollution	**Oil pollution can be seen as one of the main threats to wintering common scoters, which aggregate in discrete areas in large numbers and for which the detrimental effects of oiling are well documented.**
Habitat loss	**The development of renewable energy within the area may result in habitat loss. For example, the proposed tidal barrage within the Mersey Estuary is likely to cause a reduction in the availability of suitable habitat for this species,**

Evidence gaps

- **Understanding how barriers to movement can impact energy requirements as a result of increased flight time to avoid an activity (i.e. shipping, wind farm developments) is currently limited.**
- **Understanding timelines of displacement post-wind farm construction and the potential benefits (i.e. foraging for mussels on the hard structures of the turbine base).**
- **Migration routes have a wide range of directions, with Welsh population specific routes across the UK only recently being understood. Potential increases of risk to individuals from developments beyond the Welsh territory are poorly understood.**
- **The effects of climate change on prey distributions for this species.**
- **Mitigation approaches for displacement effects for maritime developments.**
- **An up to date survey of Liverpool Bay SPA.**

Opportunities

- **Improving our understanding of migration routes for waterbird and seaduck species, including common scoter, will better inform the risks to populations from large scale energy development may have on internationally important populations. Tracking studies have the potential to provide a snapshot of migratory behaviour which can be used within impact assessments to determine risk.**
- **Consideration of the impacts of disturbance and displacement and appropriate mitigation for common scoter should be considered during consenting for all maritime developments.**

RED-BREASTED MERGANSER

(Hwyaden Frongoch)

(*Mergus serrator*)

Population & Ecology

Location

The red-breasted merganser is a fish-eating duck with a circumpolar distribution, breeding on the ground adjacent to deeper lakes and small rivers, often in woodland and sheltered riparian habitat of the uplands.

The species is a regular winter visitor to Welsh coastal waters with the largest congregations usually on Traeth Lafan/Conwy Bay SPA. It is also a localised breeder in northern Wales within estuaries on the Anglesey and Gwynedd coasts, and some lakes/rivers in Eryri.

Current Population Status

The red-breasted merganser has moved from amber to red on the list of Birds of Conservation Concern in Wales (BoCCW4), owing to winter population declines of at least 50%. The breeding range of this species has also declined by at least 25% over the past 25 years. At the same time, the species has moved from green to amber on the list of Birds of Conservation Concern in the UK (BoCC5) due to moderate winter population declines. This species was also added to the Rare Breeding Birds Panel list in 2017.

Red-breasted merganser is listed as near-threatened on the European IUCN red list, due to a population decline approaching 30% in the past 16 years, while at the global level it is of least concern.

The Welsh breeding population of red-breasted mergansers is now likely to consist of less than 100 pairs with 18 confirmed pairs and an estimate of 37 pairs in 2021.

Avian influenza has not been confirmed in red-breasted merganser in the current outbreak and is not thought to be a threat to the Welsh population.

Historical population trends

Until the mid 19th century, breeding of red-breasted mergansers in Britain was largely confined to northwestern Scotland. The species was only a scarce visitor to Wales during the 19th and early 20th century. Numbers began to increase in the Dyfi Estuary from the 1920s. The first confirmed breeding record in Wales was at Traeth Dulas, Anglesey, in 1953. The earliest breeding records in Wales were mostly around estuaries, but a range of inland sites, particularly in Eryri were used as the population increased. By the mid 1990s, north- western Wales supported around 22% of the British red-breasted merganser population, suggesting a Welsh riverine population of around 175 pairs. That appears to have been the peak of the Welsh breeding population. Since then and into the 21st century, the picture has been one of decline in both breeding and wintering numbers.

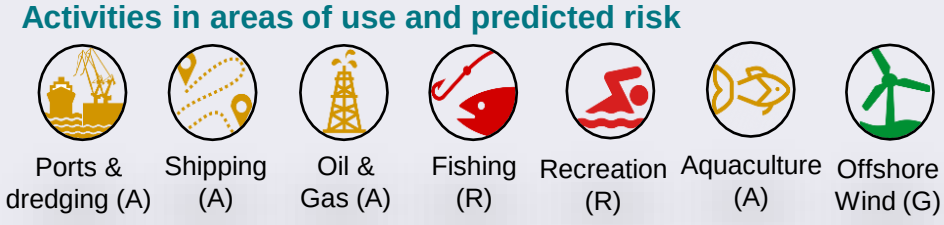
Areas of use & human activity

Little is currently known about the impacts of human activity on red-breasted merganser populations in Wales and where its current breeding distribution may overlap with human activities.

Conflicts with anglers who believe this species is a commensal pest that causes impacts on salmonid populations is likely to have been a key pressure in the past, and declining breeding numbers in Wales could be linked to targeted removal.

Regular presence of humans (and their dogs) at the nest could also be problematic for ground nesting red-breasted mergansers. Sensitivity in the non-breeding season has not been quantified in Wales or on a wider scale.

Activities in areas of use and predicted risk



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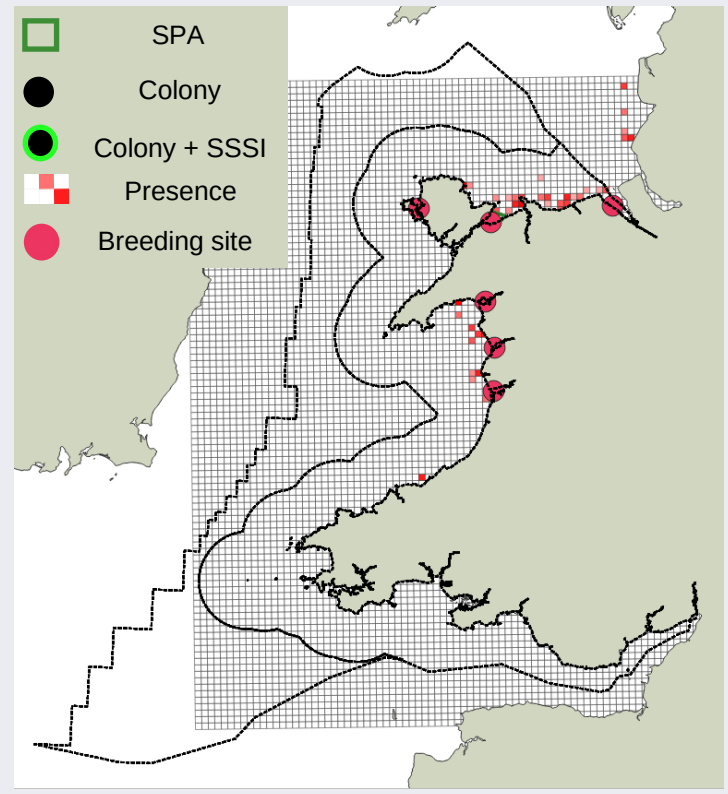


Current Impact status: Red

Winter numbers and breeding records of red-breasted mergansers in Wales are rapidly declining. Breeding numbers are highly localized and generally low (currently fewer than 100 pairs). It is important to note that the Welsh breeding population is on the southern edge of the species' European range, making it vulnerable to shift in the availability of suitable prey due to climate change.

Sensitivity score: Red

The sensitivity score for Welsh red-breasted merganser populations is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of climate change.

Climate change	**All of Britain, except the far northwest of Scotland, is projected to become climatically unsuitable for red-breasted mergansers by the end of this century. It is not yet clear whether climate change is driving the population declines already recorded.**
Nest predation	**The effects of American mink, a non-indigenous predator, on ground-nesting birds in coastal and marine habitats can be profound. It has been shown elsewhere that red-breasted mergansers are negatively impacted (and extirpated) by mink predation, and that populations may recover in response to mink removal.**
Human-caused removal	**Shooting of red-breasted mergansers on game fishing rivers in response to perceived predation of fish may have caused declines in Wales. Moreover, red-breasted merganser are potentially among the most susceptible marine waterfowl species to drowning mortality in fishing nets.**
Marine pollution	**Surface pollutants like oil put diving waterbird species at particular risk of contamination. The red-breasted merganser has been given an oil vulnerability index score of 21 (range 11-29), indicating moderate to high vulnerability.**

Evidence gaps

- **Factors limiting the number of locally breeding (and wintering) red-breasted mergansers, including the expected effects of climate change**
- **Understanding the impact of red-breasted mergansers killed under license in the UK (300 were killed in England during 2013-19) upon Welsh populations.**
- **Impact of human disturbance and mitigation methods to minimise disturbance.**

Opportunities

- **A better understanding of the factors limiting survival and reproductive success particularly linked to climate change**
- **A better understanding of the current extent of mink predation on red-breasted mergansers in Wales**
- **Develop a greater understanding of the impact on culling and illegal killing of red-breasted merganser on Welsh populations**

BLACK-LEGGED KITTIWAKE (Gwylan Goesddu)

(Rissa tridactyla)

Population & Ecology

Location

Kittiwakes can be found at coastal breeding sites in Wales. This species tend to nest on ledges on cliffs or suitable human–made structures. Birds breeding in these locations as well as those from Ireland and England forage widely in Welsh seas.

Outside the breeding season large numbers of black-legged kittiwakes pass through and forage in Welsh waters.

Current Population Status

Kittiwakes are red listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) and Birds of Conservation Concern 5 (BoCC5) in the UK due to significant breeding season declines, and the species is listed as vulnerable on the global IUCN red list.

The kittiwake population in Wales has decreased by 34% between 2000 and 2021 with **7,296** apparently occupied nests (AONs) recorded during the Seabird 2000 survey and **4,782** AONs recorded in the recent Seabirds Count (2015-2021). This decrease is not as severe in comparison with the wider UK, which experience a 43% reduction in AONs between surveys (from 379,299 to 215,913 AONs).

Whilst kittiwakes were known to have been affected by Avian Influenza, results from breeding season surveys in 2023 suggest a 10% increase in the UK breeding population.

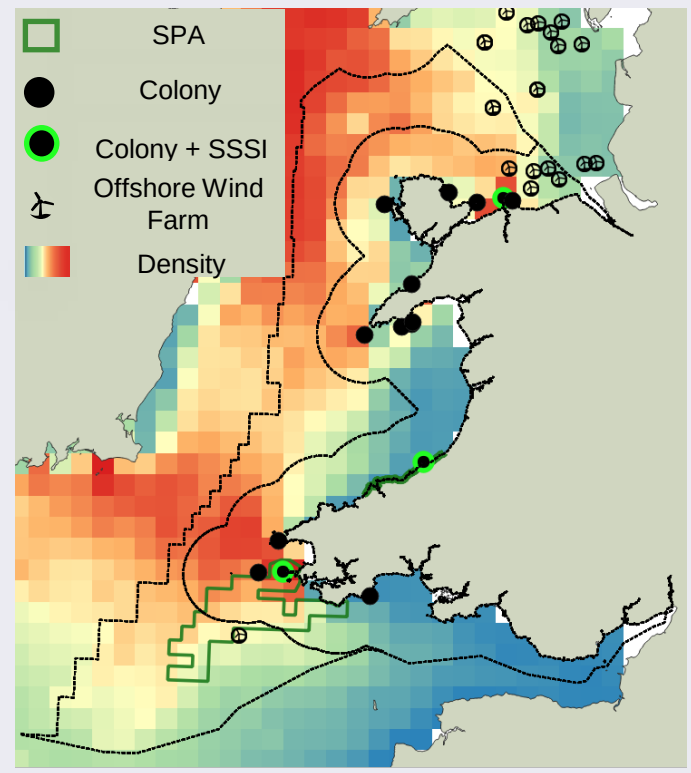
Historical population trends

Kittiwakes were heavily persecuted throughout the 19th century. They were shot for sport and the millinery trade, but a measure of protection towards the end of the century led to a rapid increase in the population. Accounts from around the turn of the 20th century describe large numbers of kittiwakes at Ramsey, Skomer, Grassholm and Carreg y Llam. Breeding was first recorded on Bardsey in the 1920s.There were few counts at most sites before the Operation Seafarer census of 1969 to 1970 which counted 6,891 AONs in Wales, but most colonies have been regularly counted since. The Welsh population continued to increase through to the late 1980s, with the seabird colony register census of 1985-88 counting 7,293 AONs, but it has steadily declined since then. This is mainly due to low breeding success as breeding adults have struggled to find adequate food to raise their chicks.

Areas of use

Black-legged kittiwake are a designated feature at Skomer, Skokholm and the Seas off Pembrokeshire (Sgomer, Sgogwm a Moroedd Penfro) SPA. Kittiwakes are included in the Aberarth Carreg Wylan SSSI, Pen y Gogarth/Great Ormes Head SSSI, and Skomer SSSI as part of the seabird assemblage. Most colonies in Wales are found in the north-west and south-west.

Kittiwake densities are greatest in the seas between Wexford and Pembrokeshire in the Celtic Sea. With kittiwakes having a large foraging range and high vulnerability to collision, the growing number of wind farm developments proposed in these areas, especially those close to protected sites, highlights potential future mortality risk.



Activities in areas of use

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

Current Impact status: Red

The Welsh kittiwake population declined significantly between the 2000 Seabird Survey and the 2021 Seabird Count, largely due to food availability and predation pressure. The recent Avian Influenza outbreak is likely to have impacted colonies in Wales. Breeding season surveys in 2023 including 9 sites in Wales (approx. 50% of the Welsh population), showed a 17% decline since Seabirds Count (2015-21). It is important to consider the wider UK populations of kittiwakes and possible transboundary impacts that may affect Welsh populations.

Sensitivity score: Red

The red sensitivity scoring for black-legged kittiwake is predominantly based on ongoing population declines in the last few decades across Wales and the UK, shifts in prey availability and abundance, and colony based pressures. Collision from offshore wind farms is another concern, though this did not have a significant effect on the population declines between 2000 and 2021.

Food Availability	**Kittiwakes are specialist surface feeders that predominantly feed on sandeels in UK waters. This dependence renders kittiwakes vulnerable to prey shortages during the breeding season as sandeels are known to be responsive to climate change. Kittiwake foraging locations may also be impacted by displacement due to offshore wind.**
Predation	**Native bird species (e.g. large gulls, skuas, corvids, raptors) have been regularly observed as predators at kittiwake colonies, while mammalian nest predation (e.g. through rats or mink) appears to be an exception compared to ground-nesting seabird species.**
Pollution	**As surface feeders, kittiwakes are likely to ingest plastic waste. Increased ingestion of plastic waste has been documented worldwide in seabird species. There is also evidence that adult birds may feed their young with regurgitated plastic debris, which could lead to reduced reproductive success. Kittiwakes can also become entangled in plastic waste. Additionally, multiple studies show that high loadings of pollutants such as organo-metals can lead to negative reproductive effects on kittiwakes, reducing breeding success.**

Evidence gaps

- **Detailed prey species maps are generally of low quality, often with large assumptions required to estimate prey availability. Shifts in prey and kittiwake distributions under the context of climate change driven environmental shifts may affect the reliability of these assumptions.**
- **Predation by other birds on eggs and young is commonly observed, however studies detailing the extent of impact of this pressure across Wales and the UK has not been carried out.**
- **Kittiwake populations are thought to be highly sensitive to prey availability due to a specialised diet. There is limited understanding of the indirect impact wider environmental factors influencing kittiwakes' prey has on kittiwake populations.**

Opportunities

- **Better understanding of adult survival, productivity, phenology, and prey selection at various Welsh colonies.**
- **Understanding how kittiwake prey species are influenced by environmental factors (pollutants and climate change), considering fisheries information along side species distribution data (tagging and surveys).**
- **Diet, foraging range, and colony count assessment to understand impacts of displacement on food availability and survival.**
- **A better understanding of the possibility of supporting breeding numbers locally by providing artificial structures.**

BLACK-HEADED GULL (Gwylan Benddu)

(*Chroicocephalus ridibundus*)

Population & Ecology

Location

Black-headed gulls can be found both inland and at coastal breeding sites in Wales. Colonies tend to form on small islands near lakes or marshy areas with these locations offering some protection from ground predators. Colonies are often formed and abandoned, indicating little breeding site fidelity.

Welsh hatched birds tend to winter in Britain along the coast but some have been found to migrate to Ireland, France, Spain, Portugal and The Netherlands.

Current Population Status

Welsh colonies are considered of higher conservation concern comparative to Global and UK populations. Black-headed gulls are red listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) due to breeding population declines whereas they are of least concern on the global IUCN red list and are amber listed in the UK by the Birds of Conservation Concern 5 (BoCC5).

Conservation concerns remain for this species as the breeding population of black-headed gulls in Wales has decreased by 16% between 2000 and 2021 with **1,986** apparently occupied nests (AONs) recorded during the Seabird 2000 survey and **1,670** AONs recorded in the recent Seabirds Count (2015-2021). However, this decrease is not as severe comparative to the wider UK, with a 29% reduction in AONs between surveys (from 138,155 to 97,950 AONs).

Black-headed gulls have been significantly affected by avian influenza in Wales, and the long-term impacts in combination with other factors need to be considered.

Historical population trends

Black-headed gulls appear transient in nature having formed and abandoned multiple colonies across Wales over time. For example, in Cors Caron, populations have fluctuated between zero and several thousand since 1923.

In the 19th century, a population decline was attributed to drainage issues and egg taking by humans for food. At the end of the 1800's, populations rebounded which was likely due to the adoption of the Sea Birds Preservation Act (1869). As a ubiquitous feeder, this population increase was also attributed to the exploitation of human food sources. Explanatory pressures are largely unknown for the majority of population fluctuations for this species, but they may include growth of scrub, predation, drainage, acidification, invasive non-native waterweeds, human activities, adjacent agricultural activities and nest space competition with Canada geese.

Areas of use

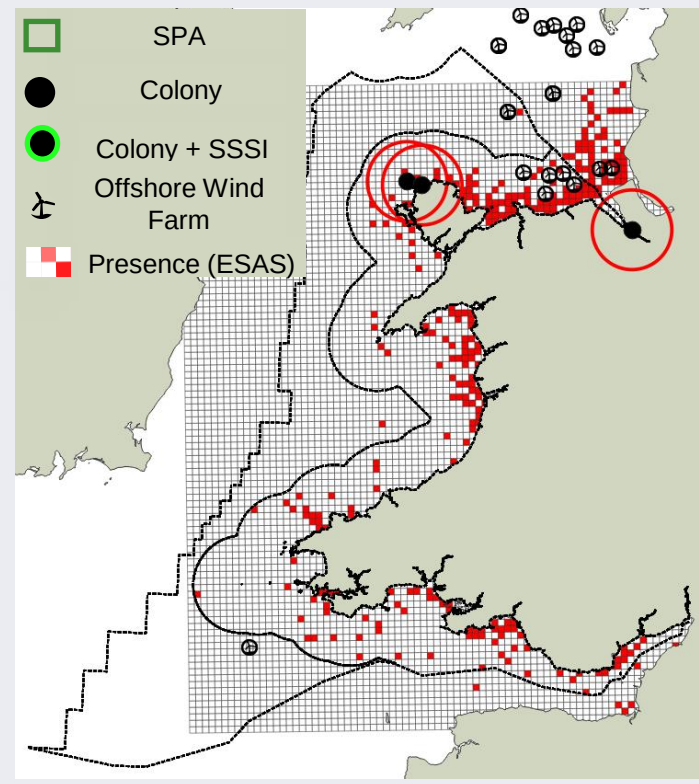
Black-headed gull are currently not a designated feature within any Welsh protected area. However, given the wide range of these species, they are likely to benefit from conservation measures within other protected area boundaries in Wales.

The largest numbers in Wales can be found along the northern coastline and on Anglesey. There are inland colonies occurring close to natural lakes.

Black-headed gulls are more likely to occur around estuaries and coasts than out at sea. This species readily exploits landfill tips as a food source in the non-breeding season.

Activities in areas of use

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity



Inland colony locations are approximate, as an average of the count location

Current Impact Status: Red

The main concern with regard the decline of the Welsh black-headed gull colonies is the uncertainty around the causes. Multiple potential impacts have been hypothesized such as nest competition, predation, increased agricultural intensity and human presence but a clear explanation for the large fluctuations in colony sizes and overall population decline has been challenging to identify.

The recent Avian Influenza outbreak is likely to have impacted colonies in Wales. Colony counts in 2023 covering 72% of the Welsh population found that the population had fallen a further 77% since Seabirds Count (2015-2021) with HPAI likely to be the main factor (Tremlett et al. 2024). Combined with other limiting factors, such short-term population declines could reinforce the overall negative population trend of the black-headed gull in Wales.

Sensitivity Score: Amber

The Amber sensitivity scoring for Black-headed gull is predominantly based on the continual decrease in Welsh and UK population sizes since the late 1990's, along with changes in food availability.

Food Availability	**Food shortages associated with agricultural practices and climate change may cause breeding black-headed gulls to invest less energy into reproduction, resulting in population declines and colony desertion. During the non-breeding season, the closure of landfill tips across the UK may have led to reduction in food availability and winter survival and thus a reduction in the breeding population.**
Predation	**Like other ground-nesting gull species, the black-headed gull is sensitive to breeding site predation by species such as the introduced American mink. Invasive non-native waterweeds can lead to drastic changes in habitat quality and to the desertion of existing colonies. Another potential cause for local declines in black-headed gulls is competition for nesting sites from increasing numbers of Canada geese.**
Disease	**Colonial breeding black-headed gulls are highly susceptible to infectious diseases, causing potentially high mortality rates. Recent avian influenza outbreaks appear to have more of a significant effect on black-headed gulls than other gull species across the UK.**

Evidence gaps

- **There is limited knowledge of adult survival, productivity, phenology, and prey selection at various Welsh colonies.**
- **There is limited information on the interactions between coastal and inshore colonies and population dynamics across the Welsh and wider UK population as a whole.**
- **The extent of impact from displacement and habitat degradation on survival is unknown and difficult to quantify. This is important to quantify as both factors influence diet, foraging range and colony status.**

Opportunities

- **Increased understanding of population ecology, seasonal distribution and migratory pathways.**
- **Studies into population connectivity between inland and coastal colonies.**
- **Development of suitable colony-protection measures in sites limited by predation or affected by severe weather conditions and sea-level rise associated with climate change.**
- **Habitat monitoring at existing colonies to quantify condition and measure human pressure to compare with recently abandoned and recent low count colonies.**

LITTLE GULL (Gwylan Fechan)

(*Hydrocoloeus minutus*)

Population & Ecology

Location

Little gulls are non-breeding and passage visitors to Wales. Their occurrence in Wales is variable which presents a challenge when determining it's status, abundance or any rates of change in Wales. Little gull has occurred widely across Wales but it is largely a coastal species. They tend to pass coastal watch sites during spring and autumn migration including Strumble Head, Pembrokeshire, and Bardsey, Gwynedd. In the autumn, they are usually found along the North Wales coast and occur there in low densities in winter.

Current Population Status

Little gulls are amber listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) due to non-breeding rarity, whereas they are green listed in the UK Birds of Conservation Concern 5 (BoCC5) and are considered near threatened and of least concern on the European and global IUCN red lists respectively.

Due to the transient nature of little gull in Wales, it has not been possible to quantify population levels and overall population status. However, observations over time suggest that numbers have not changed noticeably over the last 30 years.

Little gull is a colonial breeding species and as such is at risk of Avian Influenza. No records of HPAI in little gulls have been recorded in Wales but impacts in this species are not clearly understood given the core breeding range is in Fennoscandia and extends eastwards across Eurasia.

Historical Population trends

Little gull sightings in Wales are usually of single birds, with aggregations rarely exceeding 3 to 4 birds. However, larger aggregations have bee historically reported which were wrecked by midwinter storms. Larger spring passages were recorded in 1974 with 74 birds observed at Kenfig Pool and 73 at Eglwys Nunydd Reservoir. Similar numbers were recorded past Strumble head in 1985 and 1987, past Aberaeron, Ceredigion in 2002 and past Bardsey in 2005. More than 200 little gulls passed Point of Ayr, Flintshire in February 1992. Numbers have been low since 2005, with passing birds rarely exceeding 100-120 birds. Large aggregations have sporadically been recorded further offshore, suggesting that this species may be present in higher numbers within territorial waters further from the coast within the migratory season.

Areas of use & human activity

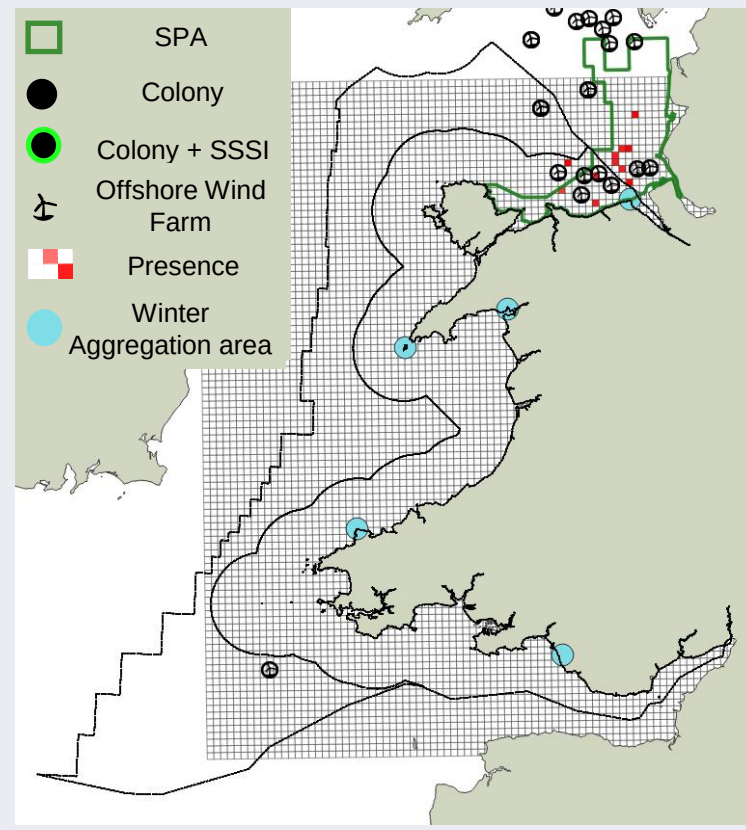
Little gulls are a protected feature of the Liverpool Bay (Bae Lerpwl) SPA. They tend to remain in coastal areas and they are believed to pass overland, funneling through the Mersey Estuary and out into the Irish Sea and Atlantic Ocean. They are a transient species that is concentrated by weather events during times of migration and have been recorded widely along the Welsh coastline. Wrecks of this species may occur after winter storms.

Current human activities that may affect little gulls include industries that could release hydrocarbons, and other pollutants. This could include oil and gas extraction, dredging and agricultural practices near the coast. There is currently no evidence that little gulls in Welsh waters have been impacted by these potential pressures.

Activities in areas of use and predicted risk

Ports & dredging (G) | Shipping (G) | Oil & Gas (G) | Fishing (G) | Recreation (G) | Aquaculture (G) | Offshore Wind (G)

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity



Current Impact status: Amber

Little gull populations in Wales have been difficult to quantify, although it is assumed that numbers have not materially changed in the last thirty years. However, as they remain amber listed on the BoCCW4 and given the limited information regarding their migratory pathways and their susceptibility to human activities near the Welsh coast, it is recommended that their impact status be scored as amber. The presence of HPAI in Wales, the wider UK, and internationally may have impacted little gull populations, the scale of which is yet to be determined.

Sensitivity score: Amber

The sensitivity score for little gulls in Wales is primarily based on assumptions to wider gull sensitivity to pressures and due to the limited information that is currently available for little gull.

Removal	**Removal via entanglement in fishing nets may pose a threat to little gulls. Furthermore, wind turbines could have negative impacts due to collision or barrier effects if these structures are located along migration routes. However, evidence to determine the level of risk specifically for little gull is limited both in Wales and globally.**
Pollution	**Whilst there is little species specific evidence for little gull, some studies have shown that this species can be susceptible to synthetic compound contamination. For example, high levels of DDT have been reported in the Mediterranean although the effects upon the population remain unknown. The effects of other chemicals have been reported in other gull species. As surface feeders, little gulls are also susceptible to pollutant contamination although no direct reports of these impacts have been found for little gull in Wales or globally.**
Climate change	**Climatic modelling suggests that the Baltic, a key breeding location for this species, will not be suitable for little gull by the end of the century. Range changes have occurred since 1997 with large scale reductions in eastern Europe and an expansion further north. It is unclear how this may affect occurrence in Wales in the future.**

Evidence gaps

- **The distribution and abundance of little gulls in Wales is not clearly understood due to their transient nature, small size, and maritime habits.**
- **Little gull does not breed in the UK regularly and has not been recorded breeding in Wales. Despite this, impacts on the breeding grounds in North-eastern Europe are likely to determine the number of little gulls using Welsh waters. The pressures on this species in the breeding season and its connectivity to Wales are not clearly understood.**

Opportunities

- **Offshore wind farm data may hold more information regarding little gull populations in Welsh and UK waters as well as ESAS data and small scale surveys completed by research organisations and government bodies. Collation of this data may build a more complete picture of little gull distributions, population levels and offer insight into migratory patterns and preferred locations in Wales.**

MEDITERRANEAN GULL

(Gwylan Môr y Canoldir)

(*Ichthyaetus melanocephalus*)

Population & Ecology

Location

Over the past decades, Mediterranean gulls have expanded their breeding range in Britain and Ireland. They have recently begun to nest in small numbers at a few coastal locations in Wales, including Penclacwydd (Carmarthenshire), Cemlyn (Angelsey), Burton Mere Wetlands and Shotton (Flintshire). Also, hundreds may be seen along the Welsh coast during post-breeding dispersal, particularly in the south and west. Wintering birds appear to be mostly from the continent.

Current Population Status

Mediterranean gulls are amber listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) and in the Birds of Conservation Concern 5 (BoCC5) in the UK, due to their small and highly localised breeding populations. They are considered of least concern on the global IUCN red list.

The breeding population of Mediterranean gulls in Wales has increased between 2000 and 2021, though it remains low, with no apparently occupied nests (AONs) recorded during the Seabird 2000 survey and **17** AONs recorded in the recent Seabirds Count (2015-2021). In the UK, there has been a 1,639% increase in AONs between surveys (from 132 to 2,295 AONs), due to increases in the number and size of colonies.

No cases of mortality in Mediterranean gull have been recorded from Avian Influenza in the UK although its ecology suggests it may be at risk.

Historical population trends

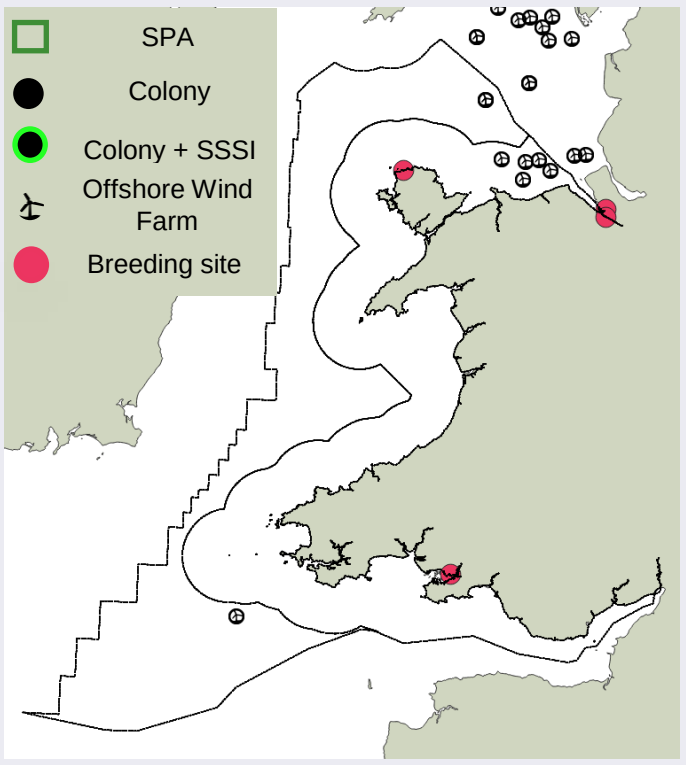
The first record of a Mediterranean gull in Wales was one in East Glamorgan in 1964, and the first breeding attempts were made at Cemlyn, Anglesey, in the mid-1990s, though all were unsuccessful. The first successful breeding occurred at Cemlyn in 2010 and a few pairs continued to nest there over the following years, but no breeding was observed there in 2018 or 2019. At Penclacwydd, breeding attempts have occurred since 2009, with the first successful breeding in 2014.

In recent years, the largest numbers have been reported for Cardigan Bay (e.g. 1,250 at Llanon, Ceredigion, on 2 August 2022), with smaller numbers (c. 500) on the Gower peninsula, Carmarthenshire and Pembrokeshire (e.g. 444 off Skokholm in December 2021). During post-breeding dispersal and migration, counts off the south and west coasts can be much higher, with a peak of 436 recorded off the Gower Peninsula in July 2019. In Wales, this species remains scarce inland.

Areas of use

Mediterranean gulls are currently not a designated feature of any SPAs or SSSIs in Wales.

This species has a considerably shorter foraging range than other gulls, so they are vulnerable to the effects of anthropogenic activities close to their breeding sites. Due to the predominantly coastal ecology in both the breeding and non-breeding seasons, Mediterranean gulls can be disturbed by coastal developments and recreation, and fishing may also present a risk.



Activities in areas of use

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

Current Impact status: Green

The Mediterranean gull population in Wales increased between the 2000 Seabird Survey and the 2021 Seabird Count due to the species' range expansion throughout Britain and Ireland. It remains to be seen whether this species will establish as a regular breeder in Wales, but it is likely if the upward trend in the UK population continues. Also, no mortality from Highly Pathogenic Avian Influenza has yet been recorded for this species in the UK.

Sensitivity score: Amber

The amber sensitivity score for Mediterranean gulls is primarily due to its small population size and limited number of colonies in both Wales and the wider UK. The European population is also thought to be declining, mainly due to predation and disturbance at colonies.

Climate change	**Some Mediterranean gull colonies in Britain and Ireland are prone to desertion after tidal flooding. A predicted increase in storm frequency and intensity due to climate change may have population-level impacts. Equally a warming climate may make Wales more suitable for breeding Mediterranean gulls as their niche moves north.**
Predation	**Pressure from mammalian and avian predators can displace Mediterranean gulls from their breeding sites. Between 1980 and 2000, the colony at RSPB Dungeness in Kent collapsed due to predation by badgers, foxes, introduced American mink, and larger gulls. Interspecific competition and aggressive behaviour from terns has also been documented, which may also affect breeding success.**
Disturbance	**Egg collecting and disturbance have led to nest desertion in Ukraine. Habitat loss and disturbance due to tourism development in coastal areas may have also caused declines at some breeding sites in Europe.**
Bycatch	**Mediterranean gulls are vulnerable to bycatch, particularly on migration and in winter. Substantial numbers of these birds have been bycaught in longline fishing gear in several Mediterranean countries.**

Evidence gaps

- **The extent of impact from displacement and habitat degradation on survival is poorly known and difficult to quantify. This is important as both factors influence diet, foraging range and colony status.**
- **The collision risk for this species with offshore wind turbines is unknown but as a gull species with a coastal distribution it is likely to be impacted.**
- **There is a lack of data on the extent of bycatch of Mediterranean gulls in British and Irish waters.**

Opportunities

- **Suitable habitat protection and restoration, where necessary (i.e. in areas of habitat reduction and disturbance or predator introduction).**
- **Diet, foraging range, and colony count assessment to understand impacts of displacement on food availability and survival.**

GREAT BLACK-BACKED GULL

(Gwylan Gefnddu Fawr)

(*Larus marinus*)

Population & Ecology

Location

Great black-backed gulls are the largest and most dominant species of gull, with most found near the coast, often nesting in isolated pairs on islets or rocky outcrops. Currently, the largest populations in Wales can be found in Pembrokeshire and Puffin Island although colonies also currently exist in South-west Wales.

Great black-backed gulls can occasionally be found inland should food supply attract them but urban foraging and nesting is less prevalent compared to other gull species.

Current Population Status

The Welsh population of great black-backed gulls terns is of higher conservation concern compared to global and UK populations. This is due to a population crash between the 1985/88 and 1998/2002 census which resulted in a 68% reduction in apparently occupied nests (AONs) during that time. Therefore, great black-backed gulls are amber listed in the Birds of Conservation Concern in Wales 4 (BoCCW4). They are amber listed in the UK Birds of Conservation Concern 5 (BoCC5) due to moderate breeding and winter population declines and are of least concern on the European and global IUCN red lists.

Despite conservation concerns, the population of great black-backed gulls in Wales has increased by 49% between 2000 and 2021 with 434 AONs recorded during the Seabird 2000 survey and 648 AONs recorded in the recent Seabirds Count (2015-2021). Conversely, UK great black-backed gulls populations in this period have reduced from 16,814 to 8,021 AONs, a reduction of 43%. As a scavenger and predator, great black-backed gull is susceptible to Avian Influenza but impacts on Welsh birds have not been detected and no population decrease was recorded at two major colonies in Wales, Skomer and Skokholm , in 2023.

Historical Population trends

Great black-backed gull breeding records in Wales date back as far as the 1700s. In the 18th and 19th century, this species is thought to have been heavily persecuted with eggs taken and adult birds shot. Inland nests were found during this time and were thought to have been deserted due to hunting and egg collection. Colonies in Skokholm and Pembrokeshire were impacted by targeted nest removal in the 1950s to minimize Manx shearwater predation. Persecution of this species continued between 1960 and 1976 with continued nest removal and the shooting or trapping of adults birds, resulting in 350 birds killed on Skomer. Conversely, populations at St Margaret's Island increased between 1949 and 1976 from 24 pairs to 147.

In the late 1970s to the mid 1980s, great black-backed gull populations were impacted by a botulism outbreak, reducing the populations on both St Margaret's Island and Skomer. The reduction in the population due to the outbreak resulted in the cessation of control measures on Skokholm and Skomer.

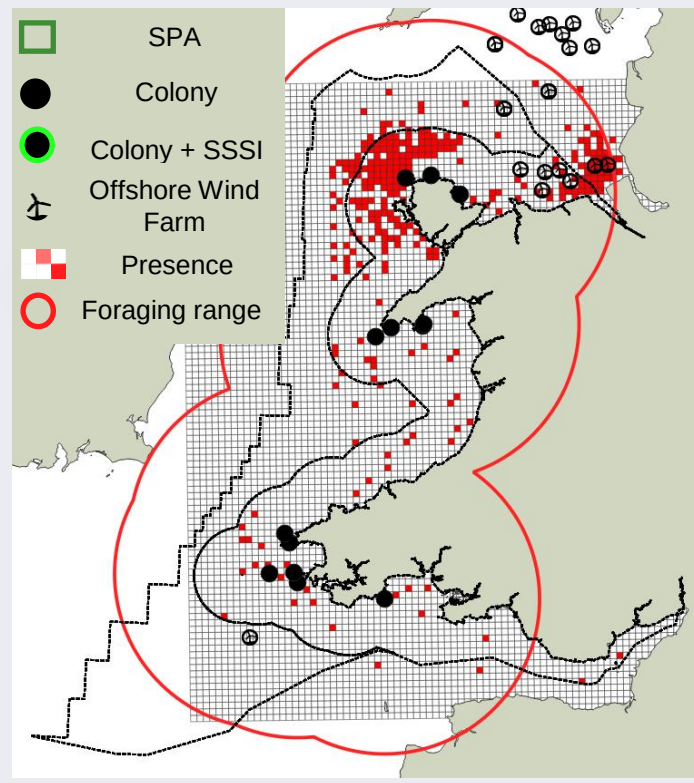
Areas of use & human activity

Great black-backed gulls are currently not a protected feature in Wales. Colonies are aggregated in Anglesey and surrounding islands, wider North Wales, and south-west Wales. This species favours coastal habitat, yet a number of Welsh birds also utilize inland reservoirs and lakes to roost in the winter

The species is at risk of collision with offshore wind turbines; existing and planned wind farms are likely to overlap with this species foraging and post-breeding dispersal range. They are also vulnerable to disease related to waste management and organo-metal contamination, the release of which can be associated with coastal industries.

Activities in areas of use and predicted risk

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity



Current Impact status: Amber

Whilst great black-backed gull populations in Wales have increased between the 2000 Seabird Survey and the 2021 Seabird Count, the effects of the recent Avian Influenza outbreak is yet to be determined for this species in Wales given the late arrival of the virus comparative to the wider UK. It is also important to consider the decline of wider UK populations of great black-backed gulls and possible transboundary impacts that may later affect Welsh populations given the overall decrease across the UK.

Sensitivity score: Amber

The sensitivity score for Welsh great black-backed gull populations is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development and climate change. Therefore, this is the predicted sensitivity to change if these risks are not mitigated.

Removal	**This species is still culled in some areas to increase breeding success of other species subject to gull predation as well as for aircraft safety and clean water management. Severe culling may cause a population decline as seen in Welsh colonies in the 20th century.**
Invasive species	**Whilst predation by invasive non-native mammals is currently not recorded as a pressure in Welsh colonies, the species may be susceptible to predation as demonstrated elsewhere. Similar gull species have been impacted by the introduction of mammals such as American mink and brown rats across the UK. Indirect impacts could occur if seabird colonies, which serve as a food source for great black-backed gulls, are depleted through predation or as a consequence of climate change.**
Disease	**Great black-backed gulls have been historically been impacted by botulism outbreaks and Avian Influenza. The impact of the recent Avian Influenza outbreak on this species in Wales is yet to be quantified.**
Offshore wind	**Along with other large gulls, great black-backed gulls are considered to be at high risk of collision with wind turbines, as they do not avoid offshore wind farms and often fly at the height of turbine blades.**

Evidence gaps

- **Limited knowledge of adult survival, productivity, phenology, and prey selection at various Welsh colonies compared to other UK populations.**
- **The impact of Avian Influenza on Welsh populations of great black-backed gulls is yet to be quantified.**
- **There is evidence that great black-backed gulls tend to bioaccumulate pollutants but there is little research on this in a Welsh context or how this affects survivability of this species.**

Opportunities

- **Regular population monitoring to understand population ecology and determine the impacts of infectious diseases and other pressures.**
- **Understanding the actual impacts of invasive predator species (rodents) on breeding colonies on islands (e.g. Puffin Island).**
- **Understanding whether pollutants may affect great black-backed gulls in Wales and impacts on survival, particularly when considering the cumulative pressure of other activities.**

HERRING GULL (Gwylan Penwaig)

(*Larus argentatus*)

Population & Ecology

Location

Herring gulls breed widely along the Welsh coastline, especially on offshore islands and sea stacks and increasingly on buildings in coastal areas and inland.

Welsh breeders are largely resident, rarely moving more than 100 miles from their colonies in the non-breeding season, although some ringed birds have been recovered as far away as Morocco. In winter, they are also joined by large numbers of migratory herring gulls from Northern and Eastern Europe.

Current Population Status

Herring gulls are red listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) and Birds of Conservation Concern 5 (BoCC5) in the UK due to severe declines in breeding populations and international importance of both breeding and non-breeding populations, whereas they are of least concern on the global IUCN red list. Conservation concerns remain for this species as the population of herring gulls in Wales has decreased by 23% between 2000 and 2021 with **12,826** apparently occupied nests (AONs) recorded during the Seabird 2000 survey and **9,815** AONs recorded in the recent Seabirds Count (2015-2021). However, this decrease is not as severe comparative to the wider UK, with a 44% reduction in AONs between surveys (from 109,815 to 61,077 AONs). This species winters in large numbers in Welsh estuaries. WeBS indices have shown a steady increase of wintering birds in Wales since the 1990s, with some very large gatherings of 10,000-12,000 individuals at single sites. Herring gulls have been recorded with Avian Influenza and the impact on this species is unknown in Wales although declines continue.

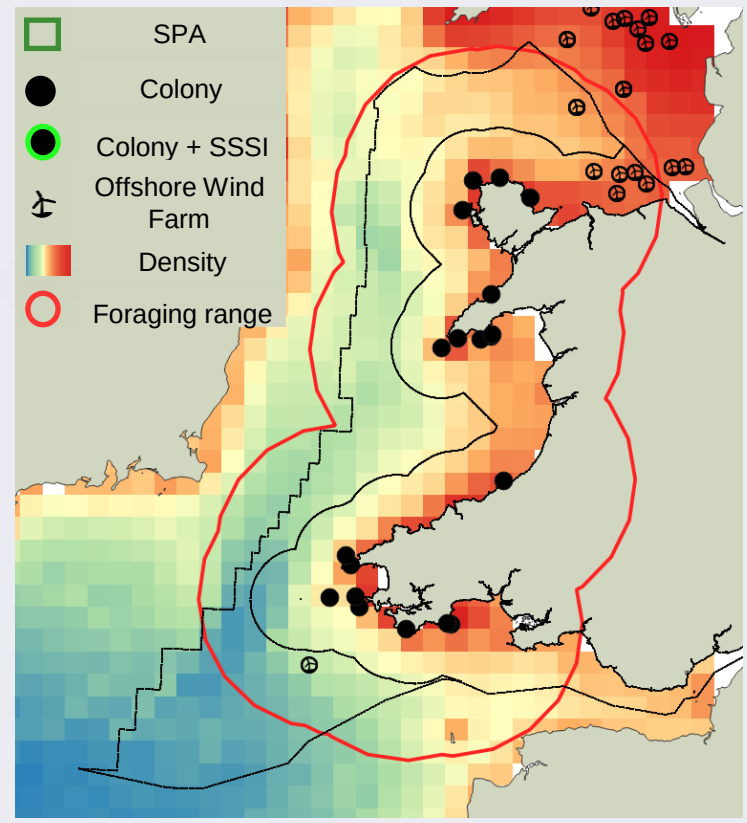
Historical population trends

Historical accounts from the early 19th century describe herring gulls as common but do not give counts at breeding colonies. One account from 1894 states that the species was common on the islands and cliffs of Pembrokeshire and that they had greatly increased in numbers since the Sea Birds Preservation Act of 1869. The breeding population of herring gulls in Wales increased significantly between 1930 and the late 1970s, due to increased food availability from discards from fishing boats, at docks and at landfill sites. There was then a sharp decline in the 1980s as a result of botulism which was most likely linked to landfill sites and almost exclusively killed adults. The Seabird Colony Register census in 1985-1987 showed a 77% decrease in the Welsh breeding population since 1969-1970. Following changes in waste management, the population began to stabilise at much lower levels by the early 2000s.

Areas of use & human activity

The herring gull is not a specific feature of SPAs or SSSIs in Wales, including potential wintering sites. Given the wide range of this species, they are likely to benefit from conservation measures within other protected area boundaries in Welsh waters.

Due to their wide distribution, herring gulls are often scoped into monitoring and environmental impact assessments for marine activities. Gull roosting areas can be disturbed by on land developments (i.e. port and harbour expansions), with gulls commonly considered for collision risk assessments from offshore wind farms (OWFs).



Activities in areas of use

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

Current Impact status: Red

The Welsh herring gull population declined between the 2000 Seabird Survey and the 2021 Seabird Count, likely due to a combination of several factors including predation pressure and reduced food availability associated with a decrease in fisheries discard. The recent Avian Influenza outbreak is assumed to have impacted colonies in Wales although quantification of this pressure is yet to be determined through long-term monitoring. It is also important to consider the decline of wider UK populations of herring gulls and possible transboundary impacts that may later affect Welsh populations.

Sensitivity score: Red

The red sensitivity score for herring gulls is primarily due to the vulnerability to diseases and collision from wind farms. Population control measures may have significant population effects if they coincide with disease outbreaks.

Disease	**Herring gulls are susceptible to a wide range of infectious pathogens. The current concern for the Welsh and the wider UK herring gull population is the impact of the recent outbreak of Avian Influenza.**
Predation	**Herring gulls in the UK are known to be susceptible to predation due to non-native species introduction. In a Welsh context, there is limited evidence of impacts from non-native species on herring gulls, other than red fox (*Vulpes vulpes*) introductions in Anglesey. Multiple Scottish colonies experienced declines following introduction of mink and there is potential for this to occur in Wales.**
Habitat Degradation	**Changes in habitat can reduce access to high energy food resources and increase energy expenditure as herring gulls seek food further away from their colonies, e.g. in intertidal habitats. Tidal barriers pose a potential risk by prolonging the inundation period and/or altering prey availability. Habitat degradation may be further exacerbated with policy changes affecting supplementary resources, i.e. changes in fishing discard legislation. In addition, the perception of rooftop breeders as pests can lead to the targeted destruction of nests and eggs.**

Evidence gaps

- **Knowledge of adult survival, productivity, phenology, and prey selection at various Welsh colonies and breeding sites, including rooftop habitats.**
- **It is unknown why there has been a shift from natural breeding sites to rooftops, and whether there are measures that could reverse this trend to reduce conflicts with humans.**
- **The long-term effects of Avian Influenza alongside other endemic diseases present within herring gull populations.**

Opportunities

- **Increased understanding of seasonal distributions and migratory pathways in Wales to assist placement of offshore wind farms and to support appropriate compensatory measures where appropriate.**
- **Targeted monitoring to determine impacts of Highly Pathogenic Avian Influenza.**
- **Establishment of long-term, systematic surveys of rooftop breeders to substantiate current population estimates and a high-level review of local authority culling and nest removal initiatives.**
- **Suitable habitat protection and restoration, where necessary (i.e. in areas of habitat degradation or predator introduction).**
- **Diet, foraging range, and colony count assessment to understand impacts of displacement on food availability and survival.**

LESSER BLACK-BACKED GULL

(Gwylan Gefnddu Fach)

(*Larus fuscus*)

Population & Ecology

Location

In Wales, the majority of lesser black-backed gulls breed on rat-free islands, though there are also inland colonies. Increasing numbers are nesting on buildings, particularly in Cardiff. Outside of the major colonies, scattered groups and single pairs breed around the north and south coasts of Wales but there are relatively few in Cardigan Bay. Over 94% of the Welsh breeding population is in the southern counties.

Many of the wintering lesser black-backed gulls in Wales are not Welsh breeders. Some breeding birds do not travel far from their colonies, but many winter in the Iberian Peninsula and Northwest Africa.

Current Population Status

Lesser black-backed gulls are red listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) due to severe declines in the breeding population, whereas they are amber listed in the UK in Birds of Conservation Concern 5 (BoCC5) due to internationally importance of the population and of least concern on the global IUCN red list.

Conservation concerns for this species are due to the population of lesser black-backed gulls in Wales decreasing by 45% between 2000 and 2021 with **23,584** apparently occupied nests (AONs) recorded during the Seabird 2000 survey and **13,084** AONs recorded in the recent Seabirds Count (2015-2021). In the wider UK, there has been a 40% reduction in AONs between surveys (from 107,698 to 55,304 AONs).

Lesser black-backed gulls were affected by recent outbreaks of Avian Influenza but the exact magnitude of mortality in Welsh populations is currently unknown.

Historical population trends

There is no detailed information about the status of lesser black-backed gulls in Wales until the late 19th century, when it was described as a common resident on the islands of Pembrokeshire, although colonies were small (20-30 pairs). The only breeding birds in Glamorgan at the time were small numbers on the Gower Peninsula. In the early 20th century, they bred at only a few sites in North Wales and were seldom seen inland. By the mid-1950s, numbers in Pembrokeshire increased significantly, but other Welsh populations remained much lower due to egg collecting.

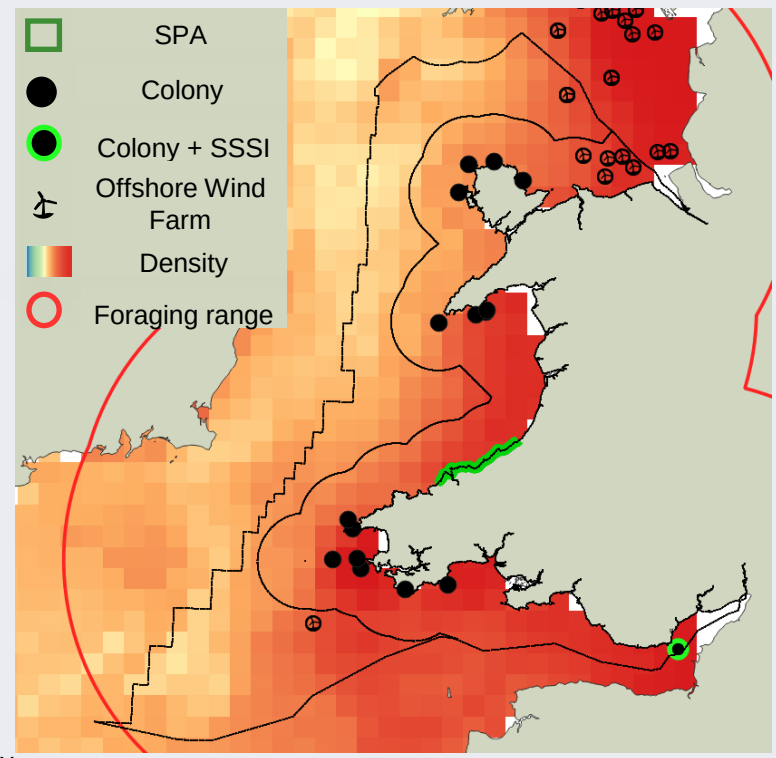
From the 1970s, there was then a marked increase in the Welsh population, with numbers peaking in the early 1990s. This was driven by increased food availability from refuse and discards from fisheries. A reversal of these factors has likely driven the decline in the population since then. There has also been a shift from natural nest sites to buildings and from maritime food supplies to farmland. The colonies on Skomer and Skokholm have declined by over 75% since 1993 and the colony on Cardigan Island declined by 93% during the same time period. Wintering numbers are likely to fluctuate strongly between years and sites: at Llys-y-frân Reservoir, Pembrokeshire, up to 10,000 were recorded in 1988, whilst the maximum in 2018 was c. 4,000. Up to 2,000 were counted at Llangorse Lake, Powys, in November 2017 and again in January 2019.

Areas of use & human activity

Breeding lesser black-backed gulls are a designated feature of the Skomer, Skokholm and Seas off Pembrokeshire SPA as well as SSSIs Flatholm and Aberarth - Carreg Wylan (Cardigan Island). The largest Welsh colonies are in this SPA and on Flatholm in East Glamorgan and Puffin Island off Anglesey. This species has a wide distribution in Wales and a wider foraging range than other large gulls, therefore they overlap with a range of anthropogenic activities. They are commonly considered for collision risk assessments from offshore wind farms and can be disturbed by coastal developments.

Activities in areas of use

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity



Current Impact status: Red

The Welsh lesser black-backed gull population declined between the 2000 Seabird Survey and the 2021 Seabird Count, likely due to a combination of factors including reduced food availability associated with a decrease in discards from fisheries. The recent Avian Influenza outbreak may have impacted colonies in Wales although high levels of mortality in this species have not been observed. The quantification of this pressure is yet to be determined for this species in Wales given the late arrival of the virus comparative to the wider UK. It is also important to consider the decline of wider UK populations and possible transboundary impacts.

Sensitivity score: Red

The red sensitivity score for lesser black-backed gulls is primarily due to the vulnerability to diseases and collision from wind farms. Population control measures may have significant population effects if they coincide with disease outbreaks.

Collision	**Along with other large gulls, lesser black-backed gulls are considered to be at high risk of collision with wind turbines, as their foraging ranges overlap with offshore wind farms and often fly at the height of turbine blades.**
Disease	**Lesser black-backed gulls have been affected by Highly Pathogenic Avian Influenza (HPAI). They are considered a low-priority species in this context as low levels of mortality were observed in 2022. However, a count from one site in the Skomer, Skokholm and Seas of Pembrokeshire SPA was 24% lower than the pre-HPAI baseline.**
Habitat degradation	**As surface feeders and utilisers of refuse sites, lesser black-backed gulls are vulnerable to plastic ingestion and entanglement in discarded fishing gear. Multiple studies have found that plastic ingestion is common in this species, but the effects on survival and breeding success are unknown. The reduction of food availability due to habitat degradation may be further exacerbated with policy changes affecting supplementary resources, i.e. changes in fishing discard legislation. In addition, the perception of rooftop breeders as pests can lead to the targeted destruction of nests and eggs.**

Evidence gaps

- **Knowledge of adult survival, productivity, phenology, and prey selection at Welsh colonies and breeding sites, including rooftop habitats.**
- **It is unknown why there has been a shift from natural breeding sites to rooftops, and whether there are measures that could reverse this trend to reduce conflicts with humans.**
- **Numbers of lesser black-backed gulls across all surveyed sites in the UK were 25% lower than the pre-HPAI baseline in 2023, but the impact of the virus on the Welsh population as a whole remains unclear.**

Opportunities

- **Further understanding of the ecology of Welsh rooftop breeding lesser black-backed gulls including collecting targeted data on breeding success and productivity.**
- **Targeted population monitoring to determine the impacts of HPAI.**
- **Non-lethal management of lesser black-backed gulls breeding on rooftops can reduce conflict between people and gulls but it may only move the problem elsewhere. Conservation measures must be holistic, taking into account the increase in rooftop-nesting gulls and the ongoing decrease at natural coastal sites.**

SANDWICH TERN (Môr-wennol Bigddu)

(*Thalasseus sandvicensis*)

Population & Ecology

Location

The Sandwich tern exhibits the most erratic distribution of any seabird breeding in Britain and Ireland, with widely dispersed populations forming colonies on sandy beaches with scrapes as nests. The Welsh breeding population was confined to a single site at Cemlyn Lagoon, Anglesey, which has been occupied continuously since 1984. However, a new colony has recently established on Anglesey's Inland Sea (2022).

Away from the breeding grounds, birds migrate along the west coast of Africa to winter mainly in the tropics.

Current Population Status

The Sandwich tern is amber listed in the Birds of Conservation Concern in Wales (BoCCW4) and in the UK (BoCC5) due to moderate loss in breeding range and as most of the population is restricted to a single site in Wales. They are of least concern on the global and European IUCN red lists.

The population of the Sandwich tern in Wales, has increased by 15% over the past two decades with 450 apparently occupied nests (AONs) recorded during the Seabird 2000 survey and 519 AONs recorded in the recent Seabirds Count (2015-2021). The UK population decreased by 4% to 12,490 from 12,980 AONs over this period.

HPAI is known to have impacted this species with the Cemlyn colony population reducing by 42% between 2022 and 2023 and further loss in the summer of 2023.

Historical Population trends

The first record of Sandwich terns breeding in Anglesey dates back to the early 20th century, which was followed by a population collapse with only isolated breeding attempts documented until the 1970s. It was not until 1984 that breeding occurred regularly at Cemlyn Lagoon thanks to seasonal wardening to protect the colony from people, dogs and predators. The colony has nevertheless been subject to strong fluctuations, with disastrous breeding seasons reported for 2007, 2008 and 2017. Electric fencing is now installed each year around the island to limit mammalian (otter) disturbance and predation, and numbers recovered to an estimated 1,200-1,500 pairs in 2019.

Areas of use & human activity

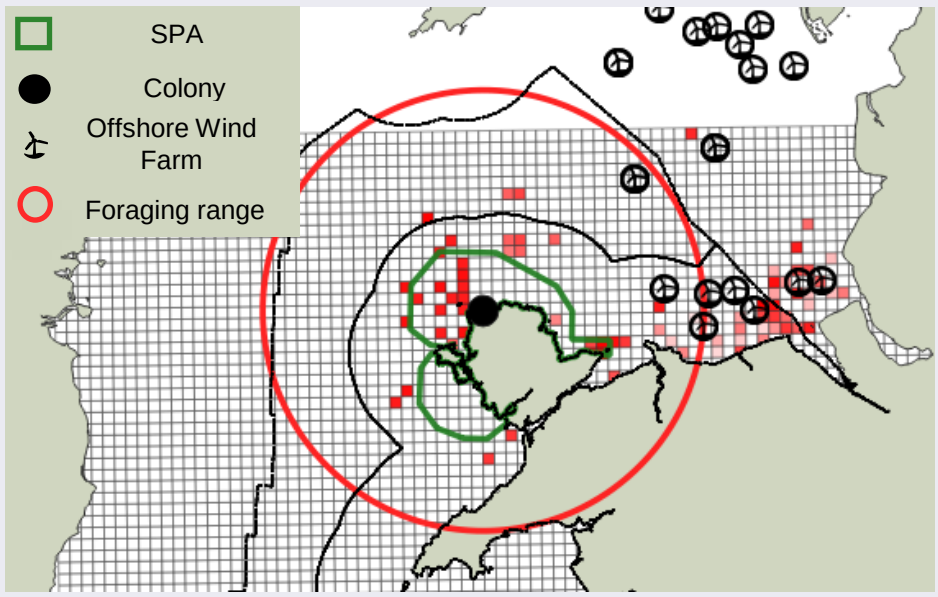
Sandwich terns breed at the Cemlyn Lagoon colony (as a feature of Cemlyn Bay SSSI, SAC, SPA) and a newly formed colony on Anglesey's Inland Sea, and are hence mostly present in and around Anglesey during the breeding season. There should ideally be no overlap in occurrence with human activities at the colony.

Sandwich terns are likely to make wider use of the Welsh coastline and the Irish Sea to forage for food, ranging from their colonies when local food resources are low and/or competition with other birds is high. Several sites such as Rhis Point, Afon Wen, Clwyd and Dyfi estuaries are important passage, foraging and roosting areas in late summer, with more birds than those nesting in Wales. Therefore, these areas are likely important for colonies in Scotland, Ireland and England.

Offshore wind developments may present a future risk to this species due to potential overlap with marine foraging areas.

Activities in areas of use and predicted risk

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity



Current Impact status: Amber

Whilst the Sandwich tern population in Wales has significantly increased between the 2000 Seabird Survey and the 2021 Seabird Count, the recent Avian Influenza outbreak is likely to have impacted tern colonies in Anglesey. The quantification of this pressure is yet to be determined in Wales given the late arrival of the virus comparative to the wider UK.

Sensitivity score: Red

The sensitivity score for Welsh Sandwich tern populations is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development and climate change. Therefore, this is the predicted sensitivity to change if these risks are not mitigated.

Human disturbance	**Human disturbances of Sandwich tern during the breeding season is mainly caused by recreational actives (e.g. dog-walking, outdoor sports). The species appears to be particularly sensitive to disturbance during the early breeding season.**
Nest predation	**Sandwich terns are vulnerable to mammalian predators such as fox and mink. In Wales, disturbance and predation of eggs by an otter in 2017 led to complete breeding failure at the Cemlyn Lagoon colony. The benefits of breeding in association with gulls appear to outweigh the costs of occasional gull predation.**
Lack of food	**The Sandwich tern is highly specialised, feeding mainly on herring, sprat, and sandeel during the breeding season and is therefore vulnerable to changes in prey availability due to human-caused impacts, including fishing, organic enrichment, physical removal of substratum, and local temperature changes associated with climate change.**
Habitat loss	**As with most tern species, flooding (as a result of weather extremes) can result in sudden loss of breeding habitat and nest abandonment, as was documented in 1977 for the Sandwich tern colony at Cemlyn Lagoon. Climate modelling predicts that the shingle ridge near the Cemlyn colony will be lost to sea-level rise, presenting a significant risk to the current colony.**

Evidence gaps

- **It is uncertain how human impacts away from the breeding colony, including mortality due to coastal and offshore wind farms, affect Sandwich tern populations.**
- **The distribution of the American mink in Wales requires further investigation as this non-native species has severely affected Sandwich tern colonies elsewhere.**
- **The extent and potential impact of marine pollutants (PAH, hydrocarbons, TBT) on egg quality and breeding success requires further attention.**
- **The potential impacts of climate change require further empirical investigation, including shifts in prey availability due to changing water temperature, the increasing frequency of weather extremes affecting habitat quality, as well as increased susceptibility to infectious diseases.**

Opportunities

- **Monitoring and tagging studies to investigate causes of mortality and mechanisms of colony formation**
- **Investigating the population size of American mink and its potential effect on colony establishment in Wales**
- **Establishment of contamination levels from marine pollutants to assess effects on breeding success**
- **Diet comparisons between Cemlyn and non-Welsh colony sites (e.g. RSPB Hodbarrow in Cumbria) to study links between prey availability and breeding success**
- **Coastal adaptation may provide an opportunity to create new nesting sites within foraging range - breeding habitat creation will be necessary given the risk to Cemlyn due to predicted sea level rise.**
- **Continuation of wardened breeding sites would allow for ongoing monitoring of the population and would provide more robust data to base measures upon to ensure the resilience of colony populations. Wardens can also help deter predation and allow for faster intervention in the event of non-native predator incursion.**

LITTLE TERN (Môr-wennol Fach)

(*Sternula albifrons*)

Population & Ecology

Location

There are currently only two breeding colonies of little terns in Wales at Gronant Dunes and RSPB Point of Ayr. They nest in shallow scrapes in a narrow and vulnerable strip of beach habitat close to the tidally washed shore.

Away from the breeding colony, little terns migrate to tropical West Africa.

Current Population Status

The little tern is red listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) - due to its dependence on a single site - and amber listed in the Birds of Conservation Concern 5 (BoCC5). It is classified as of least concern on the global and European IUCN red lists.

The Welsh population has increased by 129% over the past two decades with 75 apparently occupied nests (AONs) recorded during the Seabird 2000 survey and 172 AONs recorded in the recent Seabirds Count (2015-2021), whereas populations in the UK have decreased by 25% from 1,873 to 1,403 AONs over this period. The Gronant colony is now the second largest colony of little terns in Britain and Ireland.

Little terns do not seem to have been effected by the recent avian flu outbreak with no mass mortalities reported. This is likely due to different nesting habitats comparative to other tern species.

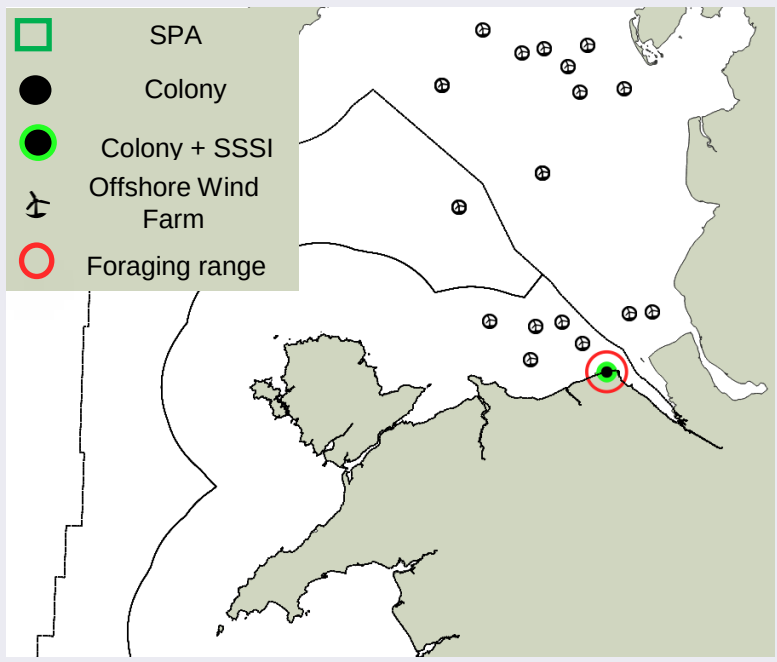
Historical Population trends

In the late 19th and early 20th century, little terns bred commonly in North Wales, with many colonies from Ynyslas, Ceredigion, northwards to the Dee Estuary, while there were only two colonies farther south, in East Glamorgan, at Sker Point and The Leys near Aberthaw. Since then, the number of occupied colonies has decreased significantly This is due to a range of factors such as the introduction of a shooting range at Ynyslas and egg predation within colonies in North Wales. Only two colonies remained by the late 1970s. By 1989, the colony at Gronant remained the only regular colony of little terns in Wales. Habitat loss and disturbance are considered the main factors preventing the establishment of new colonies in Wales.

Areas of use & human activity

The two Welsh colonies of little tern are situated close together within the Gronant Dunes and Talacre Warren SSSI. During the breeding season, little terns are mostly present in and around this site, including Dee Estuary and Liverpool Bay, which is designated as an SPA for this species. There should ideally be no overlap with human activities directly at the colonies (except for those associated with colony management).

It is currently difficult to make generalisations about human activities that overlap with the species' range whilst foraging as this species has such a small foraging range. Any nearshore activity or development is likely to present a risk to this species.



Activities in areas of use and predicted risk

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

Current Impact status: Amber

Whilst the little tern colony at Gronant has significantly increased between the 2000 Seabird Survey and the 2021 Seabird Count, only two colonies exist in Wales at present and therefore are likely vulnerable to a range of human activities. Given their very limited foraging range, they also remain vulnerable to changes in food availability.

Sensitivity score: Red

The sensitivity score for Welsh little tern populations is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development and climate change.

Human disturbance	**Little terns are highly vulnerable to human disturbance at breeding colonies through recreational activities (e.g. dog-walking, outdoor sports, bird watching, drones). Human disturbances are reported to markedly facilitate gull predation, reducing reproductive success.**
Nest predation	**Little terns are vulnerable to mammalian and avian predators such as foxes, corvids and gulls. Local predation pressure can be so high that colonies would not survive without protective measures (fencing) to keep predators away.**
Lack of food	**The little tern is highly specialised, feeding mainly on lesser sandeel, herring, and sprat and is therefore potentially vulnerable to changes in prey availability due to human-caused impacts. These include fishing, organic enrichment, physical removal of sediment, and local temperature changes associated with climate change. As their foraging range is very limited, changes to prey availability, such as distributional shifts as a result of climate change, could be catastrophic for this species.**
Habitat loss	**As little terns habitually nest close to the high-water mark, they are particularly vulnerable to flooding by both high tides and storm surges as reported for the Gronant colony where in 2018 over 50% of active nests were washed away.**

Evidence gaps

- **It is uncertain how human impacts away from the breeding colony, including mortality due to coastal renewable energy developments, affect little tern populations.**
- **The distribution of the American mink in Wales requires further investigation as this non-native species has severely affected tern colonies elsewhere.**
- **The potential impacts of climate change require further empirical investigation, including shifts in prey availability due to changing water temperature, the increasing frequency of weather extremes and sea level rise affecting habitat quality.**
- **There is limited research in how new colonies could be formed that would provide climate change proof habitats, more colonies provide resilience to sea level rise, disease such as avian flu and coastal squeeze.**

Opportunities

- **Increasing the distribution of the species by proactively creating breeding habitat and fencing off suitable areas, such as former colonies, to support colony foundation.**
- **Continuation of wardened breeding sites would allow for ongoing monitoring of the population and would provide more robust data to base measures upon to ensure the resilience of colony populations. Wardens can also help deter predation and allow for faster intervention in the event of non-native predator incursion.**
- **Investigating the effect of projected sea level rise on potential little tern breeding habitat.**
- **Monitoring studies to investigate mechanisms of colony formation in little terns.**
- **Investigating the population and distribution of American Mink and its potential effect on little terns in Wales.**
- **Diet comparisons between colony sites to study links between prey availability and breeding success in light of climate change.**

ROSEATE TERN (Môr-wennol Wridog)

(*Sterna dougallii*)

Population & Ecology

Location

The roseate tern is the rarest tern species in Wales, breeding sporadically and in very low numbers in the main tern colonies on Anglesey and The Skerries alongside other tern (and gull) species. They nest in shallow scrapes on the ground but will also use specially designed nest boxes placed on the ground.

Roseate terns breed in western Europe and spend the winter in a fairly restricted area around the Gulf of Guinea, West Africa.

Current Population Status

The roseate tern is red listed in the Birds of Conservation Concern in Wales (BoCCW4) and in the UK (BoCC5) due to a severe population decline. The species is of least concern on the IUCN Global and European red lists as there are significantly larger colonies outside the UK.

Two apparently occupied nests (AONs) were recorded in Wales during the Seabird 2000 survey and only one AON in the recent Seabirds Count (2015-2021), while the overall UK population of roseate terns has increased from 56 to 120 AONs over this period. The largest colony of roseate terns in northwest Europe is at Rockabill, Ireland, which is the likely source of recent Welsh breeding birds. The only extant UK colony (Coquet Island, Northumberland) is an unlikely source population for Welsh breeders.

Roseate Terns were badly affected by avian flu at the only significant UK colony, Coquet Island. AONs were 21% lower in 2023 than in 2022, with high chick mortality attributed to HPAI.

Historical Population trends

Wales was once a stronghold for roseate terns in Britain and Ireland, with local breeding estimates ranging between 20 to 300 pairs in the late 19th and early 20th century. Historically, this species has faced particular pressure from hunting (due to its sought-after plumage for hat decoration) and egg collection, resulting in local conservation effort. Between 1969 and 1986, the numbers of roseate terns breeding on Anglesey fluctuated between 251 pairs in 1974 (at three colonies) and 130 pairs in 1981 (at two colonies). Numbers dropped from 208 pairs in 1986 (at three colonies) to 77 pairs in 1987 (at four colonies). This decline is mainly attributed to rat, fox, peregrine and gull predation. By 1991, there were only five pairs at two colonies on Anglesey. Evidently, some roseate terns that formerly bred on Anglesey had moved to Rockabill, Ireland, so the decline in Wales did not reflect a decline in the whole Irish Sea population.

Areas of use & human activity

The single AON of the roseate tern reported for Wales in the recent Seabirds Count was recorded at Anglesey Terns / Morwenoliaid Ynys Môn SPA in 2018. There should ideally be no overlap with human activities in such protected areas.

Roseate terns have the smallest range of all five breeding tern species in Britain and Ireland. However, it is difficult to make generalizations about human activities that overlap with the species' range whilst foraging away from the breeding site. Tidal stream and offshore wind developments may present a future risk to this species due to potential overlap with marine feeding areas.

Activities in areas of use and predicted risk

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

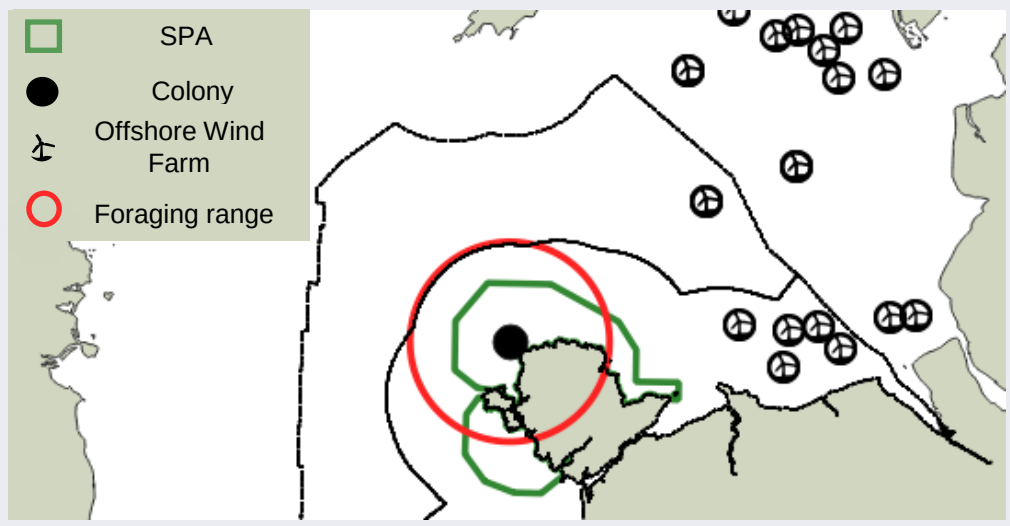


Image source: https://commons.wikimedia.org/wiki File:Roseate_Tern_at_Heron_Island,_Capricornia_Cays_National_Park_QLD.jpg

Current Impact status: Red

The roseate tern is the rarest breeding tern species in Wales with currently only one documented breeding pair, following a dramatic decline in the breeding population from the mid 1980s onwards. On the verge of local extinction, this species requires targeted protective and supportive measures at the nest in addition to reducing existing environmental risks. Critical to the conservation status and establishment of roseate terns in Wales is the connectivity to the large colony of roseate terns at Rockabill, Dublin Bay, Ireland.

Sensitivity score: Red

The sensitivity score for the remaining Welsh roseate terns is determined by the species' sensitivity to key threats that have historically been a pressure for this species (or for proxy species, i.e. the common tern), as well as future predicted risks as a result of increased use of the marine area for development and climate change.

Human disturbance	**Human disturbance of terns during the breeding season is mainly caused by recreational activities (e.g. dog-walking, outdoor sports), but also by activities associated with coastal flood protection, erosion control and industrial use (renewable developments).**
Nest predation	**In Wales, the roseate tern appears to have suffered primarily from predation by gulls, but also from predation by mammals (brown rat, fox) that found their way to the breeding islands.**
Lack of food	**In the UK, roseate terns forage mainly on sandeel, herring and sprat with the former two species considered likely to suffer negatively due to climate change. As such, roseate terns may become dependent on a single prey species and increasingly vulnerable to local resource depletion.**
Habitat loss	**As with most tern species, flood events (as a consequence of weather extremes) can lead to sudden loss of breeding habitat. In addition, competitive tern and gull species may deprive roseate terns of suitable breeding habitat in a density-dependent manner. Climate change and predicted sea level rise is also likely to impact this species as they nest on low lying islands at the coast.**

Evidence gaps

- **The connectivity between roseate tern colonies in the UK and Ireland and the extent to which Welsh breeders depend on recruitment from the colony at Rockabill, Ireland is not well known.**
- **It is unknown whether differences in roseate tern colony success are caused by differences in nest predation and/or food availability and how breeding success is related to the presence of sympatric tern species (common tern and Arctic tern).**
- **The extent of hybridization of roseate terns with common terns is currently not quantified, and the relative role of interspecific competition in territory occupation and reproductive success is still unclear.**
- **Understanding optimal conditions for establishment of roseate tern colonies including the establishment of climate change proof habitats.**

Opportunities

- **Investigation of the connectivity between roseate tern populations and the role of the Irish colony (Rockabill) as a source (and sink) population for Welsh breeders.**
- **Further investigation of eradication, deterrence and isolation measures against mammalian and gull predation at island colonies.**
- **Investigation of the effectiveness of nest box programmes to attract roseate terns to potential breeding sites.**
- **Investigation of the establishment of new colonies in climate change proofed locations.**
- **Continuation of wardened breeding sites would allow for ongoing monitoring of the population and would provide more robust data to base measures upon to ensure the resilience of colony populations. Wardens can also help deter predation and allow for faster intervention in the event of non-native predator incursion.**

COMMON TERN (Môr-wennol Gyffredin)

(*Sterna hirundo*)

Population & Ecology

Location

The largest Welsh colony of common terns is located at Shotton steelworks (Flintshire) where common terns breed on artificial islands. Further large colonies on Anglesey, including The Skerries and Cemlyn Lagoon, account for most of the remaining common tern breeding pairs in Wales. Inland breeding has been very limited in Wales.

Migration follows the Atlantic coast of southwest Europe and northwest Africa to wintering grounds in West Africa.

Current Population Status

The common tern is amber listed in the Birds of Conservation Concern in Wales (BoCCW4) and in the UK (BoCC5). The amber conservation status in Wales is due to the limited number of colonies, some of which have shown considerable fluctuations, as well as a decreased range for this species. The common tern is considered of least concern on the European and global IUCN red lists.

The Welsh population has increased by 21% between 2000 and 2021, with 700 apparently occupied nests (AONs) recorded during the Seabird 2000 survey and 850 AONs recorded in the recent Seabirds Count (2015-2021). Overall, UK common tern populations have declined by 9% from 13,385 AONs to 12,219 AONs over this period.

In 2023 common tern populations declined by 44% comparative to the Seabirds Count which is assumed to be a result of the recent HPAI outbreak.

Historical Population trends

Common terns were more widespread in Wales in the 19th century than they are today. A small colony was recorded on Skokholm in the late 19th century and remained until 1916. During the 20th century, colonies were also recorded at Morfa Dinlle in Gwynedd, as well as several sites on Anglesey that are no longer occupied, including Ynys Llanddwyn, where they outnumbered Arctic terns. The colony remained active until at least 1958.

The Welsh population of common terns represented 5% of the Britain and Ireland population in 2000 and increased steadily until 2007. It declined sharply in 2009 with the collapse of the Shotton colony, probably due to a lack of food caused by flooding in 2007/8 which destroyed the nursery grounds for fish. The recent HPAI outbreak is thought to have impacted common tern colonies with the main colony at Shotton most affected. Despite recent declines, Welsh colonies still held 5% of the Britain and Ireland common tern population at the time of the Seabird Count survey.

Areas of use & human activity

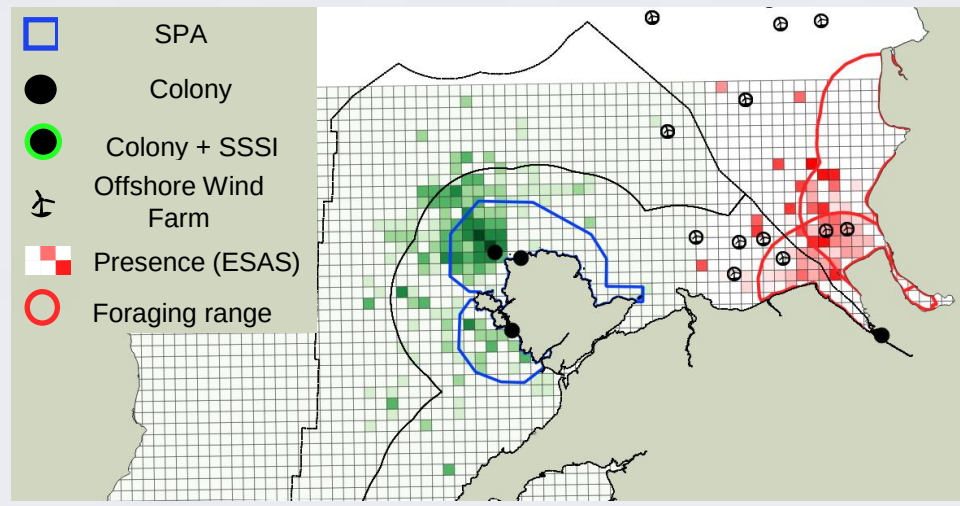
Common terns are a protected feature of the Anglesey Terns / Morwenoliaid Môn SPA, although they commonly occur along all Welsh coastlines. Liverpool Bay / Bae Lerpwl SPA and throughout the Irish Sea are known foraging locations for common terns. As terns do not carry multiple fish, foraging distance from the colony is a limiting factor.

Common terns forage where sandeels and other prey species accumulate near the surface, such as tidal streams and sandbanks. This brings them into conflict with future tidal energy developments and offshore wind farms (OWF) due to displacement from foraging habitat and the potential risk of collision.

Activities in areas of use and predicted risk

Ports & dredging (A) | Shipping (G) | Oil & Gas (G) | Fishing (R) | Recreation (R) | Aquaculture (G) | Offshore Wind (A)

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity



Distribution based on raw ESAS survey data, showing common and Arctic tern combined. Areas of use in the east (red) are more likely common tern.

Current Impact status: Amber

Whilst common tern populations in Wales have significantly increased between the 2000 Seabird Survey and the 2021 Seabird Count, the recent Avian Influenza outbreak is likely to have impacted colonies in Anglesey. The quantification of this pressure is yet to be determined for common terns in Wales given the late arrival of the virus comparative to the wider UK. It is also important to consider the slight decline of wider UK populations and possible transboundary impacts that may later affect Welsh populations.

Sensitivity score: Red

The sensitivity score for Welsh common tern populations is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development and climate change.

Human disturbance	**Regular recreational activities (e.g. motorboats, dogs off-leash, UAV) are reported to scare away common terns from nesting islands, which can lead to near total reproductive failure and may also facilitate gull predation.**
Nest predation	**The breeding density and breeding success of common terns is negatively impacted by the introduction of nest predators, such as mink, brown rat, and fox to island locations. They are also vulnerable to predation by large gulls.**
Lack of food	**Human fishing activities can impact prey availability. Factors indirectly causing reductions in prey availability include organic enrichment and local temperature increases related to climate change. Common terns depend on specific prey species (e.g. sandeel, saithe, sprat) but have a broader diet than other tern species.**
Habitat loss	**Flood events (as a consequence of weather extremes) can lead to sudden loss of breeding and foraging habitat. There are concerns that the installation of tidal lagoons could cause long-term loss of foraging habitat.**

Evidence gaps

- **It is unknown whether the increased breeding success of common terns in Wales as compared to the rest of the UK is due to differences in food availability, predation rates, or a combination of both factors.**
- **The consequences of Avian Influenza on common tern populations is currently unclear. Local observations have recorded increased mortality as a result of the outbreak but longer term monitoring is required to determine population consequences.**
- **It is unknown what the impacts of tidal lagoon developments will be on this species, particularly with regard to potential habitat loss.**

Opportunities

- **Conservation initiatives to reduce the effects of nest predators would ensure that the populations are allowed to recover as best as possible from the effects of the avian influenza outbreaks of recent years.**
- **Diet composition comparisons between colonies may support greater understanding of the linkage between prey availability and fledging success at colonies.**
- **Measures to mitigate the potential loss of colonies due to rising water levels have had proven successful in other regions which may be applicable to Welsh colonies that are considered at risk from climate change driven sea level rise and increased storm and flooding events.**
- **Continuation of wardened breeding sites would allow for ongoing monitoring of the population and would provide more robust data to base measures upon to ensure the resilience of colony populations. Wardens can also help deter predation and allow for faster intervention in the event of non-native predator incursion.**

ARCTIC TERN (Mor-wennol y Gogledd)

(*Sterna paradisaea*)

Population & Ecology

Location

In Wales, Arctic terns breed at four discrete sites on the coast of Anglesey (The Skerries, Cemlyn Lagoon, Inland Sea, and a private site) and there have been sporadic records of pairs attempting to breed in small numbers elsewhere such as Gwynedd.

They can be found nesting on Anglesey and foraging along the Welsh coastline and further offshore in the Irish Sea between April and August. They favour low-lying rocky islets when nesting, protecting themselves from ground predators.

Current Population Status

The Welsh population of Arctic terns is of higher conservation concern compared to Global and UK populations because of a long-term 60% reduction in breeding range and a higher degree of localized breeding. Arctic terns are hence red listed in the Birds of Conservation Concern in Wales 4 (BoCCW4). They are amber listed in the UK Birds of Conservation Concern 5 (BoCC5) because of regional population declines, particularly in Scotland, whereas they are of least concern on the European and global IUCN red lists.

The population of Arctic terns in Wales has increased by 134% between 2000 and 2021 with 1,705 apparently occupied nests (AONs) recorded during the Seabird 2000 survey and 3,994 AONs recorded in the recent Seabirds Count (2015-2021). Conversely, UK Arctic tern populations have reduced from 48,550 to 30,451 AONs, a reduction of 37%.

It is important to consider the recent outbreak of Avian Influenza and how this may have affected these population trends. In 2022, Avian Influenza was confirmed at the Skerries, Ynys Feurig and Cemlyn colonies.

Historical Population trends

Arctic tern colonies have historically been susceptible to localized, stochastic events that have impacted the size and the perseverance of a colony. In the 1970s, mammalian predation due to the proximity of a refuse tip resulted in the desertion of a colony in the Inland sea. A brown rat infestation at the currently occupied private land colony caused heavy predation of adults and chicks in 1978. In 2016, The Skerries colony saw the loss of 820 adults and young birds due to a botulism outbreak.

In addition to disease and mammalian predation, Arctic terns are subject to competition for nesting space in mixed colonies such as Cemlyn lagoon. This leads to pairs nesting in areas more vulnerable to extreme weather conditions and high predation risk.

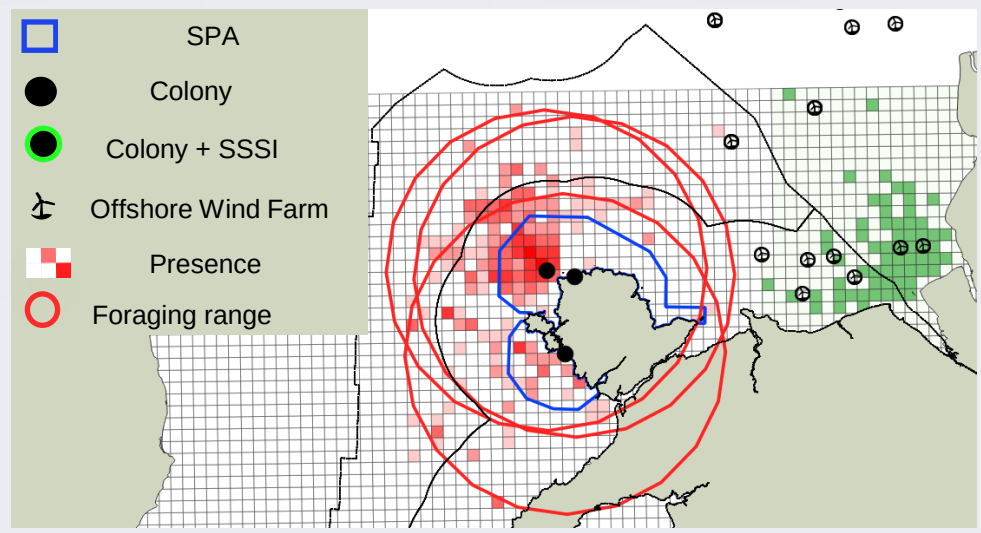
Areas of use & human activity

Arctic terns are a protected feature of the Anglesey Terns SPA in north-west Wales and are mostly present in and around Anglesey. They make wider use of the Welsh coastline and the Irish Sea to forage for food, ranging from their colonies when local food resources are low and/or competition with other birds is high.

Current human activities that overlap with Arctic terns present a low risk to existing colonies given the upward population trend between 2000 and 2021. However, potential renewable energy developments including tidal stream and offshore wind developments present a future risk to this species due to potential overlap in preferred feeding areas.

Activities in areas of use and predicted risk

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity



Distribution is based on raw ESAS survey data, showing Common and Arctic tern combined. Areas of use in the east (green) is more likely common tern.

Current Impact status: Amber

Whilst Arctic tern populations in Wales have significantly increased between the 2000 Seabird Survey and the 2021 Seabird Count, the recent Avian Influenza outbreak is likely to have impacted colonies on Anglesey. The quantification of this pressure is yet to be determined for Arctic tern in Wales given the late arrival of the virus comparative to the wider UK. It is also important to consider the decline of wider UK populations of Arctic tern and possible transboundary impacts that may later affect Welsh populations.

Sensitivity score: Red

The sensitivity score for Welsh Arctic tern populations is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development and climate change. Therefore, this is the predicted sensitivity to change if these risks are not mitigated.

Lack of food	**Arctic terns depend on sandeel to provision their young, often abandoning breeding attempts when prey abundance is low. Fishing intensity and climate change has caused prey declines and distributional shifts in the North Sea which has been linked to declines in tern populations. Should similar events occur in the Irish Sea, Welsh populations of Arctic terns are likely to be impacted. Further to this, installation of offshore renewable energy may present a conflict in preferred foraging areas.**
Nest predation	**The breeding density and breeding success of Arctic terns is negatively impacted by the introduction of non-native nest predators, such as American mink and brown rats, as well as by stoats and weasel introduced to island locations.**
Habitat loss	**Sea level rise as a result of climate change is likely to affect the availability of suitable sites as Arctic tern nest on low-lying islands.**
Disease	**Tern colonies are known to be impacted by avian influenza outbreaks which is likely due to the compact nature of many tern colonies, increasing the transmissibility of the disease. Impacts of the most recent outbreak is yet to be quantified.**

Evidence gaps

- **The impact of Avian Influenza on Welsh populations of Arctic terns is yet to be quantified. Local observations have recorded deaths as a result of the outbreak but longer term monitoring is required to understand the quantitive impacts on the population.**
- **It is unknown whether differences in colony success are being driven by food availability or nest predation from both mammalian predators and large gull species.**

Opportunities

- **Novel projects are underway at selected colonies to understand these pressures. For example, canes were installed at an angle on the Farne Islands to deter gulls landing on nests and predating on eggs and chicks. Similar small scale projects that determine the prevalence gull and mammalian predation or reduces predation could determine the amount of pressure this exerts on colonies.**
- **Continuation of wardened breeding sites would allow for ongoing monitoring of the population and would provide more robust data to base measures upon to ensure the resilience of colony populations. Wardens can also help deter predation and allow for faster intervention in the event of non-native predator incursion.**
- **Diet composition comparisons between colonies may support greater understanding of the linkage between prey availability and fledging success at colonies and provide greater insight to this pressure in Wales.**
- **Cumulative analysis of diet and predation may improve understanding of both key pressures, quantify risk and provide options for pressure reduction and managed interventions.**

COMMON GUILLEMOT (Gwylog)

(*Uria aalge*)

Population & Ecology

Location

Common guillemots can be found at many breeding sites across Wales.

They nest on steep coastal cliffs, offshore islands and sea stacks. On average, they forage within 85 km of the colony during the breeding season but have a wider range during the non-breeding season, dispersing out to sea.

Current Population Status

Common guillemots are amber listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) and Birds of Conservation Concern 5 (BoCC5) in the UK due to the international importance of the Welsh population. They are considered of least concern on the global IUCN red list.

The population of common guillemots in Wales has increased by 76% between 2000 and 2021 with **59,649** individuals recorded during the Seabird 2000 survey and **104,737** individuals recorded in the recent Seabirds Count (2015-2021). This is in contrast to the UK population as a whole, with an 11% reduction in guillemot numbers between surveys (from 1,462,282 to 1,265,888 individuals).

Common guillemot is known to have been affected by Avian Influenza both in Wales and the wider UK. It is likely that this will have negatively impacted Welsh common guillemot populations.

Historical population trends

In the late 18th and early 19th centuries, guillemot numbers were high throughout Wales, though numbers at some sites were suppressed due to the harvesting of eggs for human consumption. Photographs from Skomer in 1934 show that there were approximately 100,000 guillemots on the island at that time.

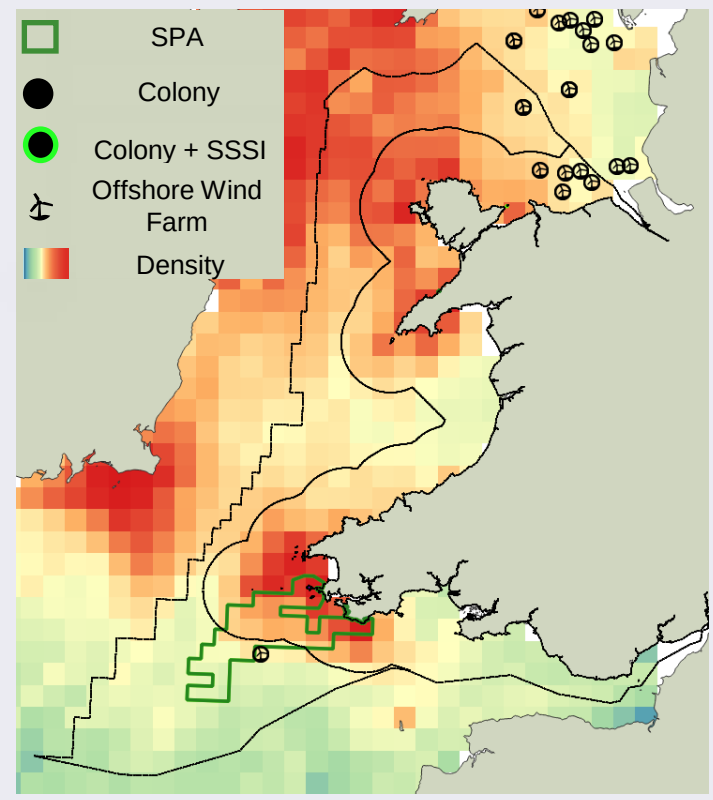
By the end of the WW2, the population on Skomer had declined by 95% due to pollution from sunk vessels. Despite a lack of reliable census figures, it is thought that there was a huge reduction in the population of common guillemots and other auks between the 1940s and 1970s. The Skomer colony was the first to be accurately censused from 1962. Further declines occurred due to oil spills and other events—the Torrey Canyon oil spill in 1967 killed tens of thousands of birds and 15,000 common guillemots were found dead after the Irish Seabird Wreck of 1969, the latter caused by severe weather which prevented birds from obtaining food resources.

By 1980, the Skomer population began to increase due to improved survival rates. In turn, other Welsh colonies began to see an upward population trend. Between the Seabird Colony Register (1985-88) and Seabird 2000, the number of common guillemots in Gower, Pembrokeshire, Ceredigion, Caernarfonshire and Anglesey increased by 124%, 127%, 62%, 19% and 98% respectively.

Areas of use & human activity

Common guillemots are a designated feature of the Skomer SPA as part of the overall seabird assemblage and the Pen y Gogarth / Great Ormes Head, Carreg y Llam, Castlemartin cliffs and dunes, Gower Coast: Rhossili to Porteynon SSSIs. They are present within 53 colonies in Wales, distributed along the coast of Wales with highest at-sea densities closest to the colonies.

Common guillemots are more sensitive to direct impacts during the breeding season, with inshore colonies at higher risk of exposure to events such as oil spills from coastal human activities. They forage in high tidal energy areas as well as sandbanks and kelp beds. This may present a risk of collision with future tidal energy developments. They are also known to be at risk of gill net fishery bycatch and potential displacement by offshore wind farms.



Activities in areas of use

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

Current Impact status: Amber

Whilst common guillemot populations in Wales have significantly increased between the 2000 Seabird Survey and the 2021 Seabird Count, mass mortalities were recorded during the late breeding season in 2023. The impact of this mass mortality is yet to be quantified. The quantification of the potential impact of Avian flu is yet to be determined for guillemots in Wales given the late arrival of the virus comparative to the wider UK. It is also important to consider the decline of wider UK populations of common guillemot and possible transboundary impacts that may later affect Welsh populations.

Sensitivity score: Amber

Qualitative assessment of sensitivity classified common guillemot as Amber. They are expected to be sensitive to the growing scope of marine energy developments, both tidal and wind, which overlap with their primary foraging areas and therefore could be a risk to smaller unconnected colonies. Gill net fishery by-catch is also a pressure for this species.

Climate change	**As climate change progresses, severe storms that can cause mass mortality of guillemots are expected to become more frequent. Impacts of climate change on the timing of breeding and on prey-species composition could result in Welsh waters providing sub-optimal habitat conditions for guillemots in the future.**
Pollution	**Common guillemots are highly sensitive to oil spills due to their abundance in UK waters, winter spatial distribution and foraging behaviour. Very high mortality rates have been reported after catastrophic events. Chronic contamination with traces of oil on feathers have long-term, often fatal consequences due to impaired thermoregulation. Multiple studies also report that guillemots and their eggs accumulate organo-metals, potentially reducing reproductive success.**
Collision / displacement	**Common guillemot forage or migrate through the same regions often targeted by offshore wind farms. Given the species is also a water-column forager, guillemots are among those species expected to be vulnerable to collision with tidal stream developments. Common guillemots are known to be displaced by offshore wind developments.**

Evidence gaps

- **Wintering areas of common guillemots breeding in Wales are not known precisely. Populations are assumed to disperse out to sea and mix with the wider UK populations, overwintering in similar areas, however there are few recent studies confirming this. Most natural mortality is thought to occur over the winter period and therefore this is an important gap to understand.**
- **Populations are increasing in Wales while decreasing elsewhere in the UK. The exact driver of this is uncertain. It could potentially be a differential in prey availability driving improved colony success in Welsh common guillemot colonies. However, little research on prey availability in Wales has been undertaken.**
- **Better understanding is required of adult survival, productivity, phenology, and prey selection at Welsh colonies.**

Opportunities

- **Increased understanding of seasonal distributions will enable insights into wintering distributions, potentially allowing for improved conservation initiatives in collaboration with other countries. Increased colony specific foraging data from tag studies would also reduce the uncertainty in assumptions made during apportionment of potential impact assessments.**
- **Further monitoring of populations and provisioning to determine impacts from Avian Influenza and also to determine whether food-availability is driving the differential in success between common guillemot populations in Wales and the wider UK.**

RAZORBILL (Llurs)

(*Alca torda*)

Population & Ecology

Location

Razorbills breed at many sites around Wales, from the Little Orme in the north to the Gower in the south, but they have not been recorded breeding in Carmarthenshire. The largest colonies are on islands, particularly Skomer, Skokholm and Bardsey, with smaller colonies on mainland cliffs in the southwest and northwest.

Some birds remain in Welsh waters in the non-breeding season while others move south.

Current Population Status

Razorbills are amber listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) because of their near threatened status in Europe and the international importance of the Welsh population. They are also amber listed in the Birds of Conservation Concern 5 (BoCC5) in the UK due to the international importance of the population and the vulnerability of breeding colonies, whereas they are of least concern on the global IUCN red list.

Despite conservation concerns, the population of razorbills in Wales have increased by 82% between 2000 and 2021 with 12,983 individuals (IND) recorded during the Seabird 2000 survey and 23,640 INDs recorded in the recent Seabirds Count (2015-2021). UK razorbill populations have also increased by 18%, from 190,397 to 225,015 INDs.

Auks have been impacted by Avian Influenza but it is thought that razorbill is less at risk than guillemot although the impacts have not been quantified.

Historical Population trends

Little is known about the historical status of razorbills in Wales. Breeding was recorded at Puffin Island, Anglesey, in 1662 and at the Great Orme in 1833. Hunting and egg collecting for human consumption were common practices until they were banned in the UK by the introduction of the Sea Birds Preservation Act 1869. Accounts from around the turn of the 20th century suggested that razorbills occurred mostly in the same places that they breed today, as did the 1969-70 Operation Seafarer survey. About 70% of the Welsh population breeds on six islands, or regions of cliffs: Skomer, Skokholm, Bardsey, Ramsey, Green Bridge of Wales to Flimston bay in Pembrokeshire, and RSPB South Stack in Anglesey. Most current breeding sites have been occupied since at least the end of the Second World War.

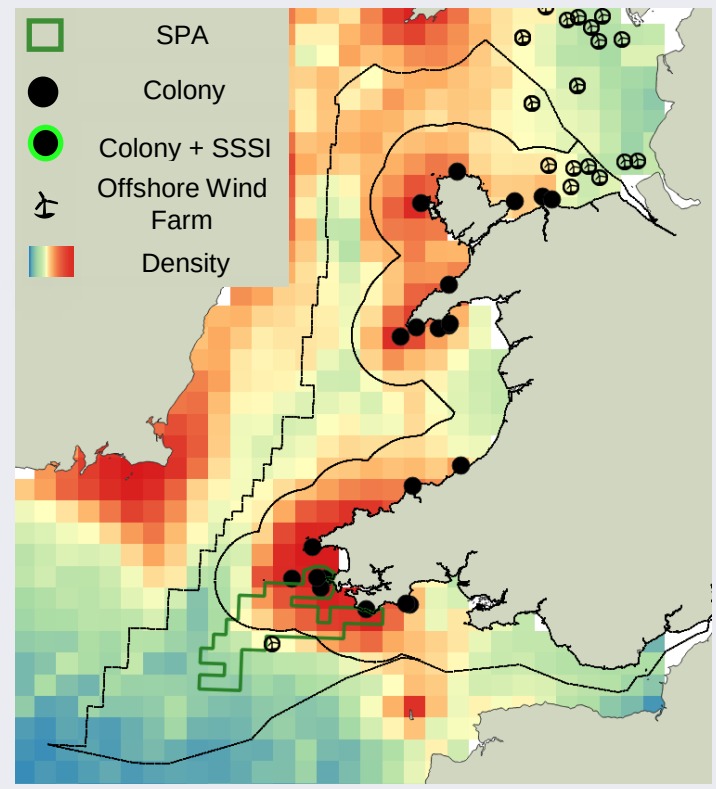
Despite the lack of data on razorbill numbers before this, it can be assumed that their population trend followed those of guillemots and puffins. The Welsh razorbill population declined until around 1970, due to pollution from sunken ships during the Second World War and further oil spills in the 1960s, plus a mass die-off in the Irish Sea after the 1969 breeding season, possibly due to toxic chemical pollution. Razorbill numbers remained relatively stable until the Seabird Colony Register Census in 1985-88 and they have increased since then.

Areas of use & human activity

Razorbills are a designated feature of the Skomer, Skokholm and Seas off Pembrokeshire SPA. In addition, razorbills are features of Castlemartin Cliffs and Dunes and Pen y Gogarth/Great Orme SSSIs.Six breeding sites account for 70% of the Welsh population, with the remaining 30% breeding in small groups along the west coast between Pembrokeshire and Anglesey. Razorbills are sensitive to direct impacts during the breeding and non-breeding seasons, including oil spills, bycatch, and displacement from offshore wind farms. They are at risk of bycatch from gill net fisheries.

Activities in areas of use

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity



Current Impact status: Amber

Whilst razorbill populations in Wales have significantly increased between the 2000 Seabird Survey and the 2021 Seabird Count, the recent Avian Influenza outbreak is likely to have impacted colonies in Wales. The quantification of this pressure is yet to be determined for razorbills in Wales given the late arrival of the virus comparative to the wider UK. It is also important to consider the decline of wider UK populations of razorbill and possible transboundary impacts that may later affect Welsh populations.

Sensitivity score: Amber

The sensitivity score for razorbill is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development and climate change. Therefore, this is the predicted sensitivity to change if these risks are not mitigated.

Climate change	**Climate change will lead to an increase in the frequency and intensity of storms such as those in 2013-14 which caused a large wreck of seabirds between the English Channel and the Bay of Biscay. Food availability will also be affected, as razorbills are heavily dependent on sandeels and higher sea temperatures may cause changes in their abundance and distribution (higher sea temperatures are known to reduce sandeel recruitment). The breeding range of razorbills is forecast to move away from southern Britain, including Pembrokeshire, during the 21st century.**
Bycatch	**Fishing with modern monofilament nets is also a cause of razorbill mortality. Bycatch in fishing nets was a significant contributor to razorbill mortality off the south and west coasts of Ireland from at least the 1960s.**
Pollution	**Razorbills are the second most common seabird species to die in most major oil spills. A severe auk wreck in the Irish Sea in 1969 was thought to be caused by toxic chemical pollution, though no firm conclusions could be drawn.**
Displacement	**Razorbills demonstrate avoidance of offshore wind farms, which may limit food availability and increase energy costs during foraging trips.**

Evidence gaps

- **Better understanding of adult survival, productivity, phenology, and prey selection at Welsh colonies.**
- **Understanding the potential risks of bycatch from gill net and tidal devices on the population is current limited in Wales.**
- **The impact of Avian Influenza on Welsh populations of razorbills is yet to be quantified.**

Opportunities

- **Tagging projects to inform colony specific foraging patterns will better inform impact assessments from bycatch and the marine renewables sector, as well as understanding potential changes in prey distributions from climate change.**
- **Rats have re-colonized Puffin Island off Anglesey in 2020 after previously being eradicated. Whilst eradication is taking place, further studies on biosecurity to prevent future rat colonization would be beneficial.**
- **Studies on the impact of gill net fishery bycatch on populations.**

BLACK GUILLEMOT (Gwylog Ddu)

(*Cepphus grille*)

Population & Ecology

Location

In Wales, black guillemots breed in a few discrete locations on the coast of Anglesey, Great Orme, and the Llyn Peninsula. They can be seen foraging along the Welsh coast throughout the year.

They breed away from large seabird cliff colonies and can be found at the base of steep cliffs, in rocky islets and along low-lying stretches of coast. They generally nest in rocky crevices or under boulders but will also use human-made structures such as piers and artificial nests.

Current Population Status

Black guillemots are amber listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) due to moderate declines in their breeding population and small population size. The are also amber listed in the Birds of Conservation Concern 5 (BoCC5) in the UK, whereas they are of least concern on the global IUCN red list.

The population of black guillemots in Wales has increased by 15% between 2000 and 2021 with 33 individuals recorded during the Seabird 2000 survey and 38 individuals recorded in the recent Seabirds Count (2015-2021). Conversely, the UK black guillemot population has reduced from 39,572 to 35,193 individuals, a reduction of 11%.

There have been no records of avian influenza in black guillemots during the current outbreak, and the ecology of this species makes it less susceptible to mass mortality.

Historical Population trends

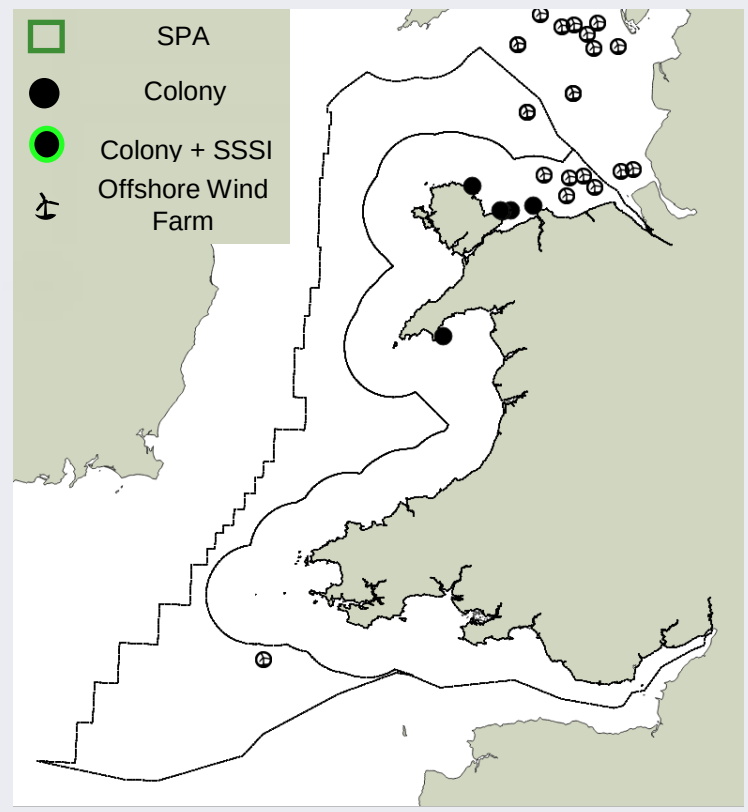
Black guillemots have always been rare in Wales but were more widespread in the past. In the 1770s, breeding pairs were recorded at Great Orme and Little Orme and at Ynys Llanddwyn in Anglesey. Another account from 1802 states that a few black guillemots bred near Tenby. However, by the end of the 19th century, it appeared this species no longer bred in Wales. A pair may have bred at Ynys Moelfre in Anglesey in 1912 and there was some evidence of breeding activity in the 1950s in Anglesey and at St Tudwal's Island in Gwynedd but this was not proven.

The first confirmed breeding record of the 20th century was in 1962 at Valley in Anglesey. By the mid 1960s, two pairs were breeding at Fedw Fawr, Anglesey. The Britain and Ireland Atlas 1968-72 recorded breeding at five sites around Anglesey. The Welsh population has slowly grown since then, with the Operation Seafarer census of 1969-70 counting 5 individuals and the Seabird Colony Register census in 1985-88 counting 26 individuals.

Areas of use

Black guillemots have been recorded at six sites, mainly around Anglesey (Ynys Môn). This species is not explicitly listed as a feature within a protected site in Welsh waters.

Black guillemots typically forage within 0.5—4km from shore, targeting sandbank and kelp forest habitats. These habitats are protected features within some inshore SPAs. If individuals use these areas, there is a risk of disturbance from shipping. Wintering distributions are similar to breeding, with limited natal dispersal.



Activities in areas of use

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

Current Impact status: Amber

Despite the increase in the Welsh black guillemot population between the 2000 Seabird Survey and the 2021 Seabird Count, it is vulnerable due to its small size. It is important to consider the decline of wider UK populations of black guillemot and possible transboundary impacts that may later affect Welsh populations. Whilst it is a largely coastal species, and offshore wind farms are unlikely to cause population scale impacts, other developments in inshore waters, such as tidal turbines, may cause adverse effects.

Sensitivity score: Amber

The Welsh population may be vulnerable to pollution events close to colonies. Additionally, the increasing industrial activities of shipping and offshore developments within the Irish Sea, as well as climate change, will likely increase the potential impacts on the black guillemot population.

Disturbance	**The black guillemot has been shown to be one of the most sensitive species to disturbance from shipping traffic, with over 90% of individuals showing evasive responses. The species is also very sensitive to regular human presence at breeding grounds, possibly having population-level impacts. The black guillemot, like other auk species, is considered to have a relatively high displacement potential with regard to offshore wind farms.**
Predation	**Black guillemots are reported to be highly vulnerable to predation through American mink at breeding sites, potentially leading to the complete eradication of local populations.**
Climate change	**Climate modelling predicts that Wales will no longer lie within its breeding range of the black guillemot by the end of the 21st century.**

Evidence gaps

- **As black guillemot are known to be highly sensitive to shipping, it is assumed that they will also be sensitive to new industry development such as offshore wind, tidal energy, and seaweed farming. The extent of this risk is largely unknown as specific targeted studies are currently limited.**
- **Reports detailing the potential impacts of oil spills for black guillemots are limited. As there are only a small number of colonies of black guillemot in Wales, the Welsh population is likely to be highly sensitive to oil spills in these areas.**
- **Fine scale distributions of black guillemot and prey distributions are limited by current data availability. To understand drivers of distributions changes in a shifting climate, holistic survey approaches should be considered to fill knowledge gaps.**
- **Bycatch is known to have a significant impact on black guillemot populations outside the UK. It is assumed that this is not the case in Britain and Ireland, however this conclusion was drawn when auk populations were increasing and further study may be required.**
- **Better understanding of adult survival, productivity, phenology, and prey selection at Welsh colonies.**

Opportunities

- **Establishment of systematic surveys that focus on Welsh black guillemot distributions and that of their preferred prey will inform multiple industry impact assessments as well as inform population management and wider ecosystem management required for the protection of this species.**
- **Linking distributional information to available shipping information could lead to a better understanding of disturbance effects on black guillemot. Data sources such as VMS and AIS information could be collated to understand the potential effects on the population through energetic based population impact modelling.**
- **Monitoring and appropriate management of mink populations near black guillemot colonies will have benefits for multiple species which share colonies with black guillemot.**
- **Using outputs from Welsh specific prey distributions and habitats to create artificial nesting sites to encourage the creation of additional colonies in Wales and improving resilience in the Welsh population.**

ATLANTIC PUFFIN (Pâl)

(Fratercula arctica)

Population & Ecology

Location

In Wales, puffins breed within a few discrete sites in Anglesey, Gwynedd and Pembrokeshire. They can be found foraging offshore throughout Welsh waters between April and August.

Outside the breeding season puffins are widely distributed at sea at low densities and mostly outside of Welsh waters.

They nest on offshore islands and in areas of the mainland coast that are safe from terrestrial predators, nesting in burrows dug into the soil or in crevices between boulders.

Current Population Status

Puffins are red listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) and Birds of Conservation Concern 5 (BoCC5) in the UK due to their presence as vulnerable on the global IUCN red list. Puffins are also on the European Red List of Birds. This is due to declines in areas in which they are most abundant in Iceland and Scandinavia.

The population of puffins in Wales has increased by 197% between 2000 and 2021 with 10,325 apparently occupied burrows (AOBs) recorded during the Seabird 2000 survey and 30,663 AOBs recorded in the recent Seabirds Count (2015-2021). Conversely, UK puffin populations have reduced from 554,070 to 474,679 AOBs, a reduction of 14%.

Avian influenza is known to have occurred in puffins but no mass mortalities have been known to occur in Wales and it does not appear to have had an affect at the population level in Wales.

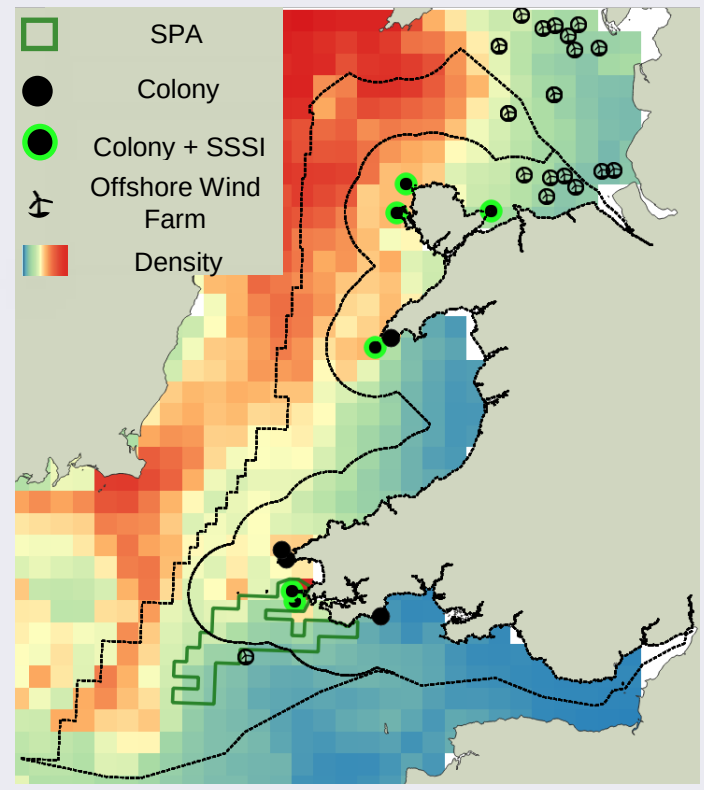
Historical Population trends

The puffin population in Wales was once much higher and colonies existed across several islands including Caldey, St Margarets, Ramsey and Cardigan Island—none of these colonies exist today. Several hundred thousand birds were recorded prior to a significant decline in the early 20th century, with large colonies located in Pembrokeshire and Anglesey. Colonies subject to decline included Skomer and Puffin Island, which were almost completely deserted. The exact causes of this decline are not fully understood but it is thought that predation by rats, human exploitation and changes in food availability as a result of changing environmental factors were likely contributory factors. Puffins are also vulnerable to severe weather in both breeding and non-breeding seasons. For example, extreme storms in the North Atlantic in the winter of 2013-14 caused mass mortality—29,000 dead puffins were recorded and 7% of recovered ringed birds were attached to a Welsh colony. Furthermore, adult survival rates on Skomer dropped from 90% to 75%. Skomer and Skokholm are the two major puffin colonies in Wales since the collapse of the Grassholm colony in the early 20th century. Their numbers have been recovering steadily since the early 1990s, though they are still far below their previous levels.

Areas of use & human activity

Puffins are a protected feature of the Skomer, Skokholm and the Seas off Pembrokeshire (Sgomer, Sgogwm a Moroedd Penfro) SPA and the Gwylan Islands (Ynysoedd y Gwylanod) SSSI. Other major colonies can be found on Puffin Island, The Skerries, South Stack and Bardsey. Puffin colonies are mainly found on the north west and south west corners of Wales, with at-sea distributions generally showing wide ranging use of the Irish Sea.

Due to their wide distribution, puffin commonly overlap with a large range of anthropogenic activities. However, due to their ecology and foraging behaviour, potential direct impacts are primarily limited to coastal gillnet fishing bycatch and displacement from Offshore Wind Farms (OWF).



Activities in areas of use

Ports & dredging (G) | Shipping (G) | Oil & Gas (A) | Fishing (A) | Recreation (G) | Aquaculture (G) | Offshore Wind (R)

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

Current Impact status: Amber

Puffin populations in Wales have significantly increased between the 2000 Seabird Survey and the 2021 Seabird Count, However, given broader declines in the UK and Internationally, it is important to consider the possible transboundary impacts that may later affect Welsh populations. Distributional shifts in prey species as a result of climate change is an ongoing concern for puffins which could effect both breeding and wintering populations and have an impact on breeding success and adult survival.

Sensitivity score: Amber

This is predominantly based on the species' reliance on prey species known to shift with climate change, as well as vulnerability to displacement by offshore wind farms.

Food availability	**There is contradictory evidence about whether and how changes in food availability affect puffin breeding success, with the prediction that suitable feeding grounds will shift northward as climate change progresses. Generally, adult puffins reduce provisioning effort to ensure their own survival if prey availability is low. Most mortality of puffins, however, is thought to occur during the winter, so food availability may be of critical importance during the non-breeding season.**
Nesting habitat / predation	**Puffins can be directly impacted by the introduction of non-indigenous species through predation of eggs and chicks. There is evidence that the presence of brown rats (and possibly mice) in coastal habitats can have a negative impact on puffin numbers. Also, as breeding density in puffin colonies increases, the ground can become so "honeycombed" with burrows that the physical stability of their breeding habitat is reduced. There is evidence of this from Wales on Grassholm, where the breeding colony collapsed at the turn of the 20th century.**
Pollution	**Puffins generally have high vulnerability to oil discharge based on the proportion of individuals that are oiled when found dead on the shoreline. Their high vulnerability to oiling can be explained by the high proportion of time spent on the sea.**

Evidence gaps

- **Wintering distributions of the Welsh and wider UK populations are largely unknown, with few recent largescale studies. Given potential sensitivity to reduced food availability, climate change driven prey changes will drive future population trends, which is best understood through studies on species distributions for both puffins and their preferred prey.**
- **Understanding the potential risks of bycatch from gill net and tidal devices on the population is current limited due to industry scales.**
- **Understanding the ability and feasibility of attracting and translocation to offshore islands where colonies were historically present.**
- **Better understanding of adult survival, productivity, phenology, and prey selection at Welsh colonies.**

Opportunities

- **Tagging projects to inform colony specific foraging patterns will better inform impact assessments from bycatch, the marine renewables sector, as well as understanding potential changes in prey distributions from climate change. This would also allow an understanding of where Welsh-breeding birds winter.**
- **Removal of invasive mammals at suitable island nesting sites that were previous occupied by puffin colonies may induce recolonisation and support stability and growth in the Welsh population.**

RED-THROATED DIVER

(Trochydd Gyddfgoch)

(*Gavia stellata*)

Population & Ecology

Location

The red-throated diver has a circumpolar distribution and, in the UK, breeds in Scotland. The species winters widely in Wales and has always been the commonest diver species along the Welsh coast.

They are pursuit hunters, feeding on fish, and they favour large, shallow, sandy bays.

The highest densities of overwintering red-throated divers in Wales are recorded in Cardigan Bay, Caernarfon Bay, and Traeth Lafan. Inland records are irregular in comparison to other diver species.

Current Population Status

The red-throated diver is amber listed in the Birds of Conservation Concern in Wales (BoCCW4), as the wintering population is largely located within a few sites, whereas it is green listed in the UK (BoCC5). The species is classified as least concern on the global and European IUCN red lists.

The wintering population of red-throated divers along the Welsh coast was estimated at 1,300-1,400 individuals in 2008 (around 8% of the total UK wintering population). This is significantly lower than the peak count of 1,916 between Wallog and Llanbedrog in Caernarfonshire in 1997, which is a record for Wales.

Counts of red-throated divers at the main sites off the Welsh coast vary greatly from year to year. The species is not well-covered by the Wetland Bird Survey (WeBS) as accurate counts require calm conditions and good visibility. However, WeBS indices for Wales suggest a decline in recent years (2000/01 to 2018/19).

Avian influenza has not been confirmed in red-throated diver in the current outbreak and is not thought to be a threat to the Welsh population.

Historical Population trends

Cardigan Bay was found to be an important site for red-throated divers in the late 1970s, with around 100 birds reported off Wallog, Ceredigion, in January 1977. Numbers recorded increased over the next two decades following coordinated surveys of the northern part of the bay, with winter peak counts ranging from 252 to a maximum of 1,916 birds. It is likely that there are now fewer red-throated divers in Cardigan Bay in winter than in the 1990s. In the absence of standardized surveys, this is difficult to confirm, however a key driver of the recent decline may have been an oil spill in Pembrokeshire in 1996.

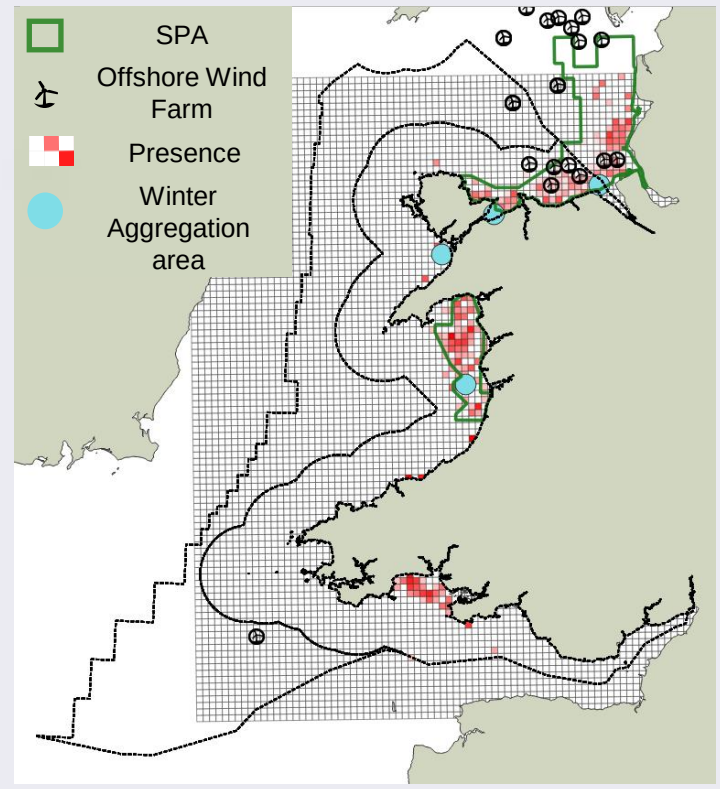
Areas of use & human activity

Red-throated divers are a designated feature of the Liverpool Bay and Northern Cardigan Bay SPAs. Assessments of impacts of human activities on red-throated divers is largely based on evidence collected elsewhere in Europe, as Welsh data has been limited in extent, and differing survey methodologies have been utilised in Wales to date.

Red-throated divers are highly sensitive to and readily displaced by human activities at sea such as boat traffic and offshore wind farms. Activities that impact on wintering red-throated divers through displacement include operational offshore wind turbines and shipping, as well as barriers to movement caused by marine infrastructure. Due to their use of shallow inshore waters, these barriers also include tidal lagoons and turbines. Oil pollution is another main threat to this species.

Activities in areas of use and predicted risk

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity



Current Impact status: Amber

The amber status of the red-throated diver for Wales is based on the criterion that the winter population is highly localized. Because of this, the population is at greater risk from stochastic events, as well as marine infrastructure or increased shipping in key areas. The species is highly vulnerable to oil spills which poses a risk, particularly in areas with high concentrations of birds, such as Cardigan Bay. The recent outbreak of avian influenza may have affected small numbers of red-throated divers in Scotland, however this has not yet been confirmed, and the risk to the population is low as they breed and winter at low densities.

Sensitivity score: Red

The sensitivity score for the winter population of red-throated divers in Wales is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development.

Marine pollution	**Evidence suggests that divers are particularly vulnerable to oil spills due to the amount of time these species spend in contact with the water surface plus their low reproductive rate which will lead to a slow recovery from catastrophic events. 81 red-throated divers were among the casualties of the *Sea Empress* oil spill in 1996 off Milford Haven, which was assumed to represent a very high proportion of the local wintering population at the time of the spill.**
Human disturbance	**Divers generally avoid areas with high shipping intensity and show the longest escape distances and highest proportions of escaping individuals compared to all other seabird species. There is substantial evidence from marine areas outside Wales suggesting that red-throated divers are widely displaced by operational offshore wind farms and associated shipping activity with potential displacement for the lifetime of the operational wind farm. Tidal lagoons are also a potential threat to this species due to possible habitat loss.**
Climate change	**Climate change is likely to affect prey distribution upon which wintering red-throated diver rely.**

Evidence gaps

- **Seasonal distribution and abundance of red-throated divers off the Welsh coast**
- **There is limited understanding of the importance of prey resources in Liverpool and Cardigan Bay.**
- **Long-term survey data based on comparable census techniques**
- **Transferability of flight-initiation and avoidance distances determined elsewhere for red-throated divers to the situation in Wales**
- **Current levels of pollutants such as hydrocarbons in red-throated divers off the Welsh coast**
- **Extent of entanglement/bycatch of red-throated divers in discarded fishing gear along the Welsh coast**
- **Potential for population effects of the recent Avian Influenza outbreak**

Opportunities

- **Detailed analysis of the distribution and abundance of red-throated divers at sea, e.g. through dedicated digital arial surveys and tagging**
- **Development of long-term data series using standardized methods to better quantify population trends and distributional shifts in response to environmental change**
- **A better understanding of migratory flyways of red-throated divers through Welsh waters and the source population of Welsh wintering birds**
- **Up to date surveys of SPAs including Liverpool Bay and Cardigan Bay SPAs**
- **Review and testing of offshore wind farm mitigation measures.**

GREAT NORTHERN DIVER

(Trochydd Mawr)

(*Gavia immer*)

Population & Ecology

Location

Great northern divers breed in northern North America, Greenland, Iceland and on Bear Island in Norway. Birds that winter along the coasts of Wales are thought to be mainly from Iceland, Greenland and Canada.

In Wales, great northern divers are usually recorded off the coast between August and late May, and even into June. The main winter aggregation in Wales is found in Caernarfon Bay, where there can be up to 100 birds present. There are also other sporadic smaller aggregations at various other sites around north and south Wales.

Current Population Status

The great northern diver is green listed in the Birds of Conservation Concern in Wales (BoCCW4) and amber listed in the UK (BoCC5) due to the internationally important wintering population. The species is classified as least concern on the global IUCN red list, and is considered to be vulnerable on the European IUCN list.

An estimated 4,300 great northern divers winter around Britain, but Welsh waters hold only a small proportion of these. The Welsh wintering population is probably no more than 150 birds, with more birds moving through on spring and autumn migration.

Historical Population trends

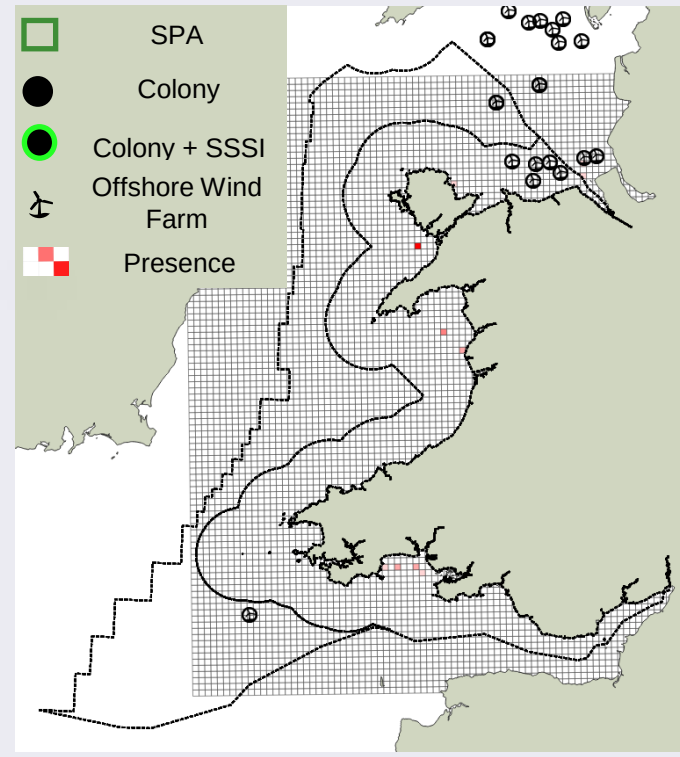
Great northern divers were less frequently reported off the coast of Wales in the first half of the 20th century, though sometimes were found to be numerous in Pembrokeshire. Numbers apparently increased from the late 1950s onwards (7-8 individuals in Conwy Bay, Gwynedd/Anglesey; 8 on the Dee Estuary, Flintshire/Wirral). Great northern divers were said to be by far the commonest diver species in Glamorgan during 1967-79 (at least 15 ind. in 1976). Records increased in the early 21st century as it became apparent that Caernarfon Bay held large numbers of great northern divers above international (>50 ind.) and British (>43 ind.) thresholds for importance in late winter/early spring when bird moult occurs.

Areas of use & human activity

There are currently no SPAs or SSSIs designated for great northern divers. Due to the relatively low number and density of overwintering great northern divers in UK and Welsh waters, an assessment of the impacts of human activity is derived from evidence on a related proxy species (i.e. red-throated) that is more abundant in winter.

The impacts of human activity on diver species that have been documented elsewhere are primarily large-scale displacement from suitable foraging habitat, e.g. by operational offshore wind turbines and shipping. Great northern divers utilize deeper waters and are thought to be less sensitive to disturbance than red-throated divers, however there is a lack of literature to support this assumption.

Activities in areas of use and predicted risk



Current Impact status: Green

Although some great northern divers have been caught and drowned in fishing nets, there appears to be few systemic conservation threats in Welsh waters. The species is highly vulnerable to oil spills which poses a risk, particularly in areas with high concentrations of birds, such as Caernarfon Bay. Future possible offshore wind developments within Caernarfon Bay may cause long-term disturbance and displacement for this species.

Sensitivity score: Amber

The sensitivity score for the winter population of great northern divers in Wales is determined by the species' sensitivity to key threats that have historically been a pressure for this species, the current evidence gaps for this species (particularly in relation to sensitivity to disturbance) as well as future predicted risks as a result of increased use of the marine area for development.

Marine pollution

Evidence suggests that divers are particularly vulnerable to oil spills due to the amount of time these species spend in contact with the water surface plus their low reproductive rate which will lead to a slow recovery from catastrophic events. Eight great northern divers were among the casualties of the *Sea Empress* oil spill in 1996 off Milford Haven, which may have been a very high proportion of the Welsh wintering population at that time. The largest documented oil-related mortality of great northern divers in Europe followed the *Erika* spill in December 1999 off the coast of Brittany when at least 248 great northern divers were among 402 oiled divers.

Human disturbance

Divers generally avoid areas with high shipping intensity and show the longest escape distances and highest proportion of escaping individuals compared to all other seabird species. There is substantial evidence suggesting that divers are widely displaced by offshore wind farms.

Evidence gaps

- **Distribution and abundance of great northern divers off the Welsh and wider UK coasts during migration and winter periods.**
- **Information on the source population of birds wintering in Welsh waters.**
- **Species-specific flight-initiation and avoidance distances for great northern divers in response to shipping, disturbance and infrastructure. Most literature uses proxy information from red-throated divers when there are suggestions that great northern divers are less sensitive to marine infrastructure and boats.**
- **Current levels of hydrocarbon contamination in great northern divers off the Welsh coast.**

Opportunities

- **Surveys of seasonal distribution and abundance in great northern divers at sea, e.g. through dedicated digital aerial surveys and telemetry**
- **Quantification of the sensitivity of great northern divers to disturbance from shipping and infrastructure.**

EUROPEAN STORM PETREL (Pedryn Drycin)

(*Hydrobates pelagicus*)

Population & Ecology

Location

In Wales, European storm petrels breed on six islands off the Pembrokeshire coast: Skokholm, Skomer, Carreg Rhoson, North Bishop, Grassholm and Ramsey. There is also a breeding population on Bardsey. Over 80% of the Welsh population breeds on Skokholm.

They nest in rocky crevices, stone walls and in burrows, foraging at sea during the day and returning to land at night. Storm petrels are surface feeders, taking fish, squid and crustaceans and can dive up to 2 metres. They winter in the South Atlantic.

Current Population Status

The European storm petrel is amber listed in the Birds of Conservation Concern in Wales (BoCCW4) and in the UK (BoCC5). The amber conservation status in Wales and the UK is due to the limited number of colonies relative to the population size. The European storm petrel is considered of least concern on the European and global IUCN red lists.

The total Welsh population has increased by 11% between 2000 and 2021, with 2,644 apparently occupied sites (AOSs) recorded during the Seabird 2000 survey and 2,943 AOSs recorded in the recent Seabirds Count (2015-2021). UK European storm petrel populations have also increased by 41% from 26,647 AOSs to 37,655 AOSs over this period.

Avian Influenza has not been found in European storm petrels and it is considered of low risk due to its breeding and foraging ecology.

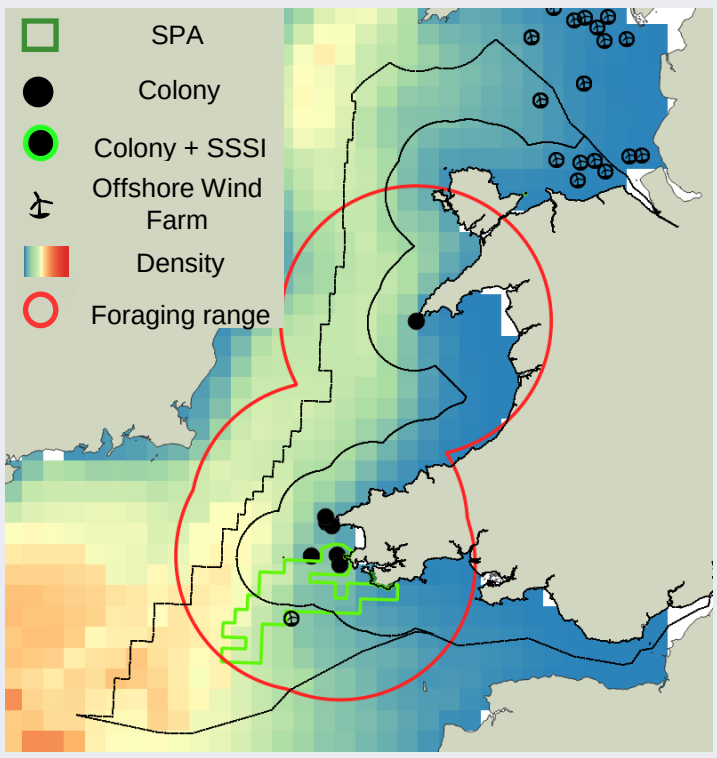
Historical Population trends

The nocturnal behaviour and nesting habits of European storm petrels have made them difficult to monitor in the past. At the turn of the 20th century, the only known breeding site was on Skomer. In 1946, 30 pairs were believed to nest there. Breeding was confirmed on Bardsey in 1926 and the Skokholm colony was discovered in 1931.Three pairs were reported to breed at a site in Anglesey in 1966. Historic breeding has also been reported from Green Scar, Stack Rocks and St Margaret's, though the status of these populations was unknown. They were also known to breed on Middleholm until at least 1994. The Operation Seafarer survey in 1969-70 estimated the Welsh population at 5,100-7,100 pairs, but this is now considered an overestimate. The Seabird 2000 count was the first to definitively describe the status of this species in Wales, however it is not directly comparable to the Seabirds Count of 2015-21 due to differences in methodology and, therefore, the reliability of the population estimates. Between the two counts, numbers appear to have increased on five islands and decreased on two: Ramsey (102 to 7 AOSs) and Skokholm (2,450 to 1,910 AOSs) but as aforementioned, counts for the latter may not be comparable.

Areas of use & human activity

European storm petrels are a designated feature of the Skomer, Skokholm and Seas off Pembrokeshire SPA. There are seven known breeding colonies in Wales, all on offshore islands. The Irish and Celtic Sea fronts are important feeding areas for this species.

Light pollution from oil and gas developments and other marine infrastructure is a concern for this species which could make them vulnerable to increased lighting within the marine environment such as lighting on wind farm turbines.



Activities in areas of use

Ports & dredging (G)	Shipping (G)	Oil & Gas (A)	Fishing (G)	Recreation (G)	Aquaculture (G)	Offshore Wind (A)

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

Current Impact status: Amber

European storm petrel populations in Wales are thought to have increased between the 2000 Seabird Survey and the 2021 Seabird Count. Despite this, European storm petrels may be at risk from maritime infrastructure developments and this species has been shown to become disorientated by lights such as flares associated with oil and gas installations. The impact of offshore wind farms on this species is not well understood.

Sensitivity score: Amber

The sensitivity score is determined by this species' small population size in Wales and its sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development and climate change. Therefore, this is the predicted sensitivity to change if these risks are not mitigated.

Litter	**Seabirds that forage on or near the water surface are likely to ingest plastic waste, feed it to their young and may also get entangled in discarded fishing gear. There are records of European storm petrel ingesting litter, including macro plastic from studies in multiple countries.**
Light pollution	**Fledglings of burrow-nesting seabirds, and to a lesser extent adults, are attracted to artificial light and can be grounded by them when flying at night. In St Kilda, both breeding species of storm petrel (Leach's storm petrels and European storm petrels) were attracted to artificial lights. Experimental decreases in light emissions reduced the numbers of birds attracted to the lights.**
Predation	**In Wales, European storm petrels only breed on rat-free islands, but there is a risk of accidental introduction of mammalian predators, plus human disturbance can increase chick mortality. European storm petrels are also vulnerable to avian predators including owls, gulls and skuas.**
Climate change	**Storm petrels were listed as a species vulnerable to climate change as part of a global review but the effects are still unknown. It is possible that climate change will cause a range shift for this species.**

Evidence gaps

- **No studies have yet provided a measure of plastic pollution in Welsh waters or the impact of plastic pollution on European storm petrels in Wales.**
- **Better understanding of adult survival, productivity, phenology, and prey selection in Welsh colonies.**
- **A recent review of global threats to seabirds identified climate change as a threat to European storm petrels, however its potential effects on this species are not well known.**
- **An understanding of the numbers of storm petrels in areas proposed for the Round 5 floating windfarms to the south-west of Pembrokeshire.**

Opportunities

- **Diet composition studies on colonies in Wales, as well as tagging studies, may be useful to determine foraging patterns and assess how changes in prey abundance and distribution due to climate change may affect these populations.**
- **Attracting European storm petrels to create colonies on rat-free islands historically known hold colonies using artificial nest sites, which are known to work on Skokholm. Artificial nest boxes may also benefit existing island colonies where nesting locations are at**

NORTHERN FULMAR (Aderyn Drycin y Graig)

(*Fulmarus glacialis*)

Population & Ecology

Location

Fulmars breed along almost the entire coast of Wales, from Flintshire to East Glamorgan. The largest colonies are on Skomer, Ramsey and Skokholm. They principally nest in small scrapes on cliff faces both on the coast and a small distance inland. They are also known to nest in disused quarries in Flintshire and Denbighshire. In winter, fulmars are mostly pelagic, with their range extending across the North Atlantic.

Current Population Status

The fulmar is amber listed in the Birds of Conservation Concern in Wales (BoCCW4) and in the UK (BoCC5) due to moderate population declines and its European status as vulnerable. The global population is considered of least concern on the IUCN red list.

The Welsh population of fulmars decreased by 27% between 2000 and 2021 with 3,418 apparently occupied sites (AOSs) recorded during the Seabird 2000 survey and 2,494 AOSs recorded in the recent Seabirds Count (2015-2021). Also, UK fulmar populations decreased by 37%, from 503,670 to 319,508 AOSs.

Fulmars are not known to have suffered significant mortality from Avian Influenza.

Historical Population trends

A southward expansion of the fulmar population from the Arctic began in the mid-18th century, lasting until the 1980s. This may have been driven by increased food availability due to whaling, commercial fisheries and increasing sea temperatures, as well as reduced hunting pressure from people. Fulmars first arrived in Pembrokeshire in 1930 and were seen during the breeding season at many coastal locations soon after. The first confirmed breeding occurred in 1940 at Flimston in Pembrokeshire. Ceredigion and Caernarfonshire were colonised in the 1940s and fulmars continued to extend their range along the south coast to East Glamorgan in the late 1980s.

The Welsh population increased rapidly until the late 1980s but slowed by the mid-1990s before it began to decline. This is thought to have been caused by a decrease in food availability due to changing fishing practices (i.e. the banning of discards) and changes in copepod and sandeel distribution due to climate change.

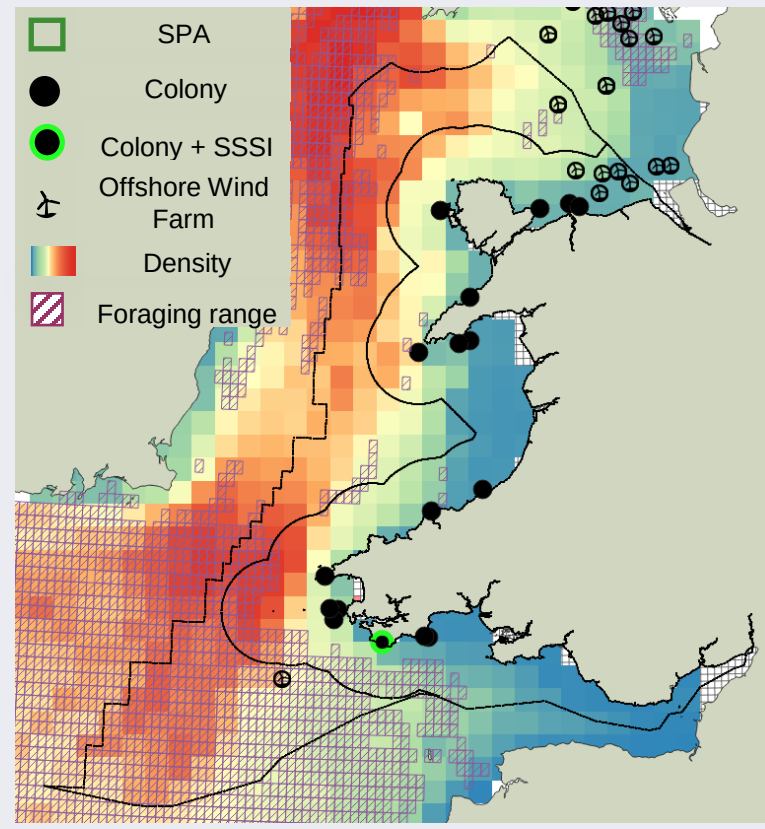
Areas of use & human activity

Fulmars are not a designated feature of any SPAs or SSSIs in Wales although are expected to be part of the breeding birds assemblage protected within the Castlemartin cliffs and dune SSSI. The largest colonies in Wales are within the Skomer, Skokholm and Seas off Pembrokeshire SPA.

Given their wide foraging range, surface feeding behaviour and avoidance of offshore wind farms, the main risk to fulmars in Welsh waters is considered to be from commercial fishing.

Activities in areas of use

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity



Current Impact status: Amber

Fulmar populations in Wales have seen a marked decline between the 2000 Seabird Survey and the 2021 Seabirds Count survey. Also, the recent Avian Influenza outbreak may have impacted colonies in Wales. The quantification of this pressure is yet to be determined for fulmars in Wales.

Sensitivity score: Amber

The sensitivity score for Welsh fulmar populations is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development and climate change.

Bycatch

Bycatch has long been known to be an important factor affecting fulmar populations. Its effect on adult survival rates, which have been declining since the 1970s, could be considerable. According to one estimate, 1,000 to 2,000 individuals are lost to bycatch in the UK each year. Fulmars are reported to be the second most numerous bycatch species in Irish longline fisheries and the most common bycatch species in Norway, Iceland and the Faroes. The total annual mortality figure for bycatch in fulmars in the North Atlantic may be 50,000 to 100,000 individuals. Fulmars have large foraging ranges and Welsh fulmars may be impacted by transboundary effects.

Litter

As surface feeders, fulmars are likely to ingest plastic and feed it to their young, plus they may also become entangled in discarded fishing gear. Multiple studies have found rates of plastic ingestion in different fulmar populations ranging from 70% to 93% of individuals and Welsh populations are likely to be affected.

Predation

Fulmars are less tied to steep cliff faces compared to other seabirds and will make use of more accessible locations, making them vulnerable to terrestrial predators such as introduced American mink. Mink are present in many areas around the west coast of Scotland, where fulmar numbers have declined significantly.

Evidence gaps

- **The sublethal effects of marine litter ingestion are an area of considerable uncertainty. Many studies report incidences of plastic ingestion but not effects.**
- **The recent decrease in population size may be a result of a return to sustainable levels following changes to discard policies but this has yet to be quantified.**
- **Better understanding of adult survival, productivity, phenology, and prey selection at Welsh colonies.**
- **There is a high degree of uncertainty in fulmar bycatch estimates in UK and Irish waters and beyond. Impacts beyond Welsh waters are likely to impact Welsh breeding birds.**
- **The diet composition of fulmars in Wales is poorly known.**

Opportunities

- **Investigating the level of plastic pollution around the coast of Wales, as well as levels of plastic ingestion in the Welsh fulmar population and its effects on survival**
- **Work is underway to find effective ways to limit seabird bycatch including looming eyes on buoys and release systems for hooks. Greater monitoring of Welsh fulmars is required to assess the effectiveness of these changes and improve bycatch estimates.**
- **Studies on diet composition of fulmars in Welsh colonies and distributions of prey species to predict changes in food availability due to climate change.**

MANX SHEARWATER (Aderyn Drycin Manaw)

(*Puffinus puffinus*)

Population & Ecology

Location

Manx shearwaters are summer visitors to Wales, breeding on the rat-free islands of Skomer, Skokholm, Middleholm, Ramsey and Bardsey.

They breed in burrows and forage at sea during the day, diving to catch their prey which mainly consists of small fish such as sardines and sandeels. The Irish and Celtic Sea fronts are of particular importance for foraging. In the non-breeding season, they migrate to the South Atlantic, spending the winter off Uruguay and Argentina.

Current Population Status

Welsh and British colonies for Manx shearwater are considered of high conservation concern to due to their international importance and moderate breeding range decline. Manx shearwaters are amber listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) and Birds of Conservation Concern 5 (BoCC5) in the UK, whereas they are of least concern on the global IUCN red list.

The population of Manx shearwaters in Wales has increased by 163% between 2000 and 2021 with 168,133 apparently occupied sites (AOS) recorded during the Seabird 2000 survey and 480,627 AOSs recorded in the recent Seabirds Count (2015-2021). UK Manx shearwater populations have also increased by 163%, from 299,678 to 786,743 AOSs.

Manx shearwater has shown low mortality to Avian Influenza although the impacts on Welsh and UK colonies have not been studied to date.

Historical population trends

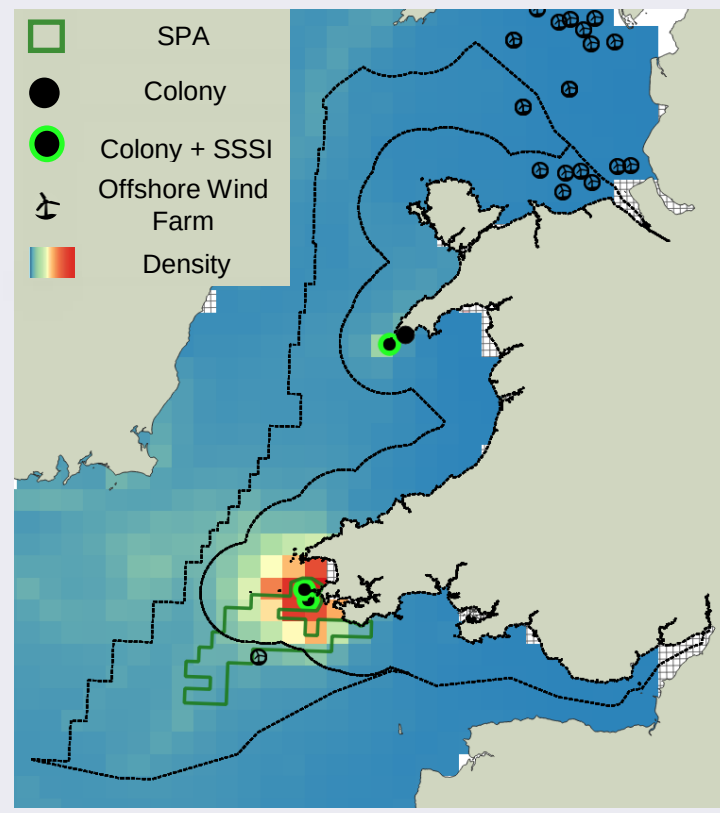
Manx shearwaters previously bred on Caldey and St Margaret's Island until the late 19th century. They also bred on St Tudwal's Islands before brown rats arrived in the 1950s, and there is evidence that they bred on mainland cliffs on the Llyn Peninsula until the 1970s. Breeding may also have occurred at other sites in Ceredigion, Anglesey and the Gower in the late 20th century but this was not confirmed. On offshore islands, many Manx shearwaters were taken for use as fertilizer, bait for lobster pots or for human consumption, prior to the Sea Birds Preservation Act of 1869.

Historical population estimates are limited as Manx shearwaters are difficult to census given their habit of breeding in burrows and visiting colonies at night. There are estimates of 10,000 pairs on Skomer in 1930 and 35,000 pairs in the late 1960s. The Seabird 2000 census estimated 101,794 AOBs on the island, using tape playback to provide more reliable estimates of occupied burrows, and the latest count is 350,000 pairs from 2018. The confidence intervals are large for each colony count, making trends difficult to determine, but numbers in each Welsh colony are stable or increasing. The latest estimate of 480,627 AOSs from 2021 indicates that Wales holds over half of the global population.

Areas of use & human activity

Manx shearwaters are a designated feature of the Skomer, Skokholm and Seas off Pembrokeshire SPA and the Aberdaron Coast and Bardsey Island SPA. The Irish and Celtic Sea fronts are key feeding areas for this species, which has a very large foraging range.

Manx shearwaters tend to be attracted to anthropogenic lighting such as that from ships and port industries such as the refinery in Milford Haven. They may also be attracted to lighting from offshore wind developments but this has yet to be quantified. Other risks include pollution and bycatch.



Activities in areas of use

Ports & dredging (G)	Shipping (G)	Oil & Gas (G)	Fishing (R)	Recreation (G)	Aquaculture (G)	Offshore Wind (A)

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

Current Impact status: Amber

Whilst Manx shearwater populations in Wales have increased between the 2000 Seabird Survey and the 2021 Seabird Count, the recent Avian Influenza outbreak may impact colonies in Wales. The quantification of this pressure is yet to be determined for Manx shearwater in Wales given the late arrival of the virus comparative to the wider UK.

Sensitivity score: Amber

The sensitivity score for Manx shearwater is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development and climate change. Therefore, this is the predicted sensitivity to change if these risks are not mitigated.

Climate change	**Wetter summers and extreme rainfall events may increase the occurrence of burrow flooding at Manx shearwater colonies. Also, higher sea temperatures will likely cause changes in prey abundance and distribution. In theory, Manx shearwaters are less susceptible to these changes than other seabirds due to their and large foraging range. However, there is evidence that birds on Skomer are breeding later and their chicks have lower peak weights due to changes in sea surface temperature and prey quality. Climate models predict that Pembrokeshire may not be suitable for Manx shearwaters by the end of this century.** **Food availability will also be affected, as Manx shearwaters are heavily dependent on sardines and sandeels and higher sea temperatures may cause changes in their abundance and distribution (higher sea temperatures are known to reduce sandeel recruitment).**
Removal	**As water-column feeders, Manx shearwaters are vulnerable to bycatch. Also, there is concern that susceptibility to light attraction, especially for fledgling birds, may increase the risk of collision if birds are drawn towards lights associated with offshore wind farms although there is very limited evidence around this.**
Predation	**Manx shearwaters are highly sensitive to predation, particularly by introduced mammals such as rats, mink and mice. Eradication of these from breeding islands has been shown to have driven the recovery of this species and the presence of these species at breeding locations is the single biggest indicator for the success of a colony. On Ramsey, the number of AOSs was reduced to 896 following the arrival of rats. Their subsequent eradication led to a five-fold increase in Manx shearwater AOSs.**

Evidence gaps

- **The distribution of prey species considering the potential impact of climate change on species ranges around the Welsh coast requires further investigation.**
- **Recent data on Manx shearwaters breeding at Skomer indicates 71% of 34 birds had plastic in their digestive tracts, yet there is a lack of data on the extent of plastic pollution around Welsh coasts, or how this and other factors may affect mortality and breeding success.**
- **Understanding the sensitivity of the population to fisheries bycatch is currently limited.**
- **Better understanding of adult survival, productivity, phenology, and prey selection at various Welsh colonies.**

Opportunities

- **Further studies on light pollution near Welsh Manx shearwater colonies and its effects on fledgling survival may be required and mitigation measures should be applied if necessary. Alongside this, nocturnal collision risk from offshore wind farms is poorly understood in this species.**
- **Attraction of Manx shearwaters to create colonies on rat free islands in historical colony areas.**
- **Maintaining and mainstreaming biosecurity on islands occupied by Manx shearwaters in Wales and review of prior eradication successes to determine possible points of failure. For example, rat control measures on Rum unexpectedly affected Manx shearwater breeding success due to an increase in numbers of wood mice.**

BALEARIC SHEARWATER (Aderyn Drycin Balearig)

(*Puffinus mauretanicus*)

Location

Balearic shearwaters nest in burows and caves on Mallorca, Menorca and Ibiza. They are seen in Welsh waters in the post-breeding season, with particular concentrations at the Celtic Sea front (up to 23% of the global population).

Numbers peak in September, with records along the Welsh coast in every month except for February. Sea watchers tend to observe them from Strumble Head and the islands off Pembrokeshire, as well as Bardsey and Anglesey.

Current Population Status

In Wales, Balearic shearwaters are considered to be of equal conservation concern relative to UK and Global populations. Balearic shearwaters are red listed in the Birds of Conservation Concern in Wales 4 (BoCCW4) and in the UK Birds of Conservation Concern 5 (BoCC5) and are critically endangered on the European and global IUCN red lists. They have undergone a rapid decline of more than 90% in three generations.

As this species is non-breeding in Wales, it is difficult to determine how the recent Avian Flu outbreak in Wales may have affected visiting birds and the reason for population declines in Welsh waters.

Historical Population trends

The similarity of this species to the Manx shearwater and its previous inclusion as a sub-species make it difficult to determine the status of Balearic shearwaters in Wales until relatively recently. A report from 1994 states that one Balearic shearwater was identified in Pembrokeshire in 1900. Records began more regular off Pembrokeshire after the first sighting of a live bird in 1955. Initial records from the Gower and Bardsey soon followed in the 1960s and the first Ceredigion record was in 1972 and the first records for Conwy, Anglesey and East Glamorgan occurred in the 1980s.

Through to the end of the 20th century, Balearic shearwaters were being seen with increasing frequency in Wales, reflecting an increase throughout the British Isles from 300 to 2,000 records a year between the 1980s and the late 1990s. This increase coincided with a reduction in birds seen in the Bay of Biscay. Balearic shearwaters are recorded more frequently and in higher numbers at Strumble Head, with 889 recorded in 2006.

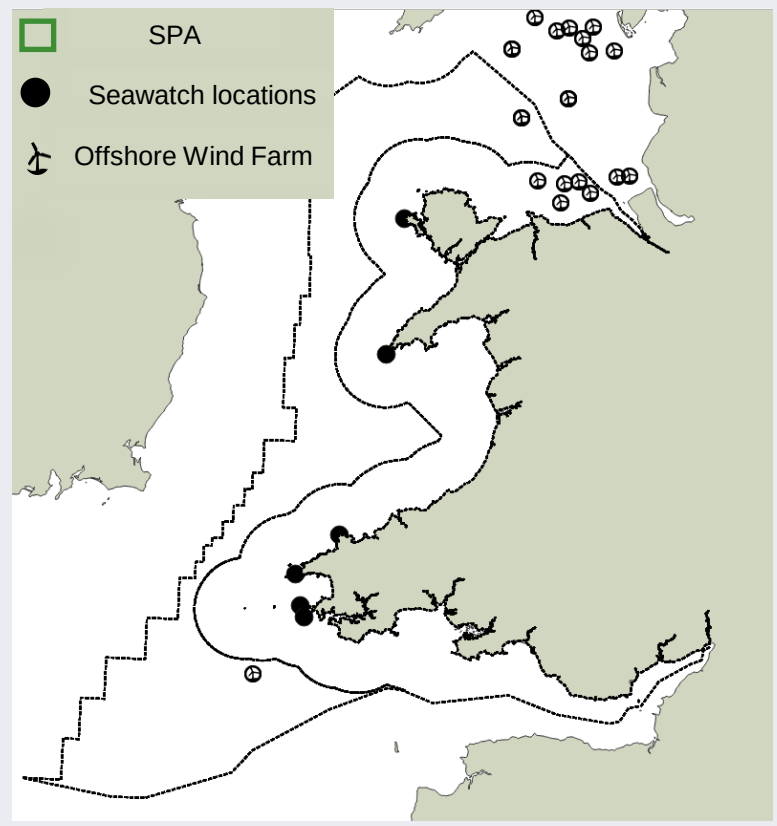
Areas of use & human activity

As they are passage migrants and non-breeding visitors, Balearic shearwaters are not a designated feature of any SPAs in the UK. Assessment by JNCC determined there were an insufficient number of birds in UK waters to reach SPA designation levels. The Celtic sea front is particularly important for post-breeding foraging.

Due to the fact that they are highly pelagic and wide-ranging, the main risks to this species from human activity in Welsh waters are exposure to pollutants and plastic ingestion. Bycatch via longlines is a risk for this species although this occurs further out within the Celtic sea and not in Welsh waters.

Activities in areas of use

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity



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Current Impact status: Red

Balearic shearwaters have been assessed as red in terms of impact due to the significant global declines within the last three generations. Declines are believed to be driven by low adult survival rates, suggestive impacts at-sea outside of the breeding season. The recent Avian Influenza outbreak may have had an impact on individuals that may have been in contact with infected colonies but, as yet, no known accounts of avian flu in the Balearic Islands have been recorded.

Sensitivity score: Red

The sensitivity score for Balearic shearwaters in Wales is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development and climate change. Therefore, this is the predicted sensitivity to change if these risks are not mitigated. It should be noted that the key threats are more likely to be encountered in outside of Welsh waters but will be experienced by birds utilising them in other periods of their lifecycle.

Predation / bycatch	**Entanglement in fishing gear (particularly artisanal longlines in the Mediterranean) is likely to be a significant factor affecting Balearic shearwaters beyond Welsh waters. In addition, cat and rodent predation on breeding grounds may contribute to increased mortality for this species.**
Food availability	**Shearwaters show flexible foraging behaviour and react to large-scale fluctuations in food availability. Food resources exploited include fishery discards, fish sheltering under floating objects and planktonic juvenile fish. There is evidence that the increase in Balearic shearwater records in UK waters from the late 20th Century was driven by a northward expansion of their food resources associated with climate change.**
Pollution	**The physical health and reproductive success of Balearic shearwaters may be negatively affected through chronic exposure to relatively low levels of pollutants and by high levels of contamination following oil spills. The presence of heavy metals (cadmium, mercury) in the environment may negatively affect pelagic seabirds of higher trophic level due to concentration in the food chain.**

Evidence gaps

- **A better understanding of migratory and non-migratory movements is needed for Balearic shearwaters. The proportion of the population that leaves the Mediterranean after breeding to feed in the North Atlantic is unknown and is likely increasing due to climate change. Alongside this, a greater understanding of how this species uses Welsh waters is required.**
- **The impact of predation by native and introduced mammals on Balearic shearwater nests is not fully understood.**
- **Understanding of numbers in the areas proposed within the Round 5 floating windfarms areas proposed near south-west Pembrokeshire.**

Opportunities

- **Tagging projects to inform movement and foraging patterns will better inform impact assessments from bycatch and the marine renewables sector, as well as understanding potential changes in prey distributions from climate change.**

NORTHERN GANNET (Hugan)

(*Morus bassanus*)

Population & Ecology

Location

In Wales, there is only one major colony of gannets on Grassholm Island, however they are recorded around almost the entire Welsh coast and a new colony was founded on Ynys Badrig / Middle Mouse in 2019. This species typically nests on offshore islands and sea stacks, or on steep mainland cliffs that are safe from terrestrial predators. They have a long breeding season, from March to September, and are pelagic in winter. Most tagged adults from Grassholm winter off the coast of Northwest Africa.

Current Population Status

Gannet is amber listed in the Birds of Conservation Concern in Wales (BoCCW4) and in the UK (BoCC5) due to international importance and breeding localisation, whereas it is considered of least concern on the European and global IUCN red lists.

The Welsh population of gannets increased by 12% between 2000 and 2021 with 32,094 apparently occupied nests (AONs) recorded during the Gannet Census in 2003-04 and 36,011 AONs recorded in the recent Seabirds Count (2015-2021). Also, UK northern gannet populations increased by 39%, from 218,545 to 304,176 AONs.

Gannets have been severely impacted by HPAI and site counts suggested up to 5,000 birds were missing from the colony. This is an estimated 54% decline in the colony in 2023 to 16,482 AON. Whether this is a long-term decline due to mortality or absenteeism is unclear at present.

Historical Population trends

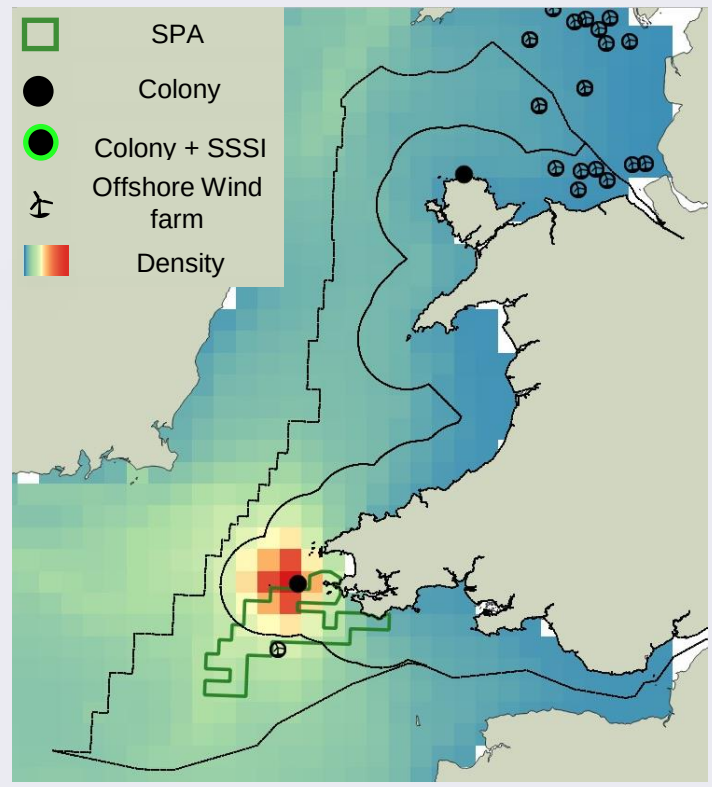
Until 2019, Grassholm was the only breeding colony of gannets ever recorded in Wales. It is believed that this colony was established in the early to mid-19th century and 20 pairs were present in 1860. During the early phase of the establishment of this colony in the late 19th century, it faced pressure from egg collecting and shooting. However, the colony has been shown to be growing steadily at a rate of 2.6% per year since the first aerial survey was conducted in 1964, from around 15,500 breeding pairs to 36,011 in the Seabirds Count survey of 2015-2021.

Grassholm is likely the fourth-largest gannetry in the world after Bass Rock and St Kilda in Scotland and Bonaventure Island in Quebec, holding 12% of the UK breeding population and 6.8% of the global population of northern gannets. The new colony at Ynys Badrig / Middle Mouse was founded in 2019, with 21 AONs recorded in 2022.

Areas of use & human activity

Gannets are a designated feature of the Skokholm, Skomer and Seas off Pembrokeshire SPA. The only other Welsh colony is on Middle Mouse. The Celtic and Irish sea fronts are particularly important feeding areas for this species.

Due to their flight height, wide foraging range and plunge-diving behaviour, gannets overlap with a range of anthropogenic activities. The main risks are collision with offshore wind turbines, displacement as a result of offshore wind farms and bycatch.



Activities in areas of use

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity

Current Impact status: Red

Whilst gannet populations in Wales have increased between the 2000 Seabird Survey and the 2021 Seabird Count, the recent Avian Influenza outbreak is likely to have impacted the Welsh population. Longer-term impacts for this outbreak are yet to be determined but there was a 54% decline on Grassholm in 2023 compared to pre-HPAI which equates to a reduction in AONs from 36,011 to 16,482. This species is also vulnerable to offshore wind developments and changes to prey availability as a result of changes to fishing effort and discard practices and climate change related prey distributional shifts.

Sensitivity score: Red

The sensitivity score for Welsh gannet populations is determined by the species' sensitivity to key threats that have historically been a pressure for this species, as well as future predicted risks as a result of increased use of the marine area for development, changes to fishing practices that may reduce discard availability, and climate change.

Bycatch	**Multiple studies list gannets as being susceptible to bycatch in gillnets as well as longlines and trawl nets. Northern gannets are identified as among the most potentially vulnerable species to bycatch in in UK waters given both their susceptibility to entanglement and their distribution at sea in relation to relevant fishing activity, as they frequently associate with fishing boats to feed on their catches and discards.**
Collision	**Northern gannets have been ranked as one of the most vulnerable species in terms of collision with offshore wind farm (OWF) turbines, given that they tend to fly higher than other seabirds and have a wide foraging range, although strong avoidance of OWFs has been documented for this species. As gannets plunge dive at speed, they may be at risk of collisions with structures below the surface, though this risk is currently considered to be low. Displacement due to offshore wind farms can also increase energy costs during foraging.**
Disease	**Major die-offs of gannets have been recorded at multiple gannetries in the UK since the beginning of the HPAI outbreak. Whilst not previously considered to be highly sensitive to disease, the colonial nature of gannets breeding at high densities render this species vulnerable to Avian Influenza. Despite initial population declines, colony level outcomes for Grassholm are unclear at present.**

Evidence gaps

- **Long-term population level impacts of HPAI in gannets are unclear despite initial population declines.**
- **Dispersal ability may be a key constraint on future range size, highlighting a need for further information on this trait which is currently lacking.**
- **Understanding of numbers present within the area proposed for Round 5 offshore wind developments (south-west of Pembrokeshire).**
- **Better understanding of adult survival, productivity, phenology, and prey selection at Welsh colonies.**
- **The number of gannets subject to bycatch around the Welsh coast or in the wintering range of Welsh breeders is unclear. Mortality in Britain and Ireland appears to be low but there are reports of thousands of gannets drowning annually off Portugal and being caught deliberately off the West African coast.**

Opportunities

- **Tagging studies to assess the dispersal patterns of gannets in Welsh colonies and linkage between Middle Mouse and Grassholm could be enacted.**
- **Targeted studies in mortality rates and impacts of HPAI on gannet colonies in Wales would help understand the robustness of the population and the impact of Avian Influenza in Wales.**
- **Continued monitoring of the colony to determine recovery levels and track changes to areas of use.**
- **Consideration of protective measures around Middle mouse (Ynys Badrig) to allow new colony to establish.**

GREAT CORMORANT (Mulfran)

(*Phalacrocorax carbo*)

Population & Ecology

Location

In Wales, cormorants are primarily coastal breeders, nesting on cliffs, sea stacks and offshore islands, whereas they also breed at inland colonies in other parts of the UK. The largest Welsh colonies are around the on the north coast in Little Orme and on Puffin Island . They are also present on the west coast, in Pembrokeshire, Ceredigion, Gwynedd and Anglesey.

In winter, cormorants use coastal, estuarine and inland waters, and their numbers tend to increase due to birds arriving from Northern Europe.

Current Population Status

Cormorant is green listed in the Birds of Conservation Concern in Wales (BoCCW4) and in the UK (BoCC5). The global and European populations are considered of least concern on the IUCN red list.

The Welsh population of cormorants has decreased by 17% between 2000 and 2021 with 1,788 apparently occupied nests (AONs) recorded during the Seabird 2000 survey and 1,477 AONs recorded in the recent Seabirds Count (2015-2021). Also, UK cormorant populations decreased by 5%, from 9,258 to 8,829 AONs during the same time period.

There are records of Avian Influenza in great cormorant, however the impacts on this species and particularly in Wales are not quantifiable at present.

Historical Population trends

Cormorant colonies were first documented on Puffin Island in Anglesey and Craig yr Aderyn in Gwynedd in the late 17th century. The latter is 7km from the sea and is the only inland breeding site in Wales. Cormorants nested in Gower through the 19th century, with small numbers persisting at Worms Head until 1976 and two pairs breeding there in 2018. There has been no confirmed breeding in Carmarthenshire, though it was suspected at Telpyn Point in 1989.

The Welsh breeding population of cormorants has been relatively stable since the Operation Seafarer survey in 1969-70, which counted 1,468 AONs. However, since the Seabird 2000 survey, there have been declines at a number of colonies in Wales, including at Little Orme. This was formerly the largest colony in Britain, with 452 AONs in 2003, and numbers have fluctuated since then. However, the most recent count from 2023 saw a 45% reduction with only 250 AONs recorded. It is unclear whether this is related to an increase in cormorant numbers on Puffin Island.

Areas of use & human activity

Cormorants are a designated feature of the Puffin Island SPA which is also the largest colony in the UK. Most active Welsh colonies are along the north and west coasts.

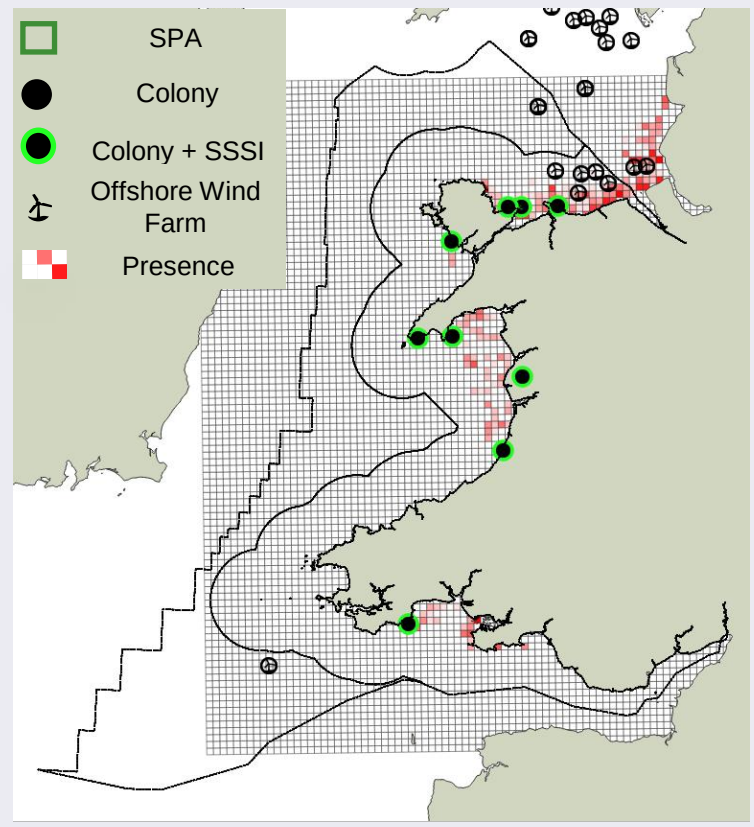
Breeding colonies are features of several SSSIs; Afordir Gogleddol Penmon, Craig yr Aderyn (Bird Rock), Cregiau Pen y Graig, Cregiau Rhiwledyn/ Little Ormes Head, Newborough Warren/Ynys Llanddwyn, St Margaret's Island, and Ynysoedd y Gwylanod/Gwylan Islands and listed as part of the winter assemblages for Dee Estuary SPA and SSSI, Gronant Dunes and Talacre Warren SSSIs and Liverpool Bay SPA.

Being pursuit hunters with short foraging range in inshore waters, cormorants are sensitive to activities close to their breeding sites, including marine infrastructure and fishing.

Activities in areas of use

Ports & dredging (A)	Shipping (G)	Oil & Gas (G)	Fishing (A)	Recreation (G)	Aquaculture (G)	Offshore Wind (A)

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity



Current Impact status: Amber

Whilst currently green listed in the Birds of Conservation Concern in Wales (BoCCW4), the impact status for cormorants has been considered as amber. This is due to the recent decline in numbers between the 2000 Seabird Survey and the 2021 Seabird Count. Furthermore, the recent Avian Influenza outbreak is likely to have further impacted the Welsh population. The quantification of this pressure is yet to be determined for cormorants in Wales given the late arrival of the virus comparative to the wider UK.

Sensitivity score: Amber

This is predominantly due to the recent decline in the Welsh cormorant population due to a decrease in the number of chicks fledged per breeding pair since 2004. The drivers of this decline are poorly understood.

Removal	**The licensed control of cormorants to reduce economic losses from river and lake fisheries has been suggested as a threat to cormorants in the non-breeding season, as has the unlicensed killing of cormorants for the same reason. However, most of this occurs in England (which can include Welsh breeding individuals), with the take in the devolved administrations at around 200-250 birds per year, including Wales. Other studies have found that control measures have not affected the UK national population trends, though further research needs to be done at a Welsh level.**
Bycatch	**As pursuit hunters, great cormorants are vulnerable to bycatch in gear. In British waters, cormorants are the second most bycaught seabird species in static fishing gear, and this may have population-level impacts. The mortality risk from static fishing gear is ten times higher for first-year birds than it is for adults.**
Collision	**Great cormorants do not tend to overlap extensively with offshore wind farms (OWFs) given their short foraging range. They may be sensitive to collision when OWFs are located close to their colonies, as they are known to roost on turbine bases. However, the provision of predator-free roosting and breeding sites may be a net benefit. Cormorants may be at greater risk of collision with underwater structures such tidal stream turbines and tidal lagoons, with the latter also presenting habitat loss risk, but this novel risk is difficult to quantify accurately.**

Evidence gaps

- **The diets of great cormorants are variable and those of breeding birds in Wales are poorly known.**
- **The number of cormorants subjected to bycatch around the Welsh coast is unknown.**
- **The impact of control of cormorants on the wider population is not yet quantified at the population level, especially when considering cumulative pressures on this species.**
- **Better understanding of adult survival, productivity, phenology, and prey selection at Welsh colonies.**

Opportunities

- **Studies on diet composition of cormorants in Welsh colonies and distributions of prey species to predict potential changes in food availability and impacts due to climate change. This would also provide information to better understand the impact this species may have on inland fishery stocks.**
- **Tagging studies would help to develop a better understanding of site use and movements of individual cormorants to inform the impact of control measures on the populations in Wales and elsewhere.**
- **Data collection and review of licence applications for bird control to quantify the impact this has upon local populations and likely cumulative pressures on the population.**
- **Encourage bycatch reporting with local fishers to understand current mortality levels.**

EUROPEAN SHAG (Mulfran Werdd)

(*Gulosus aristotelis*)

Population & Ecology

Location

European shags are strongly associated with rocky shorelines. They breed at numerous sites around the Welsh coast from the Little Orme in the north to Caldey Island in the south, with the main colonies in the north at island sites such as Ynys Seiriol/Puffin Island, The Tudwals and the Gwylans. This species nests under large boulders, in caves, or under overhanging rocks.

In winter, they tend to remain in the vicinity of the colony or disperse along adjacent rocky shores. Most Welsh birds stay within the Irish and Celtic seas although some Welsh-bred shags migrate south to Spain.

Current Population Status

The European shag is amber listed in the Birds of Conservation Concern in Wales (BoCCW4) due to moderate breeding population declines and red listed in the UK (BoCC5) due to severe breeding population declines. The global and European populations are considered of least concern on the IUCN red list. The Welsh population of European shag has decreased by 29% between 2000 and 2021 with 916 apparently occupied nests (AONs) recorded during the Seabird 2000 survey and 651 AONs recorded in the recent Seabirds Count (2015-2021). Also, UK shag populations decreased by 24%, from 26,643 to 20,209 AONs.

Avian influenza has been recorded in European shag but the population impacts in Welsh birds are not yet understood.

Historical Population trends

Information on the numbers of European shags breeding in Wales before the early 20th century is limited. Colonies were noted on offshore islands in Pembrokeshire as well as multiple sites in Anglesey and Caernarfonshire around the turn of the 20th century. Shags also bred in small numbers in Gower until 1925, and again from 1953 until 2001, when one AON was recorded.

The Operation Seafarer survey in 1969-70 recorded 550 AONs in Wales and the Seabird Colony Register (SCR) Census in 1985-88 recorded 785 AONs. The population of European shags in Britain and Ireland declined by 27% between the SCR Census and the Seabird 2000 count whereas the Welsh population increased by 16% over the same time period. In the years following the Seabird 2000 count, shag populations in Wales appeared to be stable, but they declined significantly by the time of the recent seabirds count, at a similar rate to populations elsewhere in Britain.

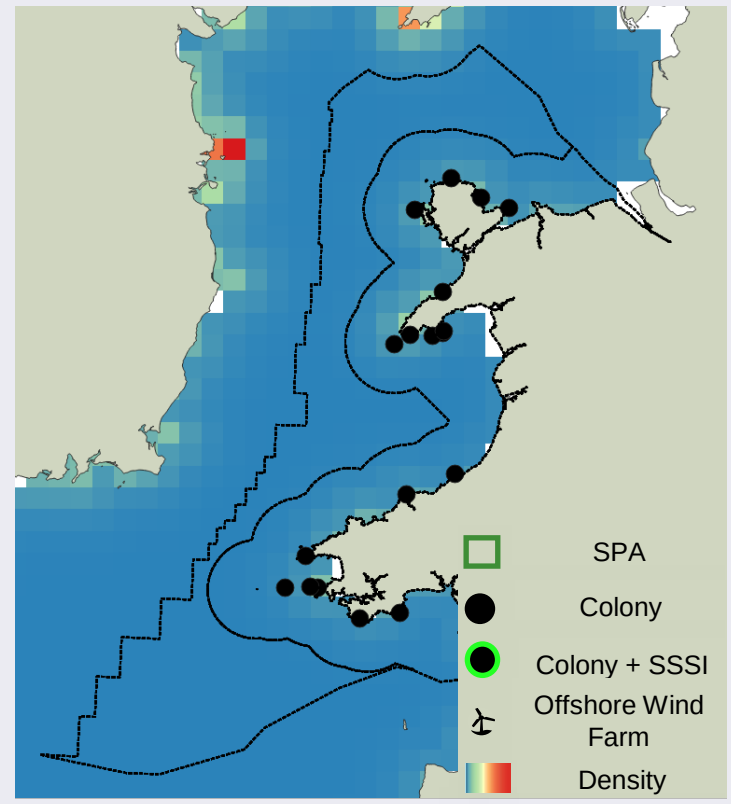
Areas of use & human activity

European shags are not currently designated features of any SPAs or SSSIs in Wales. The largest colonies in Wales are on the Llyn Peninsula, Little and Great Orme and the islands off Anglesey.

They have a short foraging range and are pursuit hunters, making them sensitive to human activities close to their breeding sites. As a pursuit hunter, they may be vulnerable to tidal turbines and loss of habitat due to tidal lagoon / barrage installations, as well as bycatch.

Activities in areas of use

Red (R) = high sensitivity, Amber (A) = moderate sensitivity, Green (G) = low sensitivity



Current Impact status: Red

There has been a marked decline in the European shag population in Wales between the 2000 Seabird Survey and the 2021 Seabird Count. Also, the recent Avian Influenza outbreak is likely to have impacted the Welsh population. The quantification of this pressure is yet to be determined for European shag in Wales given the late arrival of the virus comparative to the wider UK.

Sensitivity score: Red

The sensitivity score for Welsh shag populations is determined by the species' sensitivity to key threats that have historically been a pressure for this species, the recent population decline, and future predicted risks as a result of increased use of the marine area for development and climate change.

Severe weather	**European shag populations are vulnerable to wrecks caused by severe weather. Prolonged onshore gales in winter can limit foraging and several significant wrecks have occurred over the past 30 years in the UK. These are less common in Wales than in the North Sea, as the only winter of serious mortality since 2000 occurred in 2012-13. However, European shag may also suffer low productivity during summer storms and the frequency and severity of severe weather events are predicted to increase due to climate change which is also expected to impact prey availability.**
Bycatch	**As deep-diving pursuit hunters, European shags are considered to be sensitive to bycatch in surface gear and near the seabed. For the Norwegian and Icelandic populations, the mortality rate due to bycatch under a worst case scenario was estimated at 0.5% to 4.53% of breeding adults per year.**
Pollution	**Given that European shags forage exclusively in the near-shore zone, they are exposed to high concentrations of organic and heavy metal pollutants. Oil spills have also been a key threat in other parts of their range, causing long-term reproductive impairment.**
Predation	**Populations of European shag elsewhere in the UK have faced pressure from terrestrial predators, affecting productivity; rats on Ynys Seiriol/Puffin Island have been known to prey on eggs and chicks. The eradication of rats from Canna and Sanday in Scotland led to an increase in the breeding numbers and productivity of shags.**

Evidence gaps

- **Climate models predict that the European shag population in the UK will increase by approximately 39% by 2050. However, another study demonstrated a negative relationship between breeding success and air temperature on the east coast of the UK, so the effects of climate change are as yet unclear.**
- **The number of European shags subjected to bycatch around the Welsh coast is unknown.**
- **Anecdotal evidence suggests that shags may be breeding earlier but this is yet to be confirmed through quantitative assessment.**
- **The effects of organic and heavy metal pollutant bioaccumulation on the growth and development of European shag chicks are unknown.**

Opportunities

- **Diet composition studies on Welsh colonies, as well as studies on prey distribution, may help to clarify the potential effects of climate change on European shags in Wales, as diet varies considerably between colonies.**
- **Better understanding of adult survival, productivity, phenology, and prey selection at various Welsh colonies.**
- **Ensuring that islands remain free of rodents and other terrestrial predators will reduce pressure on breeding European shag.**