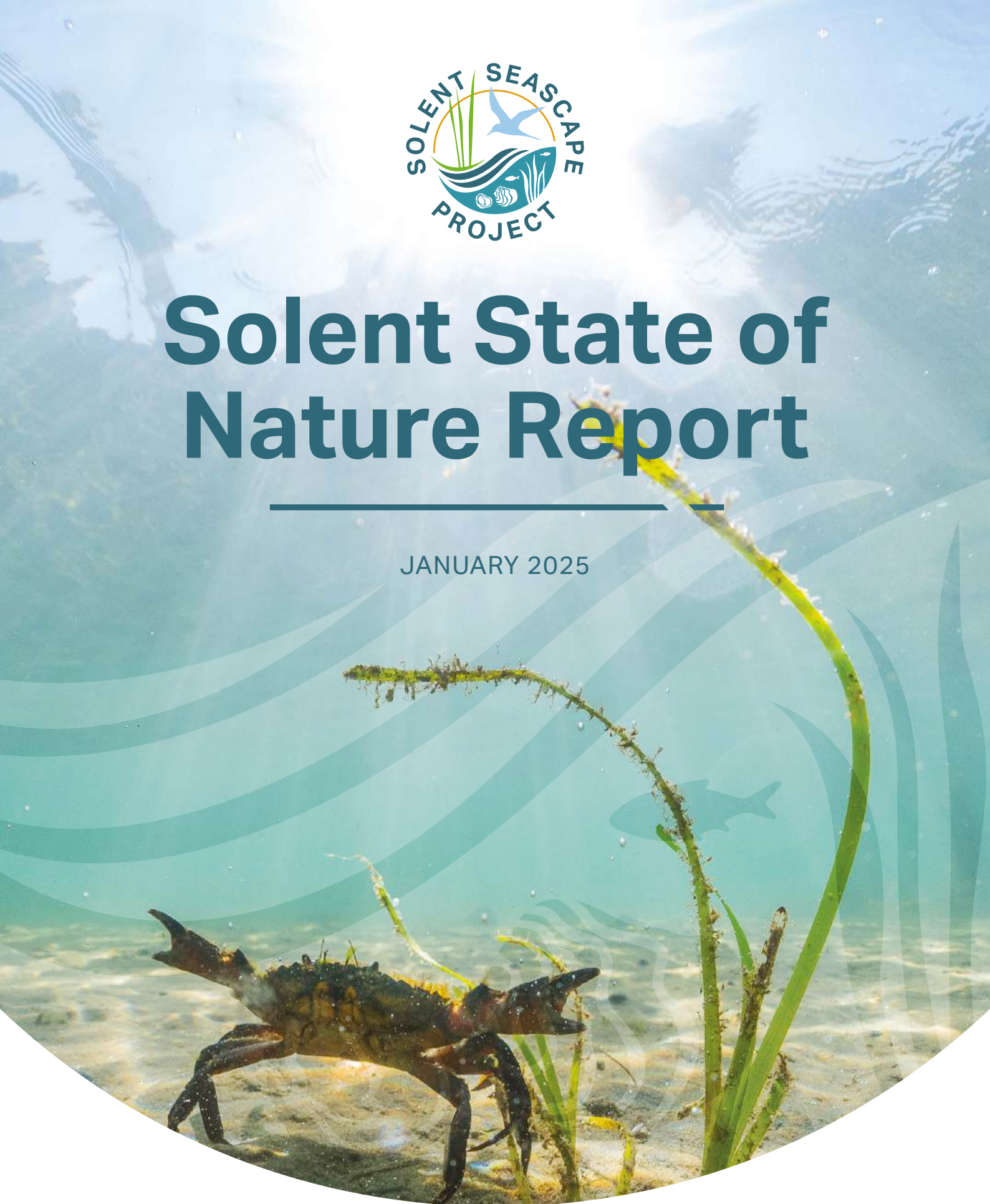




Solent State of Nature Report

JANUARY 2025



Non-technical summary



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Non-Technical Summary (NTS)

1 Introduction

The Solent State of Nature report presents an overview of the current status of coastal and marine wildlife in the region, including consideration of trends and pressures that are currently affecting these features. Most of the Solent's habitats and species are struggling, with many having suffered dramatic declines. While more work is undoubtedly needed to help the Solent's nature, a lot of important effort has already been put in to help it recover.

The report has been compiled on behalf of the Solent Seascape Project. This project aims to be the first of its kind in the UK to initiate recovery

of the marine and coastal environment at a seascape scale. The long-term vision for the project is to protect and restore the Solent's seascape, tipping the balance from a degraded state to a naturally expanding, connected and productive ecosystem.

There are ten partners on the project: Blue Marine Foundation, RSPB, Hampshire & Isle of Wight Wildlife Trust (HIWWT), Project Seagrass, Natural England, Environment Agency, Coastal Partners, Isle of Wight Estuaries Project, Chichester Harbour Protection and Recovery of Nature (CHaPRoN) and University of Portsmouth.



Most of the Solent's habitats and species are struggling, with many having suffered dramatic declines



2 The Solent

For the purpose of this report, the Solent region extends from Hurst Beach and the Needles (Isle of Wight) in the west to a line between Black Rock (Isle of Wight) and Selsey Bill in the east; incorporating Pagham Harbour. **The Solent measures approximately 510 km², or 51,000 hectares (ha). The catchments which feed into the Solent region cumulatively measure 3,360 km² (or 336,000 ha) and extend 60 km inland.**

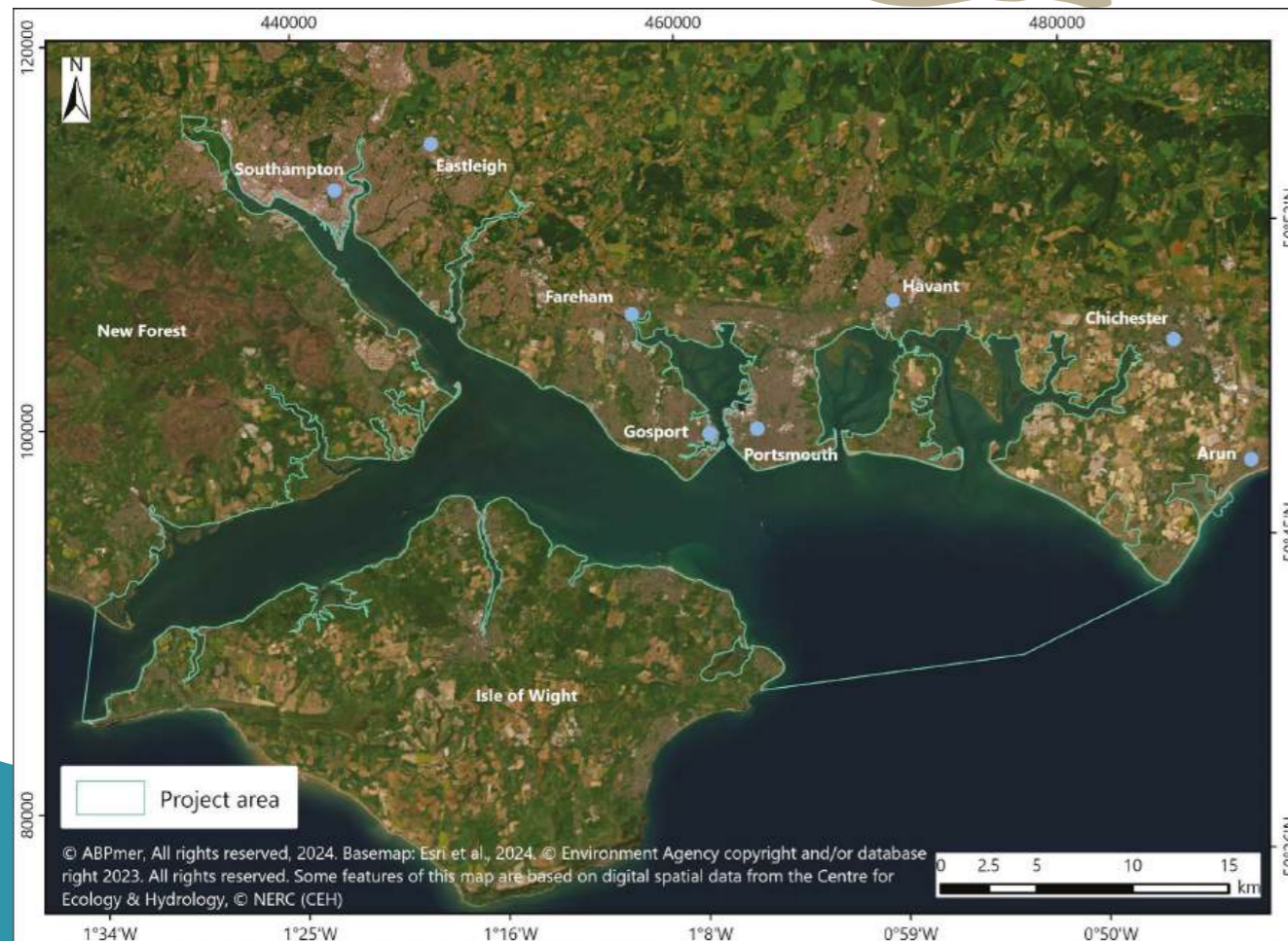


Figure NTS1. The Solent Seascape project area

The Solent itself is a large channel between the Isle of Wight and mainland Great Britain which is 32 km long and varies in width between 4 and 8 km. The major ports of Southampton and Portsmouth are situated in the Solent, and it is a major shipping lane for military, freight and passenger vessels as well as a popular location for recreational activities and water sports, including sailing, walking, angling, swimming and paddle sports.

The Solent is a system with unique tidal characteristics. Near Calshot (at the entrance to Southampton Water), the tidal conditions and

depth and shape of the seabed result in a double high tide. Further to the east, around Spithead / Portsmouth, there is an extended (rather than double) high tide. In addition, the tidal range (the difference between low and high tide) varies substantially across the region; it increases from west to east. For example, on springs, it is 2.2 m in the west (e.g. Yarmouth / Isle of Wight) and 5.1 m in the east (at Pagham Harbour entrance).

The Solent measures approximately

510 km²

or 51,000 hectares (ha)



3 Marine Protected Areas and Protected, Rare or Threatened Species and Habitats

The Solent's nature is considered to be very important internationally, nationally and locally. This is reflected in the many 'designated' sites which can be found here. In total, there are 72 designated sites within the region, which often overlap with each other; these can be seen in the figure below.

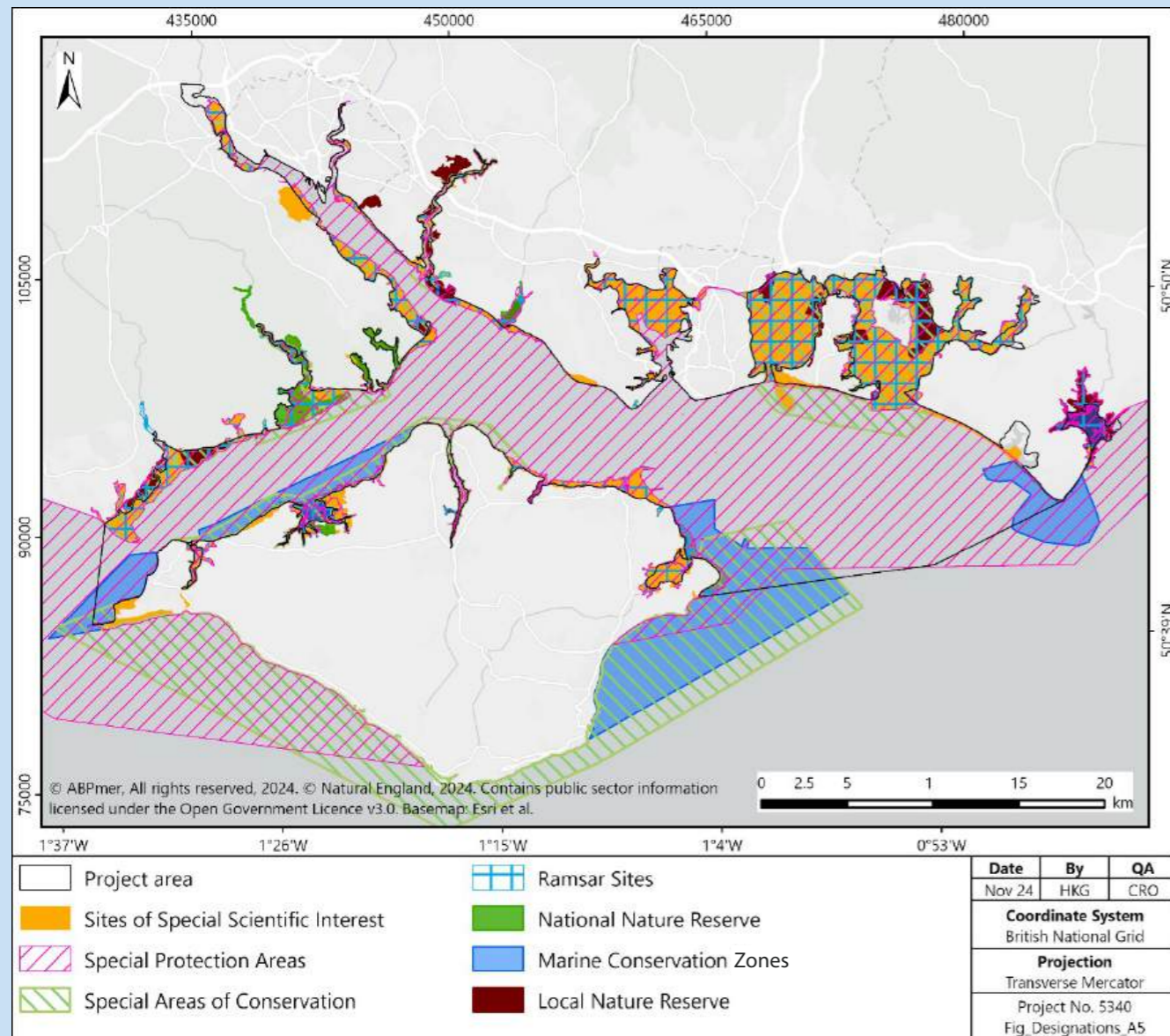


Figure NTS2. Designations which have an overlap with the Solent Seascape area

Many of the species and habitats in the Solent region are considered important, rare or particularly threatened.

- **There are 117 marine species in the Solent which are of particular importance, threatened and/or endangered.**
 - Important species include birds such as the Curlew and Dark-bellied Brent Goose; fish such as Bass, Mackerel and Whiting; and mammals such as the Harbour Seal.
 - Particularly endangered or rare species include the birds Roseate Tern and Ruff; fish such as Atlantic Salmon, European Eel and Thornback Ray; and mammals such as Harbour Porpoise.
- **There are 18 marine habitats in the Solent which are of particular importance, threatened and/or endangered.**
 - Important existing habitats include coastal saltmarsh, vegetated shingle, seagrass beds and saline lagoons.
 - Threatened habitats include saltmarshes, seagrass beds, intertidal chalk and subtidal kelp beds.
 - Lost habitats include native oyster reefs.

There are 117 marine species in the Solent which are of particular importance, threatened and/or endangered.

There are 18 marine habitats in the Solent which are of particular importance, threatened or endangered.

4 Habitats

4.1 Overview

The Solent is of great ecological importance and contains more than 51,000 hectares (ha) of coastal and marine habitats.

There are just over 11,000 ha of intertidal habitats, which are areas that are underwater at high tide, but exposed to air during low tide. These include:

- Over 8,300 ha of intertidal mudflats which are rich in invertebrates and are internationally important feeding grounds for waterfowl and wading birds;
- Over 2,100 ha of declining and threatened saltmarshes and seagrass beds; and
- 95 ha of rare intertidal chalk.

Above the intertidal zone, in the splash or spray zone, there are around 250 ha of vegetated shingle, dunes, cliffs (and their slopes) and beaches.

The subtidal, always submerged, areas measure just under 40,000 ha altogether, and include:

- Almost 24,000 ha of sands and gravels;
- Around 12,000 ha of mixed or muddy seabed; and
- Rarer habitats, such as just under 150 ha of kelp beds (mostly off Hayling Island) and rocky habitats (almost 1,500 ha).

Many of the adjacent terrestrial habitats and rivers are also often important to birds and other animals which use these coastal and marine areas. For example, wading birds and waterfowl such as Brent Geese also forage and rest in adjacent fields and grazing marshes. A Solent-wide project identifying such important terrestrial areas has mapped 3,600 ha of such fields and grassland next to the Solent's marine and coastal habitats. In addition, there are several species of fish such as Atlantic Salmon which migrate between the sea and the Solent's rivers.



4.2 Key habitats of the Solent – focus on saltmarshes, mudflats, seagrass beds and oyster beds

Most of the Solent's habitats are under a lot of pressure from human activities, particularly those in the intertidal and splash zones. Notably, many of the habitats created by shellfish or plants (biogenic habitats) which can be found in the Solent have seen dramatic declines and degradation, primarily due to destructive fishing activities, water pollution, land claim and diseases.

The status and trends of the four key marine biogenic habitats of the Solent (saltmarshes, mudflats, seagrasses and oyster beds) are summarised in the table below, and further explained thereafter.

Table NTS1 Extent, trends and condition for the four key marine habitats of the Solent

Key habitat	Current mapped extent (ha)	Historic trend	Future trend (without restoration / further action)	Current condition of majority of Solent
Saltmarsh	1,386	↓	↓	Unfavourable
Mudflat	8,362	↔	↓	Unfavourable
Seagrass	715	↓	↓	Unfavourable
Oyster reefs	0	↓	—	Lost

4.2.1 Saltmarsh

Importance

Saltmarsh is a critical coastal habitat in the UK which provides many benefits to the surrounding seascape. Saltmarsh habitats support local biodiversity, including many fish species, particularly during their younger life stages. Saltmarsh is critically important for the Solent’s internationally renowned bird populations, especially as resting and breeding areas. **The few remaining isolated saltmarsh islands in the Western Solent and Langstone Harbour are hugely important for breeding seabirds and other marine birds. For example, in 2023, more than 85% of all the seabirds that breed in the Solent did so using these saltmarsh islands (especially Sandwich Tern, Black-headed Gull and Mediterranean Gull).** Saltmarshes also fulfil many important services for humans – saltmarsh habitats act as a natural flood and coastal defence and are very efficient at storing carbon, mitigating the impacts of climate change. Because of this, they are often referred to as a ‘blue carbon’ habitat. Saltmarshes also improve water quality and are important for nature tourism, as they provide habitat for an incredible breadth of species.

over **85%** of all seabirds that breed in the Solent used saltmarsh islands in 2023.

Extent and trends

There are just under 1,400 ha of saltmarshes remaining in the Solent, and most of these are quite low lying, with 57% being either *Spartina* (cordgrass) or pioneer marshes. The fact that such a high percentage of the Solent’s saltmarshes are very low lying makes them very vulnerable to climate change and other pressures. It is of note that many of the saltmarsh areas within the Solent are of relatively recent origin, resulting from the spread of the (then new) hybrid *Spartina anglica* (which originated in the Solent) from 1870s onward. **Since around the 1940s, there has been a rapid and ongoing decline of saltmarshes, and extent has more than halved**, with estimates that there used to be over 3,000 ha of this habitat before the 1940s.

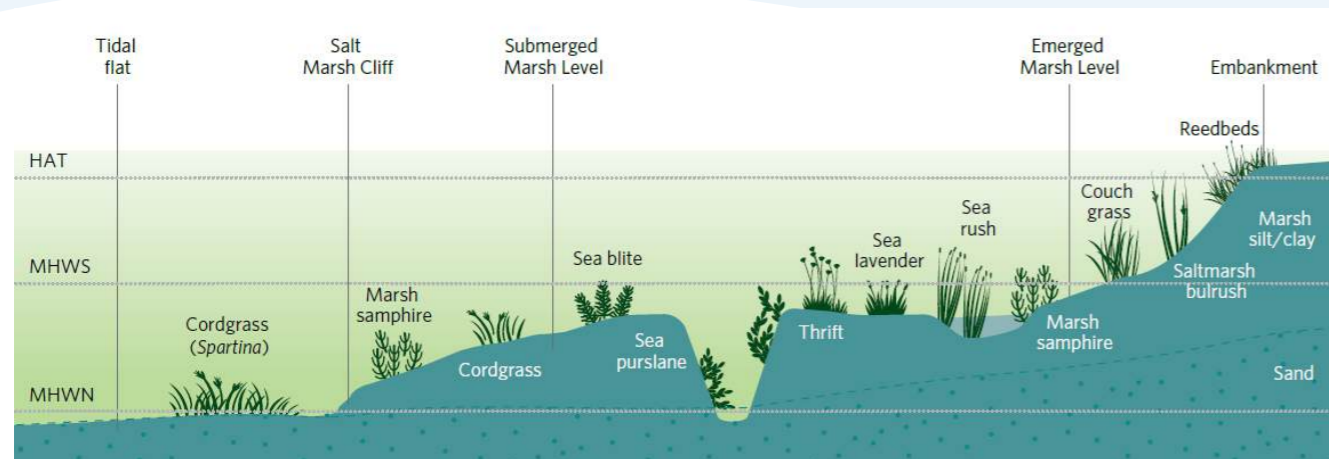


Image NTS1. Schematic showing the profile of a saltmarsh with its main typical features¹

¹Source: Hudson, R., Kenworthy, J. and Best, M. (eds) (2021) Saltmarsh Restoration Handbook: UK and Ireland. Environment Agency, Bristol.

HAT = Highest Astronomical Tide. MHWS = Mean High Water Springs. MHWN = Mean High Water Neaps. *Spartina* marshes occupy the lowest saltmarsh zone, at the mudflat to saltmarsh transition zone; this is followed by the pioneer zone which tends to be dominated by annual plants such as marsh samphire.

In the Solent, it is evident from current best available evidence, that saltmarsh extent continues to reduce, mostly due to relatively low sediment availability and ongoing sea level rise. Almost everywhere, saltmarsh cannot move inland due to the presence of flood embankments, and other human infrastructure (this is termed ‘coastal squeeze’). Other human factors are also believed to play a key role in saltmarsh decline, with poor water quality, algal mats and small wash waves created by boats being other damaging pressures. Estimates have been made that, without intervention,

saltmarsh habitat will all but disappear from the Solent over the next 100 to 200 years.

Condition

Whilst there are some saltmarshes that are faring relatively well in the Solent, the vast majority of them are struggling and are considered to be in ‘unfavourable’ condition. This is due to a combination of factors, but mainly sea level rise, insufficient sediment supply and poor water quality (including the problematic algal mats which often form as a result).

4.2.2 Mudflats

Importance

Mudflats are very important habitats which can be found at the lower end of the intertidal zone. **Mudflats provide a vital food source for most of the coastal and marine birds which either visit the Solent or consider it their home.** Many fish and shellfish species also rely on them for feeding and shelter, and many worms such as Lugworm and Ragworm live in burrows in the mud. Mudflats also provide various benefits to people, including the burial / storage of nutrients, pollutants and carbon.

Extent and trends

There are over 8,300 ha of intertidal mudflats in the Solent region, and while some of these are being lost to sea level rise (and erosion) and are becoming subtidal, more is being gained as saltmarshes erode or are submerged, die and shift to mudflat. On balance, mudflats are expected to increase in extent over the coming century, though this is at the expense of saltmarsh habitats. Beyond the 100 year timeframe, there is however expected to be an ongoing net loss of mudflats.

Condition

The majority of the mudflats in the Solent are considered to be in unfavourable condition. This is largely due to sea level rise and poor water quality. In the Solent’s estuaries and harbours, harmful blooms of macroalgae often occur due to too many nutrients in the water. Too much macroalgae can smother mudflats and negatively affect the species living on and within them, along with the species that rely on their resources. Furthermore, excessive nutrient, bacteria and contaminant loads in the water and sediments are also affecting the organisms that reside in and on muds. Heavy metal contamination is a particular issue in the Solent, with large quantities still being added every year (e.g. copper, which is used in antifouling paint on boats and ships). Invasive species have also been highlighted as a reason for mudflats in the Solent being in unfavourable condition, as too many of them have been, and continue to be, introduced, mainly via the many boats and ships which frequent the region.

4.2.3 Seagrass Beds

Importance

Seagrasses are the only flowering plants that can live in seawater but are restricted to shallow and protected coastal areas. **Seagrass beds are very important for marine life and thought to support 20% of the world's biggest fisheries.** Furthermore, the meadows seagrasses form also help to store carbon and stabilise the sediment on our sea floors. This can help combat climate change

and prevent coastal erosion. Seagrass beds are a blue carbon habitat because they can capture carbon and move it to the underlying sediment.

Extent and trends

At least 715 ha of seagrass beds have been mapped in the Solent, though overall extent is believed to be bigger. This uncertainty is related to seagrass being difficult to map and monitor. Efforts are underway across the Solent to better understand and map seagrass extent.

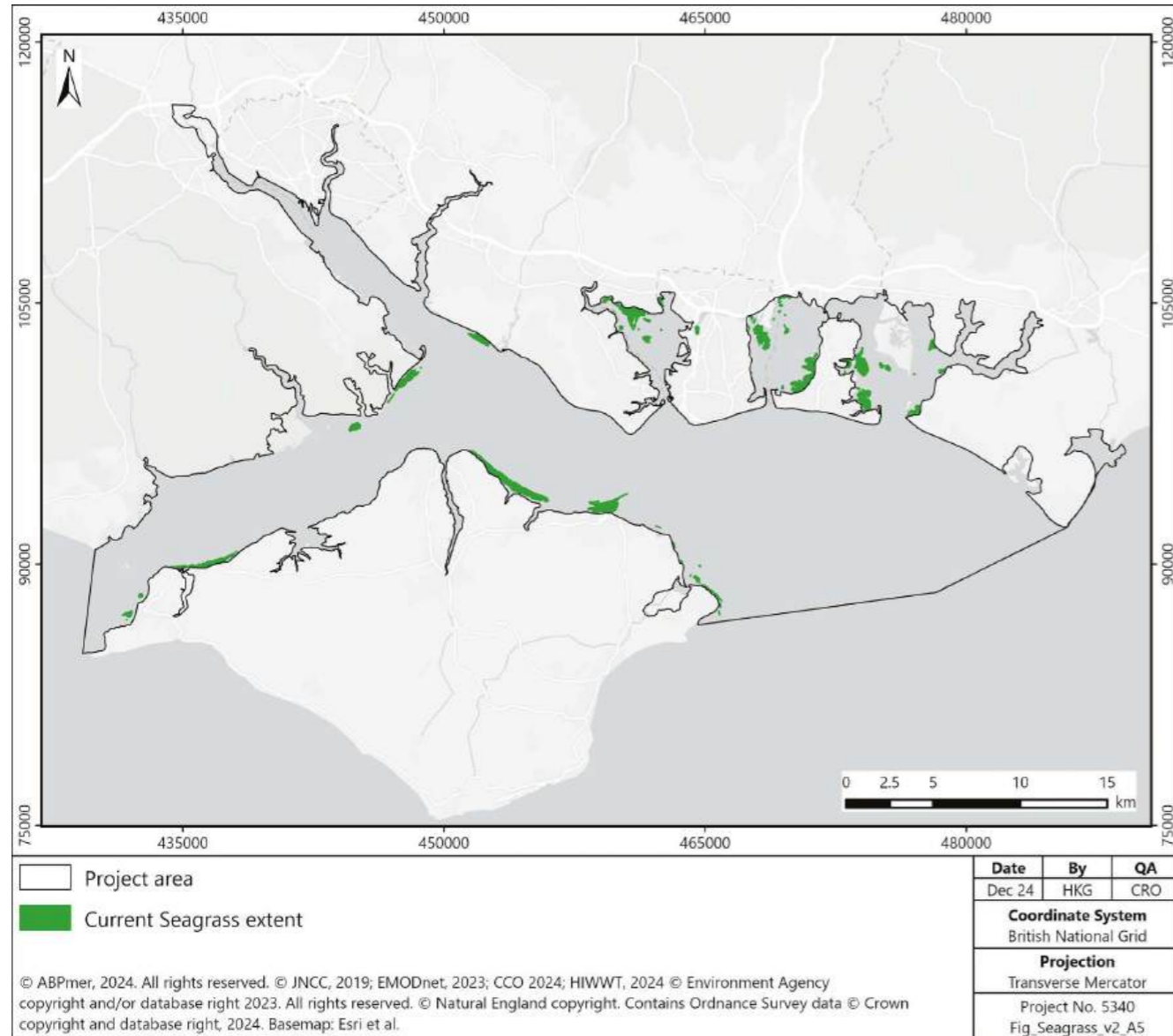


Figure NTS4 Mapped Seagrass in the Solent

Historically, there used to be much more seagrass in the Solent, though numbers on historic extent do not exist. In the UK, estimates suggest that 92% of the seagrass meadows were lost over the last century, largely due to a catastrophic wasting disease which occurred across the North Atlantic in the 1930s, and also poor water quality, as well as bottom-towed and other destructive fishing practices and the spread of *Spartina*. In the future, seagrass beds will continue to be impacted by many of these pressures, and also by sea level rise and climate change. For example, intertidal seagrass, which resides on mudflats, would be lost wherever

mudflat is lost, and subtidal seagrass would also eventually not receive enough light as water depths increase.

Condition

The majority of the remaining seagrass beds in the Solent are considered to be in unfavourable condition. This is due to nutrient enrichment resulting from water pollution, as well as seabed disturbance caused by recreational activities including boat anchors. Heavy metal and other contamination and invasive species are also reasons for the unfavourable condition of some of the Solent's seagrass meadows.

20%

Seagrass beds are very important for marine life and thought to support the productivity of a fifth of the world's biggest fisheries.

The majority of the seagrass beds in the Solent are considered to be in unfavourable condition.

4.2.4 Native oysters

Importance

Native oysters provide numerous ecosystem and social benefits. They filter large amounts of water; for example, just one adult native oyster can filter over 140 litres of water per day. Oysters contribute to improvements in water quality, as well as the removal of excess nutrients and contaminants, and they form a commercially important food source (although the Solent native oyster fishery is closed, see below). They stabilise sediments, reduce wave energy and provide shelter to many marine species; for example, they are an important nursery and feeding habitat for fish.

Extent and trends

Naturally occurring native oyster reefs have all been lost from the Solent, leaving fragmented remnant populations of oysters and historic beds which are not generally home to enough oysters to be officially classed as 'beds' (at least five oysters per square metre are required for this). Comprehensive efforts are underway to restore these back into the seascape.



Until the early 2000s, the Solent oyster fishery was one of the last remaining (and largest) native oyster fisheries in Europe but populations collapsed in 2007 and have not recovered since.

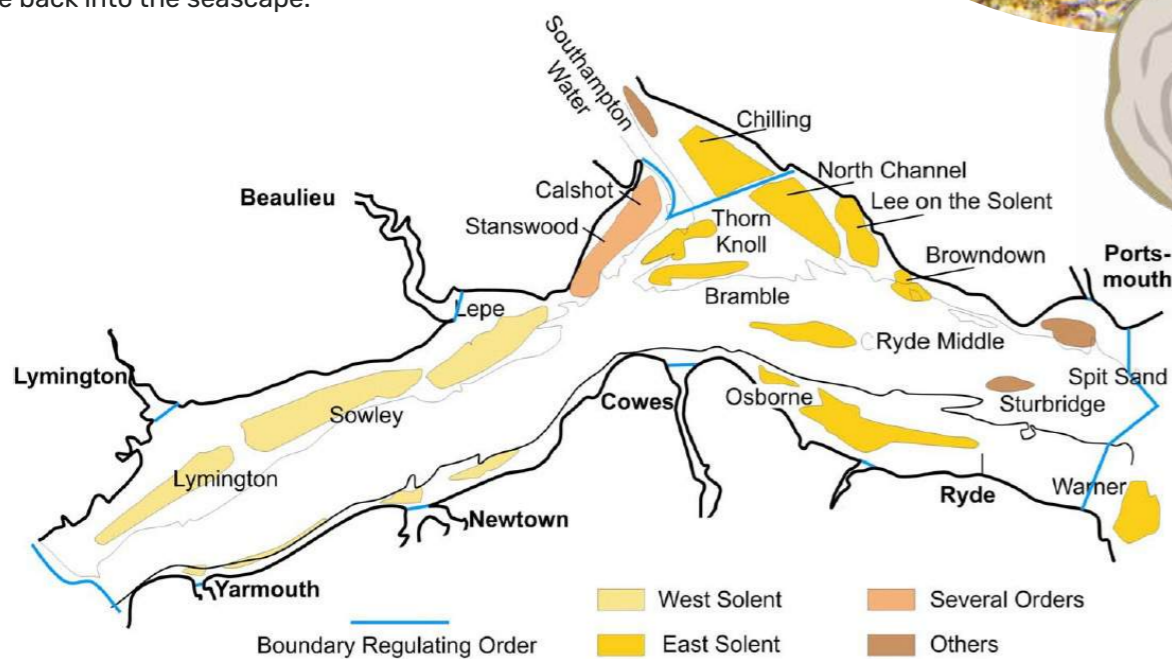


Image NTS2. Historic Solent oyster beds²

² Source: Vanstaen, K. and D. Palmer (2009) Solent Regulated Fishery Oyster Stock Survey 16 - 22 June 2009. Technical report. Centre for Environment, Fisheries and Aquaculture Science, Lowestoft Laboratory. 29p.

Similar to other regions in Northern Europe, the effective extinction of native oyster reefs in the Solent was likely mostly due to overfishing, which is an issue which goes back many centuries (industrial-scale fishing is believed to have started in the late 18th century in the Solent). It is also important to understand that not only did the Solent used to have large areas of native oyster reefs, but these used to be substantial three-dimensional structures, and would have often likely reached several metres in height, possibly as high as houses in some deeper locations (pre industrial fishing). In the more recent past, severe winters and diseases and parasites further contributed to the decline of

the remaining oysters. Until the early 2000s, the Solent oyster fishery was one of the last remaining (and largest) native oyster fisheries in Europe. In 1978, 450 vessels harvested 15 million oysters, however, in 2007, populations collapsed and have not recovered since and the fishery has been closed since 2013.

Condition

As noted above, native oyster reefs in the Solent are absent. The invasive Pacific oysters are however widespread in the Solent, and they (and other invasive species) often occupy areas where native oysters could historically be found.

5 Animals

5.1 Overview

The Solent is home to a large variety of animals which depend on the marine and coastal habitats which are found here. The Solent is very important for overwintering marine and coastal birds, feeding mainly on the invertebrates found in the mud. Many birds also stay in the region during other seasons, and important seabird breeding colonies can be found here. A small Common Seal colony is present within the Solent, and several other marine mammals pass through the region. A wide variety of fish can be found, with the harbours and estuaries being of particular importance to juvenile fish, and also as corridors for migratory fish.

5.2 Key animal groups of the Solent – focus on birds, mammals and fish

The status and trends of key marine and coastal animal groups found in the Solent are summarised in the table below, and further explained thereafter.

5.2.1 Birds

Numbers and species

The Solent is of international, national and regional significance for birds; its estuaries and harbours attract over 150,000 birds of 160 species.



Table NTS2 Numbers, trends and condition for the key animal groups of the Solent

Key habitat	Current numbers	Historic trend	Future trend (without restoration/ further action)	Current condition of majority of Solent population
Non-breeding marine and coastal birds	163,000 (5-year mean peaks, summed)	↓	↓	Mixed
Breeding seabirds (gulls and terns)	11,700 (observed adults on nest, 2023)	↓	↓	Mixed
Fish	Unknown	↓	Unknown	Unknown
Seals	80 (Harbour Seals, Solent colony); Grey Seals (visiting) unknown	Recent (30 years): ↑ Further back: ↓	Unknown	Unknown

The birds which frequent the Solent can be split into three groups:

1. Waterfowl (ducks, geese and swans);
2. Waders (birds which wade along shorelines and mudflats to forage for food);
3. Seabirds (birds that live most of their life on or near the sea; in the Solent, this mainly applies to tern and gull species).

Many of these birds are present in the Solent year round, and some breed here. However, the highest numbers are seen in the winter, when thousands of birds migrate here to feed on the rich mudflats and other habitats in relatively mild weather (when compared to their Arctic summer grounds). These

'non-breeding' birds have long been monitored by British bird enthusiasts and organisations, as part of the Wetlands Bird Survey (WeBS) counts³. For these monthly surveys, numbers observed are logged, and the averages of the highest numbers seen ('mean peaks') are published.

Further detail on each of the three groups is provided below, and a graph showing summed peak numbers for non-breeding birds across the Solent is also shown (expressed as an average (mean) of numbers observed over the past five years of counts, and derived from WeBS counts). These birds are found throughout the Solent, though **Chichester and Langstone Harbours are particularly important, with around 45% of the non-breeding marine and coastal birds found here** during recent count periods.

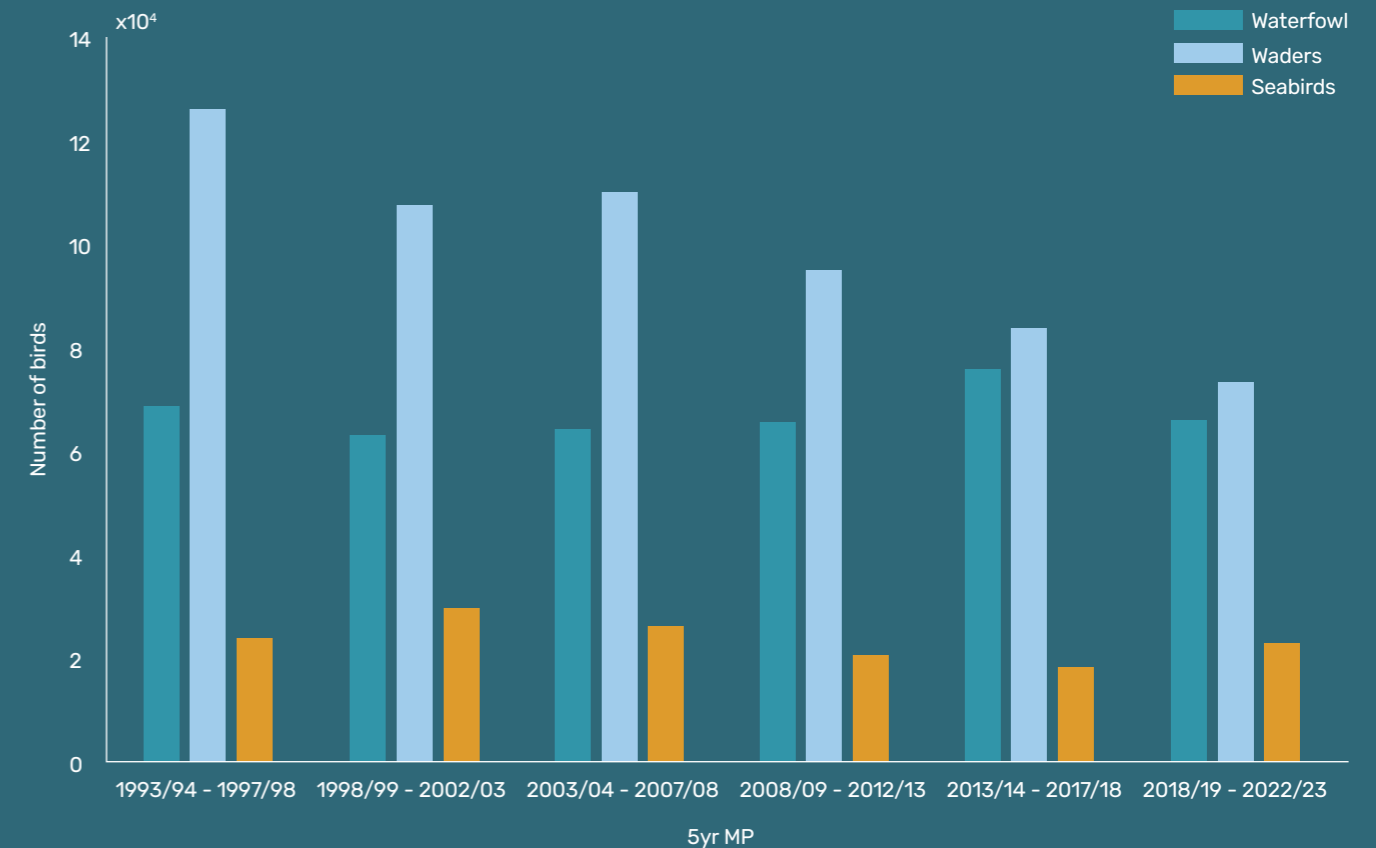


Image NTS3. Solent non-breeding bird numbers; 5-yearly mean peaks (MP) since 1993/94 (by bird group)⁴

³WeBS data is collated by the British Trust for Ornithology (BTO), in collaboration with various other bodies and many volunteers. WeBS surveyors regularly monitor the UK's internationally important non-breeding waterbirds. Counting is done once a month, at high tide, and generally year-round; although the core counting season is September to March. Only birds seen or heard are recorded.

⁴Expressed in 10,000s (104); created by ABPmer, based on WeBS survey data.



60%

of the world's population of
Dark-bellied Brent Geese
can be found in the Solent
by January each year.

Waterfowl: Waterfowl numbers in the Solent typically peak at between 65,000 and 70,000 birds every year, with numbers being particularly high in the winter, though many species are also present during other seasons. Just over 70 coastal and marine waterfowl species are regularly observed; examples include:

- **Dark-bellied Brent Geese; the Solent region supports one of the largest wintering populations of these birds in the UK and is of international importance for this species. By January each year, around 28,000 individuals, or 6 per cent of the world's population, can be found in the Solent.** Dark-bellied Brent Geese are widespread in the region and feed in the intertidal zone (on seagrass and green algae), as well as on nearby grazing marsh, grassland, and arable fields.
- Dabbling ducks such as Wigeon, Teal, Pintail and Mallard; these duck species are often seen in sheltered locations such as upper sections of estuaries, lagoons, creeks, and sheltered channels, as well as freshwater pools and ponds near the coast. Species with peaks in excess of 1,000 birds include:
 - Wigeon, whose numbers round up to around 13,000 birds in the region; this species is mainly present in winter, feeding on coastal grassland habitat;
 - Shelduck, whose numbers typically peak at just under 2,000; this species is particularly reliant on mudflat habitat, and feeds on mud snails, cockles and ragworms; and

- Pintail, which typically have peak numbers of around 1,300, and are found in sheltered estuary and harbour locations.

Some of these marine and coastal waterfowl species also breed in the Solent; this includes Shelduck, Shoveler, Gadwall and Teal.

Wading birds: These now peak at around 80,000 birds every winter in the Solent, with the intertidal mudflats of the region being particularly important feeding habitats. A wide variety of waders can be found, with most of them visiting the region in particularly high numbers over the winter. However, some species, such as Lapwing, Redshank and Bar-tailed Godwit, can be found year-round. Around 60 species are regularly observed; notably:

- **There are nationally important populations of Dunlin (peaking at around 33,000 per annum recently), Redshank (4,300), Black-tailed Godwit (3,300), Curlew (3,800), Grey Plover (3,100), and Sanderling (600);** most of these are observed throughout the Solent
- There are also large numbers of other species such as Ringed Plover (1,500), Knot (1,900), Bar-tailed Godwit (500) and Turnstone (1,400).

Some of these waders are also known to breed in the region; this includes Avocet, Lapwing, Redshank, Ringed Plover and Oystercatchers. For example, in 2022, at least 55 breeding territories of Ringed Plover were found across 24 sites in the region, often in precarious shingle beach locations. Efforts are underway to protect the nests of Ringed Plover (and other vulnerable breeding coastal birds).

over **11,500**

pairs of seabirds bred in the solent region in 2023

Two Roseate Tern adults successfully raised two chicks in the Solent in 2024; the first Roseate Tern breeding success in the Solent in over 15 years.

Seabirds: Count data is available for both breeding and non-breeding seabirds.

The Solent is also an important location for breeding seabirds. Over 11,500 pairs of seabirds bred in the Solent region in 2023, with varying productivity / breeding success.

- Gull species accounted for the largest percentage of this, with 8,645 pairs of Black-headed Gull adults observed on nests in 2023, followed by Mediterranean Gulls (2,218). Whilst exact annual breeding abundance trends are not known, it has been estimated that the Solent breeding Mediterranean Gull population represents the overwhelming majority of the UK and Ireland population, likely well over 90% in any given year.
- 484 Sandwich Tern nesting attempts were recorded in 2023, followed by 317 for Common Terns and 57 for Little Terns. In addition, in 2024, two Roseate Tern adults successfully raised two chicks in the Solent; this was the first Roseate Tern breeding success in the Solent in over 15 years, and was the result of concerted efforts by conservation bodies.

Breeding locations are often precarious for most of the Solent's breeding seabirds (and indeed waders breeding in similar habitats); for example:

- Herring Gull and Lesser Black-backed Gulls mostly breed in urban areas in the region. They prefer to nest on non-smooth corrugated iron-type flat roofs. Deterrents are frequently used to prevent them from nesting at such sites;
- Black-backed and Mediterranean Gulls, as well as Sandwich Terns mostly breed on saltmarsh and lagoon islands in the region. These can be subject to disturbance and are generally threatened by erosion and/or sea level rise; and
- A lot of Common Terns in the Solent rely on tern rafts for breeding, but also lagoon islands and offshore islands. Tern rafts need to be regularly maintained and reconstructed, and many of the Solent's shingle islands are relatively low lying and could benefit from raising to stop nests from being washed out (some have been raised already, see 'restoration and management' section below).

Trends

Numbers of many of the Solent's bird species are declining, some rapidly, and often declines are due to reasons which originate elsewhere. Most notably, **the numbers of non-breeding waders in the Solent have seen a large decline over the last 30 years (almost 60%)**, especially Ringed Plover, Bar-tailed Godwit, Sanderling and Ruff. Numbers of other species such as Black-tailed Godwit, Redshank and Oystercatcher have generally been more stable. Trends for breeding waders are not known due to a lack of longer term monitoring data for this category of birds.

Waterfowl numbers have been relatively stable over the past 30 years, though some species have seen declines across the region, especially Shelduck and Red-breasted Merganser.

Historic data in the Solent is often inconsistent or incomplete, especially for breeding seabirds; however, it is believed that the Solent is broadly following national trends. **Across the UK, since the late 1990s, breeding seabird numbers have declined by 28%, on average.** In the Solent, seabird breeding success is frequently quite low, and not generally high enough to sustain, or even grow, populations.

Condition

Condition information on birds is not consistent across the Solent, and where condition assessments are available, the conclusions are mixed, i.e. both favourable and unfavourable. Efforts are underway, or planned, to provide assessments for more sites and their bird features. Where unfavourable conditions have been identified, then coastal squeeze and erosion, recreational disturbance and nutrient enrichment / water pollution were the reasons most commonly cited for causing such a state.

Predation by foxes and predatory birds is furthermore known to often devastate breeding bird colonies in the Solent. In the last few years, bird flu (Highly Pathogenic Avian Influenza) has also emerged as a major threat to all marine birds, but breeding seabirds in particular. In Hampshire, Black-headed Gulls and Common and Sandwich Terns all appear to have been severely impacted.

5.2.2 Marine, estuarine and migratory fish and shellfish

Numbers and species

Many fish are found in the Solent's estuaries and harbours, and some of these migrate through to the rivers of the region; including Atlantic Salmon, Sea Trout and European Eel. Atlantic Salmon are only found on the Rivers Test and Itchen. All the eastern harbours of the Solent, as well as Southampton Water, are designated bass nursery areas.

Over 50 species of fish are observed in the estuaries and harbours of the Solent, with clupeidae (Herrings, Shads, Sardines, Menhadens) being the most abundant family group, followed by Atherinidae (Silver Sides / Sand Smelt) (30%) and moronidae (Bass).

Away from the estuaries and harbours, other fish species will be observed, although reporting on this can be quite sparse. The South Coast region is, however, known to support a diverse array of bottom-dwelling and pelagic fish and shellfish. Among the most characteristic are Black Sea Bream, Plaice, Smoothhound, Mackerel and Sprat (also known as whitebait).

The Solent supports a wide range of shellfish species, including important commercial species typical to the UK such as Whelk, King Scallop, Lobsters, crabs, and cuttlefish. Cockles and clams (particularly Manila Clam) are common along the region's sandy beaches and muddy estuaries.

The Solent and Isle of Wight area have also been highlighted as a shark and ray hotspot, and provides a pupping ground for Smoothhound, Tope and possibly Thresher Shark.

Many other fish also spawn here (i.e. produce offspring), including Dover and Lemon Sole, Cod and Plaice.

The Solent, and particularly its harbours and estuaries, is also a vitally important nursery ground (i.e. sheltered habitat for juveniles) for many fish, shark and ray species. For example, most of the easterly harbours, and Southampton Water, are protected Bass nursery areas. Nursery grounds for many other fish species have been identified in the area, including Mackerel, Plaice, Lemon and Dover Sole. Juvenile Thornback and Undulate Ray and Tope shark are also found in the Solent.

Many fish also migrate through to (and from) the rivers of the region; including Atlantic Salmon, Sea Trout and European Eel. Atlantic Salmon are only found on the Rivers Test and Itchen in the Solent. Sea Trout and European Eel are observed in many rivers of the Solent, essentially all those rivers where there are no significant obstructions to the sea to stop them from migrating in and out. Rare migrants, which probably used to be present in larger numbers, include River and Sea Lamprey and Twaite Shad.

Trends

There have not been many studies on fish trends in the Solent, although it is not disputed that there would have been many more fish species and much higher numbers in the distant past, before industrial fishing commenced and water quality drastically deteriorated in the late 19th century.

A recent study led by the University of Portsmouth⁵ shows that, in the region's estuaries and harbours, there has also been a significant recent decline in fish abundance over the past two decades, with most of the (14) study sites having seen decreased total fish numbers.

Detailed monitoring data is available from the region's two salmon rivers, the Test and the Itchen. This reveals that Atlantic Salmon numbers are far below the conservation limits in both the Test

Over **50** species of fish are observed in the estuaries and harbours of the Solent



and the Itchen, which means numbers are well below the abundance levels which the rivers should support. **The Solent's Atlantic Salmon stock is considered to be at risk.** Reasons for this are believed to include low river flows, high water temperatures and water pollution (with continuous outflow from a sewage plant at Portswood/Southampton having been highlighted as problematic, amongst others).

European Eel numbers have also collapsed in the Solent, and those of middle aged and older eels are particularly low. In addition, eels are not found as high up the rivers as they used to be. There are many reasons for the collapse and

continuing decline of European Eel numbers, including obstructions on rivers, pollution, parasites and diseases, and overfishing elsewhere (European Eels migrate a long way to and from their spawning ground in the western Atlantic near Bermuda (an area known as the Sargasso Sea)).

Sea Trout go against a declining migratory fish trend in the Solent, for reasons which are not entirely understood. The trend here also contravenes other regions in the UK, where numbers are falling markedly. In the Solent, numbers are increasing, and indications for 2024 are for a boom in numbers; this is likely related to above average river flows in combination with a cool spring.

⁵ Morrall, Z., Hendy, I., Craig, H., Watson, G., and Preston, J. (2024) Assessing baselines for restoration: evaluating trends in abundance, functional guild and dominant species in Solent Fish populations. Poster displayed at the 2024 ReMeMaRe Conference in July 2024, Scarborough.

5.2.3 Marine mammals

Numbers and species

The Solent is home to a small colony of Harbour Seals; apart from that, other marine mammals pass through but are not residents. Bottlenose Dolphin and Grey Seals are the most commonly spotted other mammals in the region, with sightings generally increasing over recent years. Less common, but occasionally spotted visitors include Harbour Porpoise and Common Dolphins.

Seals were first reported to have recolonised the Solent in 1994. The population has continued to increase ever since, and there are now estimated to be around 80 individuals in this colony. Harbour Seals give birth from late June to late July. Over the past nine years, the number of pups born has varied between six and 14, with 2022 seeing the highest number of births to date. In 2023, one Harbour Seal pup was counted in Langstone Harbour for the first time. These seals are not only seen in Chichester and Langstone Harbours, but also elsewhere across the Solent as they roam and forage for food. Over the past decade, Newtown Harbour on the Isle of Wight has become established as another site where Harbour Seals frequently 'haul out' in the Solent, i.e. where they rest and sleep.



Grey Seals normally only visit the Solent (rather than living here permanently), although they do so quite frequently, and they haul out at similar locations to the resident Harbour Seals. In March 2024, in what is believed to be the first of its kind in the Solent, a Grey Seal pup was born on the Beaulieu Estuary.

Trends

Seal numbers are increasing in the Solent, with the resident Harbour Seal numbers having gone from 0 in the early 1990s to around 80 today, and numbers having more than tripled in the last decade. Grey Seals also visit the area more. The image below illustrates trends of observed numbers over the past decade.

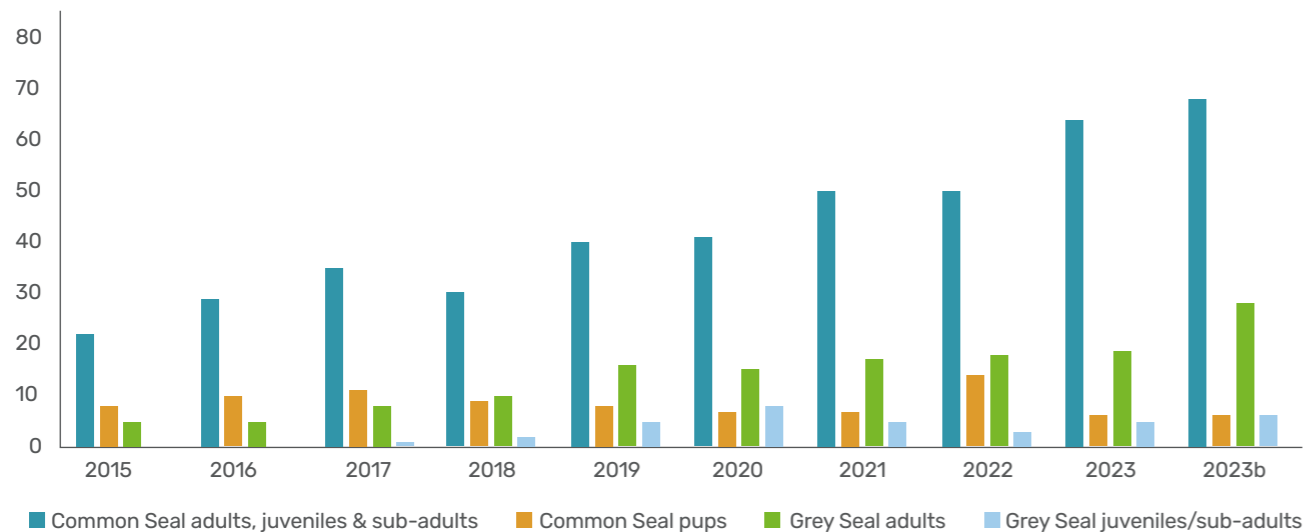


Image NTS4. Combined peak counts for Chichester and Langstone Harbours 2015 to 2023 (2023b are values including Newtown Harbour counts for 2023)

The Solent is known as a key entry point for non-native species into the UK due to its high volumes of international shipping and recreational boating.

5.2.4 Other animals and species

In addition to the key animal species discussed above, the Solent is of course home to many further animals from other groups.

There are for example many species of 'invertebrates' (animals without a backbone) which live on and in the marine sediments of the Solent. For example, many worms live in the mudflats of the region, and provide food for fish and birds; this includes bristleworms, ragworms and catworms. Marine invertebrate communities are generally judged to be in good or moderate condition in the Solent, where condition has been assessed (invertebrate condition has not been formally assessed for nine of the smaller waterbodies in the region).

The waters of the Solent also hold a rich planktonic life. Plankton comprise a wide range of organisms (not just animals) which live at least part of their lives drifting in the water column. Their size ranges from that of a single bacterium to big jelly fish. In the Solent, plankton includes millions of larvae of crustaceans which, as adults, live on the sea floor as crabs and prawns. A recent quality status report for the North Atlantic region, which includes the UK,

reveals that trends vary amongst the different groups of plankton. **Small copepods, a category of zooplankton that serve as vital prey for larval fish, have exhibited long-term increases in abundance in many coastal regions, but not the Solent.** Additionally, the population of planktonic larvae, such as sea urchins and crustaceans, has risen in most regions, correlating with increasing sea temperatures. This includes the Solent, and another plankton category, large copepods appear to also have seen modest increases in this region. **Weak decreases are mapped for the Solent for the four other plankton categories, dinoflagellates (phytoplankton), diatoms (phytoplankton), small copepods and holoplankton (zooplankton).**

Biological invasions by non-native species also represent a key threat to biodiversity in the Solent. The Solent is known as a key entry point for such species into the UK due to its high volumes of international shipping and recreational boating. Many non-native species are found in the Solent, including Slipper Limpet, Pacific Oyster and several species of sea squirt. Trends are still increasing in both the number of species observed (though at slower rates than in the past), and likely also the area these species cover.





6 Human activities and pressures

6.1 Human activities

6.1.1 Population

The Solent is home to a large number of people, it has a population of just under 1.3 million (population of the nine unitary/local authority areas which are next to the Solent). **This population is growing. Over the past decade, increases have been seen**

in all the counties which share a boundary with the Solent, with the population of West Sussex growing the most, by almost 9% between 2011 and 2021, and the Isle of Wight seeing more modest increases of just under 2% (see image below).

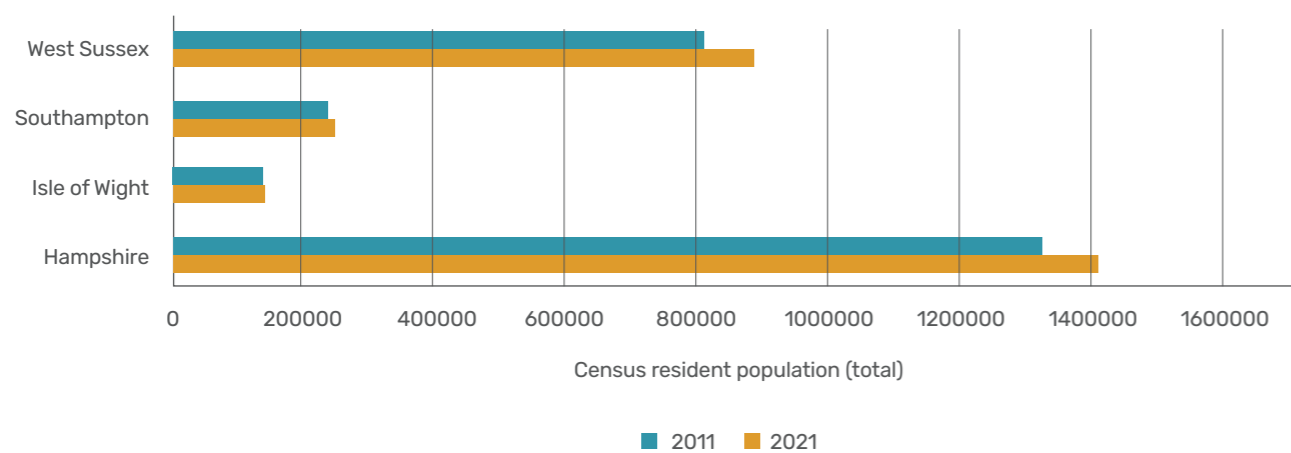


Image NTS5. Resident population of the bordering counties, 2011 and 2021 census total

6.1.2 Shipping and navigational dredging

Ports are vital to the UK economy, with 95% (by volume) of all imports and exports transported by sea. In the Solent, activity centres on the ports of Southampton and Portsmouth. Cowes Harbour is the main port for the Isle of Wight, and the only location on the Island with deep-water channels capable of handling bulk-cargo carrying ships. For example, over the past two decades, movements to and from the Port of Southampton terminals have averaged between 43,000 and 70,000 per year.

Southampton is also the main cruise ship calling point in the UK, with over 80% of the nation's cruise traffic typically passing through Southampton. For example, in 2023, 87% of the cruise traffic passed through Southampton, with record passenger numbers of 2.6 million observed.

Shipping intensity to and from these ports is high, with most of the traffic exiting and entering the Solent to the east, via the Nab Channel, though substantial traffic also navigates through the Needles Channel which lies between the western tip of the Isle of Wight and the mainland (see figure below).

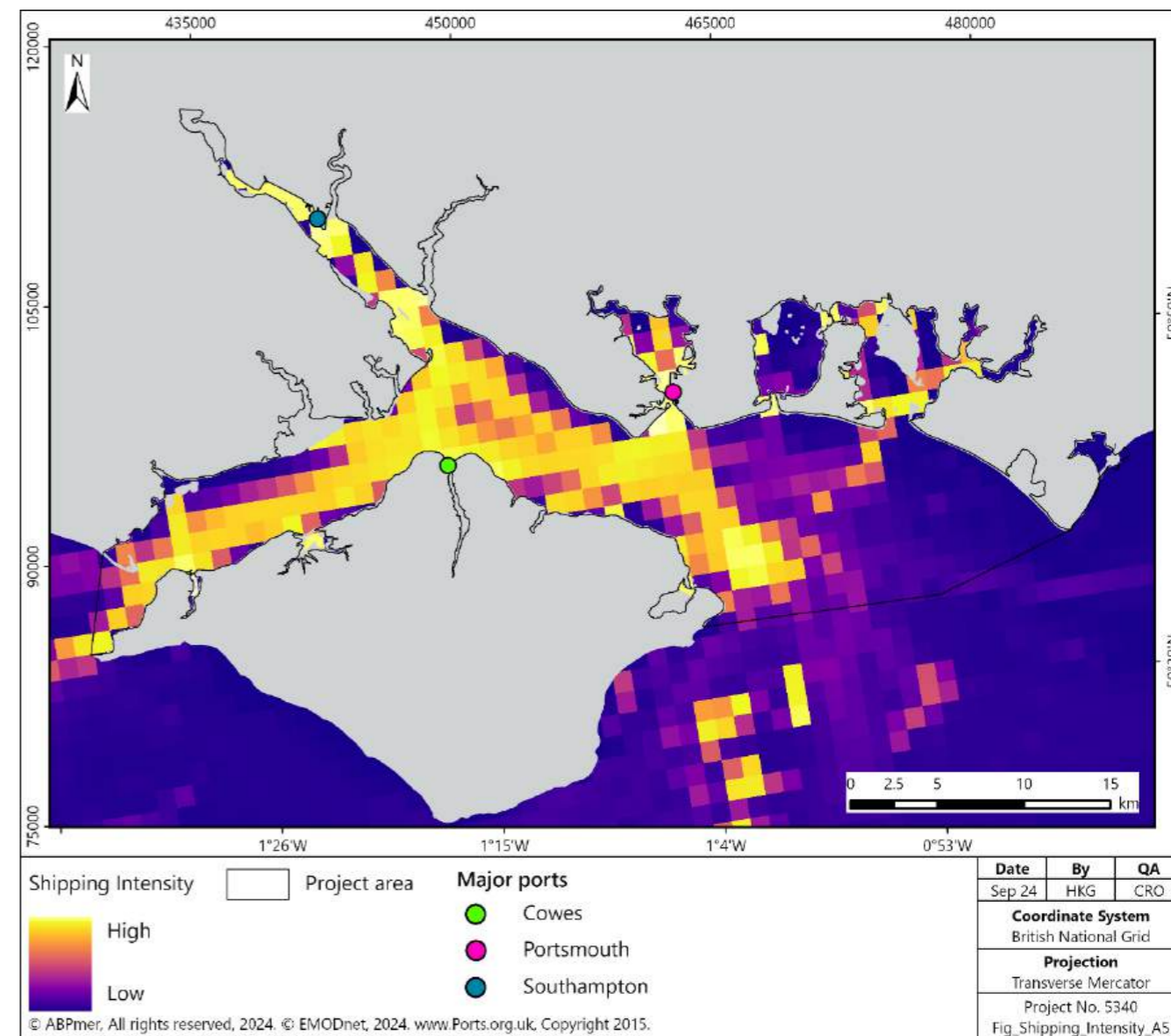


Figure NTS5. Shipping intensity in the Solent region

Dredging for navigation occurs over substantial proportions of the marine environment in the Solent, with around a quarter of the marine area subject to active dredging licences. **Large amounts of sediments are dredged every year, and deposited at offshore disposal sites; mostly the Nab Tower site east of the Isle of Wight. Between 2012 and 2022, just over 15,500,000 wet tonnes were deposited here.** Dredged sediments can be used beneficially to reshape shorelines and to protect and restore coastal and estuarine habitats such as mudflat and saltmarsh. However, only a very small percentage of the dredged sediment is used that way, although the Solent is home to a relatively high number of such projects.

6.1.3 Industry and military

There are many marine industries in the Solent, often related to the shipping and navigational activities in the region, as well as the fact that the Solent is an internationally renowned location for sailing and other water sports.

The petrochemical industry is of particular importance to the region, with the largest refinery in the UK being located at Fawley on Southampton Water. This facility processes around 270,000 barrels of crude oil a day and provides 20 per cent of UK refinery capacity. Over 2,000 ship movements are handled by Fawley refinery every year.

Military use of the Solent is of substantial economic importance to the region, and centres primarily on the naval base at Portsmouth Harbour and Marchwood Military Port. Portsmouth Harbour is the traditional home of the Royal Navy, is the base port for the majority of the Navy's surface warships, including aircraft carriers, and is also the major naval stores distribution centre in the UK.

6.1.4 Flood risk management

The construction of hard defences around parts of England's coast has provided coastal communities,



farmland, and infrastructure with valuable protection from flooding and erosion. **Around 45% of the Solent's shoreline is defended with hard defence structures.** Coastal defence techniques frequently involve groynes and breakwaters, often backed by concrete seawalls, with less exposed frontages in the estuaries and harbours generally protected by earth embankments. Numerous flood and erosion risk management programmes are underway or in development in the region, including for example the Hurst Spit to Lymington Flood and Coastal Risk Management Strategy, the Southsea Coastal Scheme, and the North Portsea Coastal scheme.

Where there are hard defences such as embankments and seawalls in place, this can cause 'coastal squeeze' which happens where the landward movement of saltmarshes and other intertidal habitats is prevented by human structures. In England, some of those losses are already being compensated for in line with the requirements of the 2017 Habitats Regulations. For example, the 300 ha Medmerry managed realignment west of Selsey was implemented as such a compensation scheme in 2011.

Between 2012 and 2022, over 15.5 million tonnes of sediment was dumped at a site east of the Isle of Wight.

6.1.5 Fisheries

Commercial fishing

There is a relatively small commercial fishing fleet in the Solent, with 49 boats registered at harbours in the region; 31 of those in Portsmouth. **Numbers are much reduced these days, for example, fishing vessel numbers halved over the past decade.** The boats based in the Solent mainly target shellfish, with whelk, clam and crab being the top three most caught commercial species in the region. Most of the fish tend to be caught outside of the Solent itself, although some low intensity fishing takes place in the region, where this is permitted. There are many byelaws (local laws) in place to support sustainable fishing throughout much of the Solent, both to protect stocks and sensitive habitats and species. For example, net fishing, trawling and oyster dredging are heavily restricted in many locations.

Hand gathering

Hand gathering encompasses both bait digging (for fishing), mainly by recreational anglers (for ragworm, for example), and the collection of clams, cockles or other bivalves for consumption. Bait digging is theoretically only allowed for personal use/consumption in most locations, but illegal collection is believed to take place in several locations; this can, however, be difficult to prove. Bait diggers typically use a garden fork to turn over the sediment to then pick worms out by hand.

Bait digging is widespread throughout the Solent, with hotspots found in Chichester Harbour (Fishbourne Channel especially), Portsmouth Harbour (Fareham Creek) and the Hamble. The collection of bivalves for consumption is particularly pronounced in Chichester Harbour, where it is of concern in the Bosham, Dell Quay and Prinstead areas.

Recreational fishing

The South Coast region has a well-established and popular recreational fishery due to its population density, as well as good accessibility and numerous sheltered areas. It attracts recreational shore and boat anglers all year round, the vast majority of which are line anglers. Many marinas, ports and harbours support numerous smaller boats which are used by casual hobby fisherman.

Marinas, harbours, breakwaters, piers and beaches also offer easily accessible shoreline fishing areas, and this takes place throughout the Solent.

6.1.6 Recreation

Recreation can be counted as the Solent's most significant activity in terms of the number of people which take part. At least twenty different activities take place, each with its own characteristic distribution and pattern of use. Tourism is also significant, particularly for the Isle of Wight. On the Hampshire coast, there are fewer long stay visitors, but the number of day and short stay visitors is significant.

In addition, many people enjoy the coast for the region's beaches and harbour and estuary shorelines, with over 200 car parks being at or near the coast, and the vast majority of the shoreline being accessible to walkers. Only very few quiet and inaccessible shorelines remain, most of these are found along the northwest Solent and on the Isle of Wight.

The Solent is one of the most densely populated sailing areas in the world and enjoys an international reputation. There are approximately 24,000 moorings and marina berths in the area, with at least 69 marinas located in the Solent study area.



Recreational activities have many effects on the marine environment

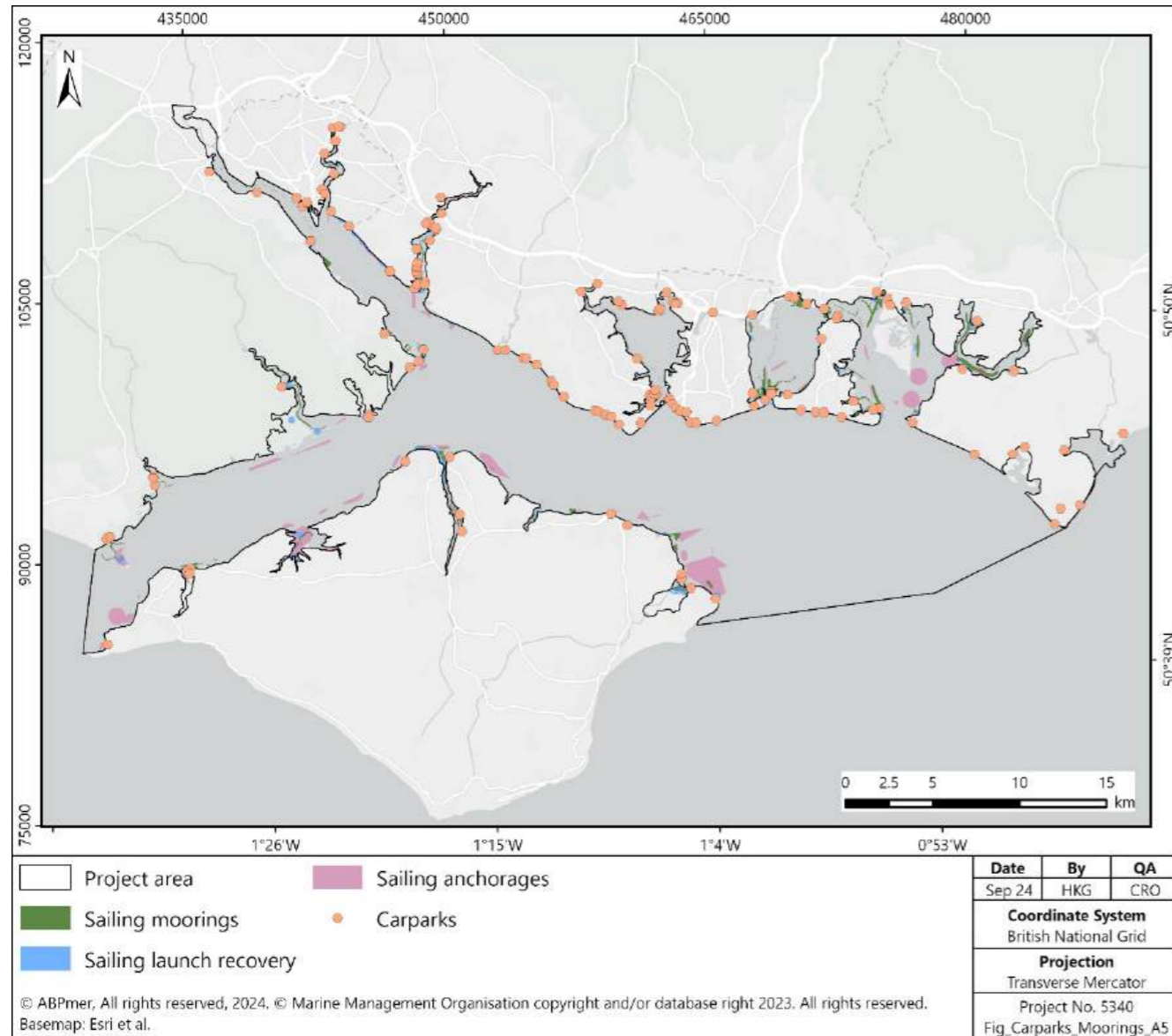


Figure NTS6. Sailing moorings, anchorages and recovery areas, also car parks, in the region

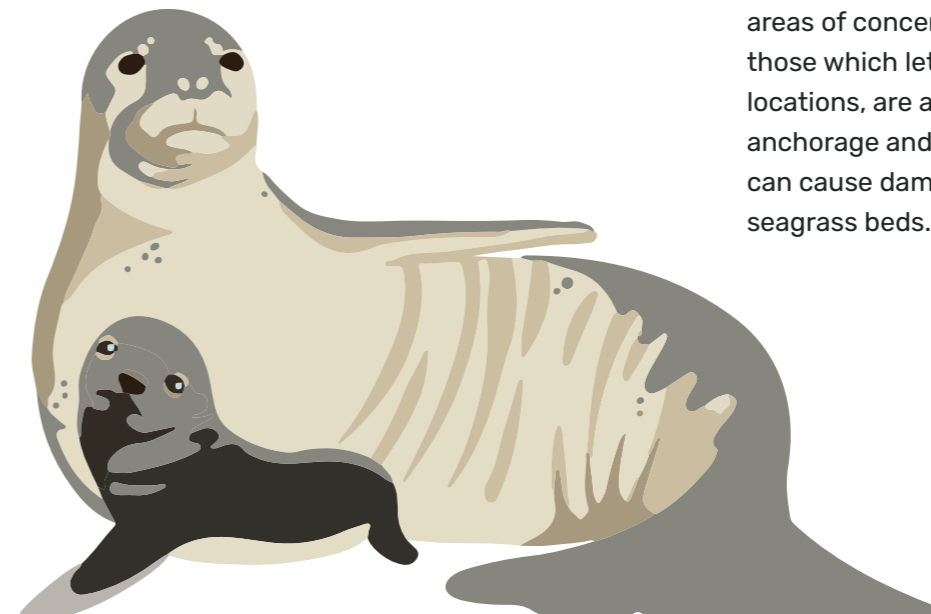
Paddle sports and wind sports have also been practiced for many years, but have grown in popularity recently, with the introduction of paddle boards and new wind sports such as wind foiling. Paddle sports, mostly rowing, kayaking and paddle boarding, are popular in most estuaries and harbours, as well as along many of the beaches. Particular paddle sports hot spots include the Hamble and Beaulieu estuaries, as well as Calshot and the upper reaches of the Emsworth Channel in Chichester Harbour. Wind and kite surfing is mostly practiced along the popular beaches of the region, notably Bracklesham, Stubbington to Gosport, around Calshot and at Hurst Spit. Some within estuary and harbour windsurfing and wind foiling also takes place, for example at Netley in Southampton Water and in the Emsworth Channel in Chichester Harbour.

6.1.7 Potential impacts on nature

These activities lead to a lot of pressures on the coastal and marine environment.

For example, shipping causes air, water, noise and light pollution which can all affect the marine environment. Southampton Water and the eastern Solent are particularly noisy underwater areas. Some bottom towed fishing practices such as trawling can destroy seabed habitats such as kelp and seagrasses, and fishing can also deplete some species. Bait digging and hand gathering of shellfish is also considered to be problematic for nature in many areas of the Solent as these activities can cause trampling of habitats and disturbance to birds.

Recreational activities have many effects on the marine environment, with disturbance of wintering and breeding birds, but also seals, being key areas of concern. Dog walkers, and particularly those which let their dogs off leads near sensitive locations, are a key issue in the Solent. Boat anchorage and mooring is also of concern, as this can cause damage to seabed habitats such as seagrass beds.



6.2 Pollution

Pollutants originating from various sources lead to significant pressures on the Solent's coastal and marine ecosystems. It is estimated that approximately 80% of marine pollution is derived from land-based sources. Contaminants entering rivers and streams (from agricultural activities, stormwater overflows, wastewater treatment facilities, urban area runoff, and industrial facilities) are carried downstream into estuaries and coastal waters, leading to a large variety of adverse effects on ecosystems and wildlife.

6.2.1 Sewage overflows and sewage plant discharges

Storm overflows from the sewage system very frequently discharge into the Solent or its catchment rivers. **Over the past two years, there have been almost 100,000 hours of storm overflow discharge into the Solent or its catchment rivers.**

There are 36 sewage treatment plants to be found along the rivers and shores which are attributed to the Solent region and its catchments. Many of the plants on the Solent are likely to be relatively high emitters of bacteria and nutrients, as indicated by the fact that 32 of the region's water treatment plants are considered to require urgent improvements (including Portswood). This is in relation to nutrients; all **32 require improvements** for nitrogen, but four plants also require works to reduce phosphorus emissions.

100,000
hours of storm overflow have been discharged into the Solent or its catchment rivers over the past two years

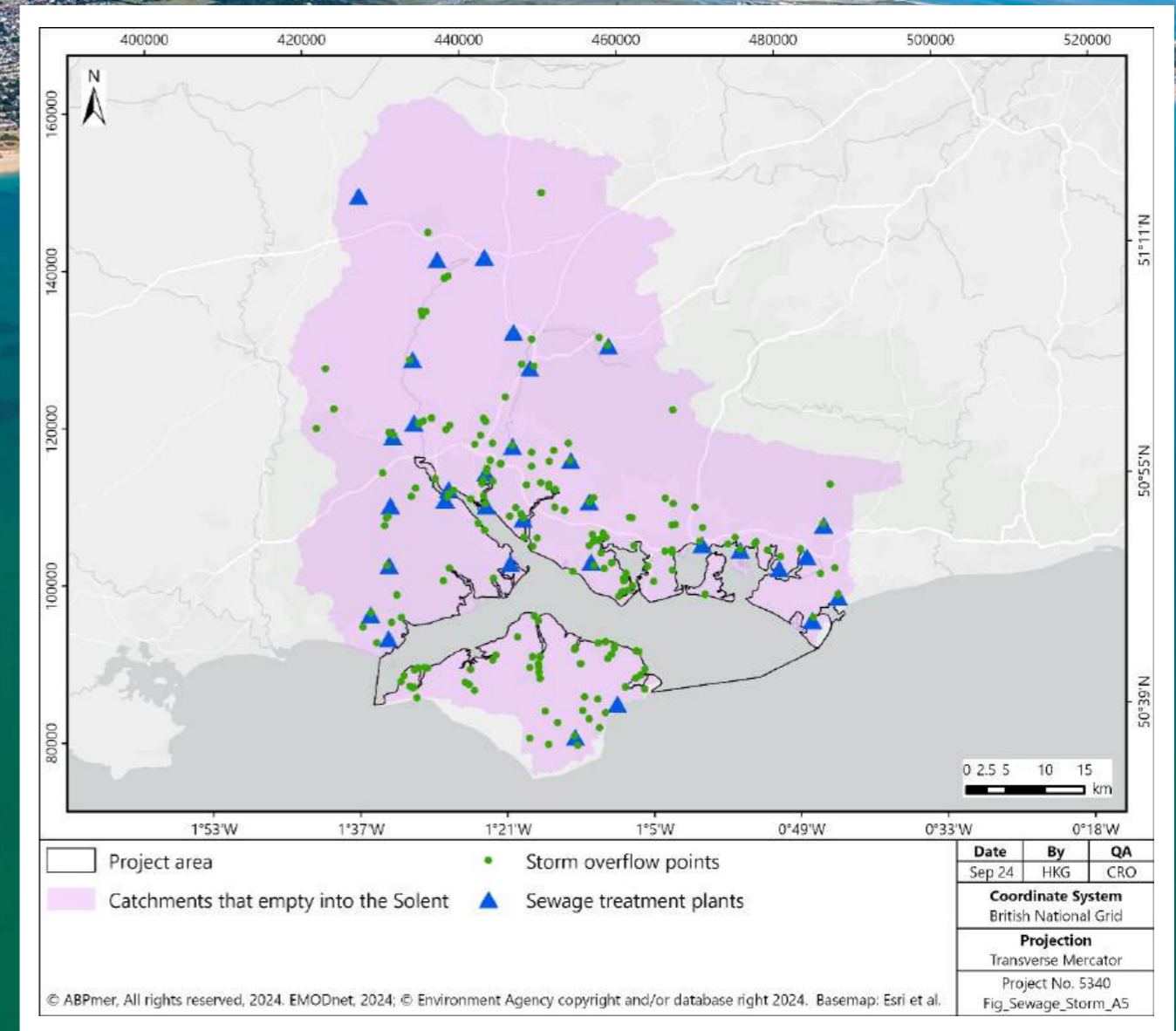
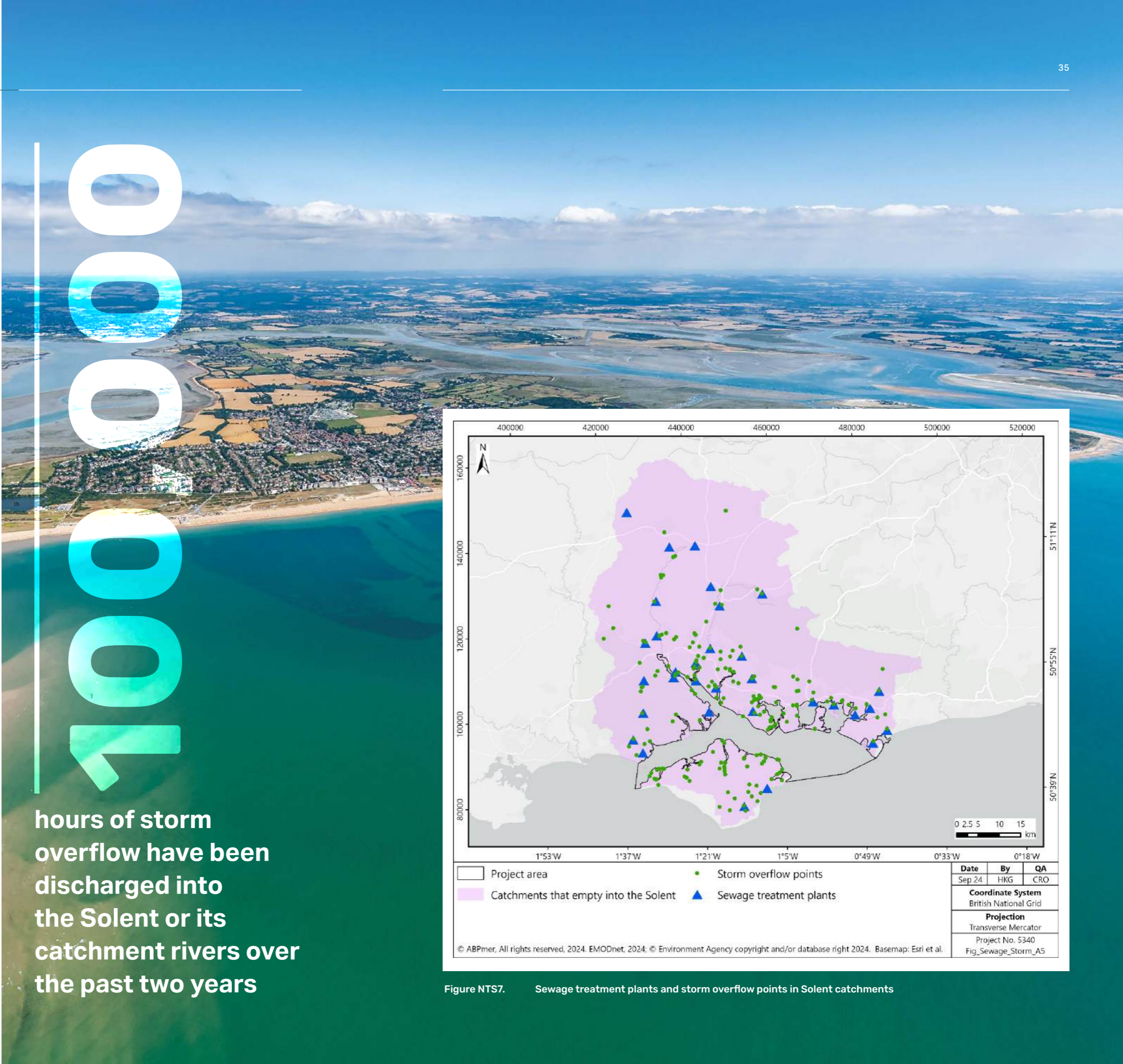


Figure NTS7. Sewage treatment plants and storm overflow points in Solent catchments

6.2.2 Eutrophication and nutrient monitoring

Eutrophication occurs where increased nutrients, especially nitrogen, in the water result in too much plant growth, seen in the Solent as harmful green macroalgal mats which often cover intertidal mudflats and other habitats.

The main sources of nitrogen to Solent estuaries are agriculture (about 50% of nitrogen is estimated to be from agriculture, often via rivers), followed by point sources from sewage discharges (about 10% of nitrogen is estimated to be from sewage).

A 2023 eutrophication report by the Environment Agency⁶ concluded that there had been a reduction in the amount of macroalgae within the estuaries of the Solent, compared to the previous two decades, and that recovery from eutrophication, in parts of the Solent, was well underway. This was attributed to schemes which encourage changes in farming practices and also improvements to water treatment plants. It was acknowledged that further work was needed however.

A 2023 study by the University of Portsmouth⁷ which analysed data from hundreds of water quality monitoring stations has however claimed that the Solent's water quality had not improved in 25 years, which it stated does 'not support current [Environment Agency] eutrophication assessments'.

6.2.3 Sediment contamination

The Solent's sediments are often contaminated with harmful substances which can have a long 'shelf life'. This includes heavy metals, pesticides, and other chemical products.

A 2022 study by the University of Portsmouth⁸ which analysed available government sediment contamination monitoring data, found that **trace element contamination markedly declined up to the 1980s**. This was mostly due to improved waste treatment and increased recycling. However, **improvements have slowed in the past three decades**, and in fact a distinct increase in some elements can be seen after 2010. **Increasing levels of pollution were found for nickel and iron** (but still at low pollution levels). Copper pollution is considered to be at moderate levels, and **copper pollution has steadily worsened since the mid-1990s**. Ship antifouling paints, ship scrubbers and sacrificial anodes were considered to be substantial causes for increases in some trace elements, notably copper, zinc and nickel. It was estimated that the following quantities are being added to the Solent every year:

- 94 tonnes of copper (mainly due to antifouling paint, but also ship scrubbers (exhaust gas cleaning system));
- 377 tonnes of zinc (mainly from anodes (metal blocks mounted to ship hulls to help protect against erosion), but also scrubbing and anti-fouling); and
- 0.2 tonnes of nickel (scrubbers).

Over **140**

existing and historic landfills are found along the Solent's shores

6.2.4 Other pollution issues

In addition to the above, **there are many other causes of pollution in the Solent**. For example, over 140 existing and historic landfills are found along the Solent's shores; these are often releasing waste into the system, or are at high risk of doing so due to deterioration of defences.

There is also a lot of abandoned debris in the Solent, including from abandoned structures such as pipes or jetties, abandoned boats and fly tipping. In addition, litter is a substantial issue, with most of the input of marine plastic litter (80%) being from land-based sources (including littering on beaches or from sewage systems or rivers). About 20% is from marine sources; predominantly from the fishing industry (e.g. nets and buoys).

6.2.5 Potential impacts on nature

Poor water and sediment quality negatively affect many species and habitats, and results from a wide variety of factors, as set out above. These can cause many issues for the Solent's nature.

High nutrient inputs to estuaries and coastal waters can lead to problem levels of growth of macroalgae in some locations. These can smother habitats and animals and also stop birds and fish from feeding effectively. There can also be wider ecological effects because of impacts from excess nutrients on plankton and other animal communities.

There is also growing recognition and understanding of the threats posed by chemical and heavy metal pollution to coastal and marine environments. Many of the substances which are still being added to the marine environment, or are still present due to historic build up, have been identified as potentially dangerous to marine life. However, there is not enough evidence on what levels of the many different pollutants can cause damage to biodiversity.

⁶ Environment Agency (2023) Overview of Solent Eutrophication and Recovery V3 – Marine Team (Analysis & Reporting). Koenker, R., 2019. Quantreg: Quantile Regression. Environment Agency, 15p.

⁷ Watson, G., Preston, J., van der Schatte, O., and Richir, J. (2023) 25 years of water quality data: mining databases to see if things have really got better. Poster displayed at the 2023 ReMeMaRe Conference in July 2023, Scarborough.

⁸ Richir, J., Bray, S., McAleese, T. and Watson, G. (2021) Three decades of trace element sediment contamination: The mining of governmental databases and the need to address hidden sources for clean and healthy seas. Environment International 149 (2021) 106362, 12p.



6.3 Climate change

Climate change is already impacting the Solent, and this will only get worse in the future. The intensity of these effects will vary both in time and space, but key physical changes will include changes in water temperature, sea level rise, and variations in salinity. These can have many potential impacts on the Solent's nature, including changes in the distribution of animals and plants.

Sea level rise in particular is already impacting the Solent's nature, and is projected to get worse. In Southampton for example, sea level rise is now on average almost 4 mm per year, and forecasts for the region are for a rise of 1.2 to 1.6 m by 2125. Larger rises than this are considered possible.

Sea level rise can:

- Lead to more widespread loss of coastal habitats, such as seagrass and saltmarsh; with saltmarsh in particular already known to struggle in the Solent due to coastal squeeze;
- Lead to increased risk to marine environments from erosion and exposing old landfill sites; and there are many such sites in the Solent, as noted above

4 mm
is the average yearly sea level rise in Southampton

7 Management and Restoration of the Solent's Nature

7.1 Management and regulation

Using site management to remove or reduce damaging activities or pressures is crucial, and numerous such management measures are already in place in the Solent. These include regulation and byelaws, guidance/best practice, monitoring, as well as voluntary measures and awareness raising. Many of these are Solent specific and some of them are considered pioneering. For example, Bird Aware Solent was initiated here in 2017; this is a strategic partnership which aims to reduce potential recreational impacts on protected birds from increased local housing development.

The measures in place in the Solent fall into the following categories:

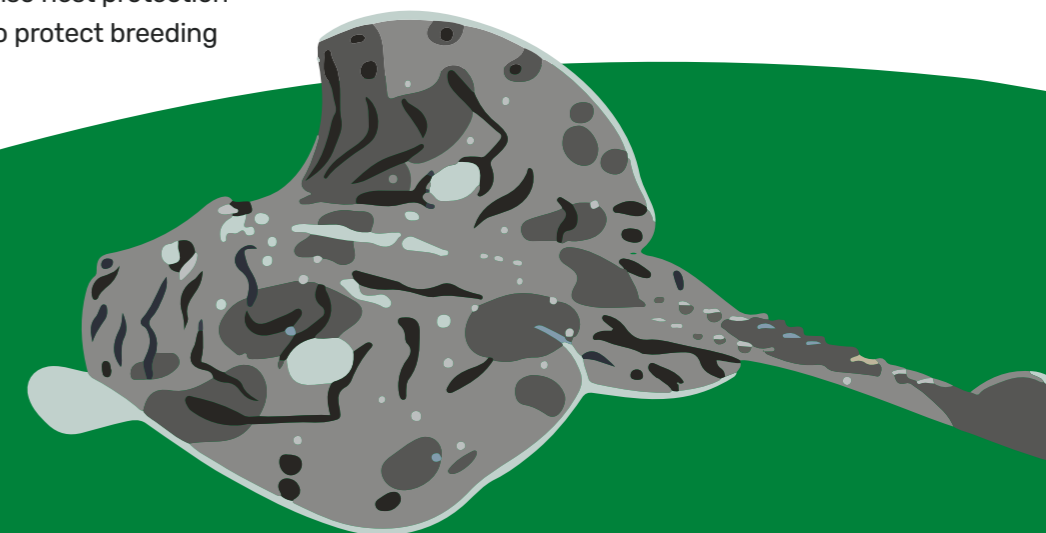
- **Designated site management** (e.g. the dedicated management scheme for the Solent's marine sites, Natural England's lists of operations for Sites of Special Scientific Interest, and also site improvement plans for most of the Solent's international sites);
- **Wildlife disturbance management** (e.g. rangers and signage to reduce disturbance, for example by Bird Aware; also nest protection enclosures and wardening to protect breeding seabirds and their nests);

• **Byelaws, codes of conduct, best practice guidance;** selected examples include:

- Many fishing byelaws exist to facilitate sustainable fishing and protect sensitive habitats and species;
- Most harbours and estuaries have guides for their users, e.g. for those taking part in paddle sports;
- Bird Aware Solent has produced a Coastal Code to minimise disturbance to birds; and

• A **voluntary no anchor zone** has been introduced in Osbourne Bay on the Isle of Wight to protect seagrass beds

• **Pollution management and reduction** e.g. litter picking and avoidance campaigns by various bodies; the Green Blue's anti-fouling best practice guide; the Environment Agency and others encouraging sewage treatment plant improvements; the Partnership for South Hampshire, and their efforts to achieve nutrient neutrality for new houses.



7.2 Active restoration

7.2.1 Overview

Active restoration measures have been implemented in the Solent, with many more under way. A wide variety of techniques have been employed and are being considered; these broadly fall into the following categories:

- **Seawall realignment (also referred to as managed realignment):** This involves relocating or removing often vulnerable coastal defences and extending areas of tidal inundation to create intertidal habitats across low-lying land (often in coastal areas that have been historically claimed from the sea);
- **Coastal intervention:** Influencing or adjusting existing coastal processes to change environmental conditions to protect habitats or promote their recovery (e.g. installation of brushwood or coir fences);
- **Sediment recharge (or beneficial use):** Replenishing deteriorating habitats, islands, and barriers with sediment, including silt, sand, shell and/or shingle, as appropriate to the habitat in question (e.g. seabird breeding habitat creation)
- **Habitat recreation:** Adopting a technique to restore and create specific habitat types either by (re)introducing keystone species (e.g. seagrass, kelp or native oyster) and/or altering seabed substrata to promote species recruitment and habitat change.

In addition, there are smaller-scale, complementary measures which can be adopted for newly created or existing habitats. These include clearing vegetation to facilitate bird nesting, the installation of bird nesting platforms on infrastructure or adding native oyster brood stock cages.

7.2.2 Solent examples

Many active restoration schemes have either been implemented or are underway in the Solent.

At least 13 existing managed realignment and sediment recharge schemes have been undertaken in the Solent to date, which have together led to the creation of just under 250 ha of mudflat and saltmarsh habitats. These schemes include the large Medmerry realignment west of Selsey Bill and several beneficial use schemes at Lymington. Around eight of the region’s important bird islands have also been topped up with soft and shingle sediment.

Active restoration to restore native oyster habitat and populations started in the Solent in 2017 with the pioneering Solent Oyster Restoration Project. This work is being continued and scaled up as part of the Solent Seascape Project. The initial oyster restoration approach was to increase larval supply by installation of broodstock nurseries in marinas across the Solent to increase breeding and the output of larvae to the wider Solent (estimated to be over 1 billion larvae in 2017). Subsequently, an oyster hatchery was installed at the Institute of Marine Sciences at the University of Portsmouth which successfully trialed the breeding of Solent stock to produce larvae for spat on shell. Following the introduction of fishery closure areas and legal protection from bottom towed fishing gear, two seabed oyster reefs have been created to improve the quality of the seabed habitat through the addition of gravel and shell material that oyster larvae will be able to settle on. This also created a suitable reef habitat for the laying of live oysters. To date, over 56,000 live oysters have been added to the two reef areas to kick start the creation of a self-sustaining oyster habitat.

Several seagrass seeding and planting schemes have also been initiated over the

past two years, with many more being planned, drawing in large numbers of volunteers (e.g. HIWWT’s Solent Seagrass Champions). There have been several schemes on the Isle Wight, as well as in Langstone Harbour, and at the entrance to the Beaulieu estuary. Advanced mooring systems have also been installed in some locations in the Solent, to reduce seagrass damage that can occur from the anchoring and mooring of recreational boats.

Active restoration efforts to support breeding marine and coastal birds have mostly focussed on ensuring the height of the existing breeding islands is high enough (by raising with sediment including shingle), but also creating new islands and installing tern rafts and fencing.

7.2.0 Planned measures

Many more schemes are being planned as part of the various initiatives and projects which are taking place across the Solent, including the Solent Seascape Project, which is coordinating many of these efforts. Planned schemes by various organisations include further managed realignment and beneficial use schemes (often to support flood risk management activities / compensate for coastal squeeze), as well as more oyster and seagrass restoration sites.

National and regional ‘opportunity’ maps have been produced to help identify areas which might be suitable for habitat creation, including for managed realignment potential areas, as well as seagrass, kelp and oyster habitats.

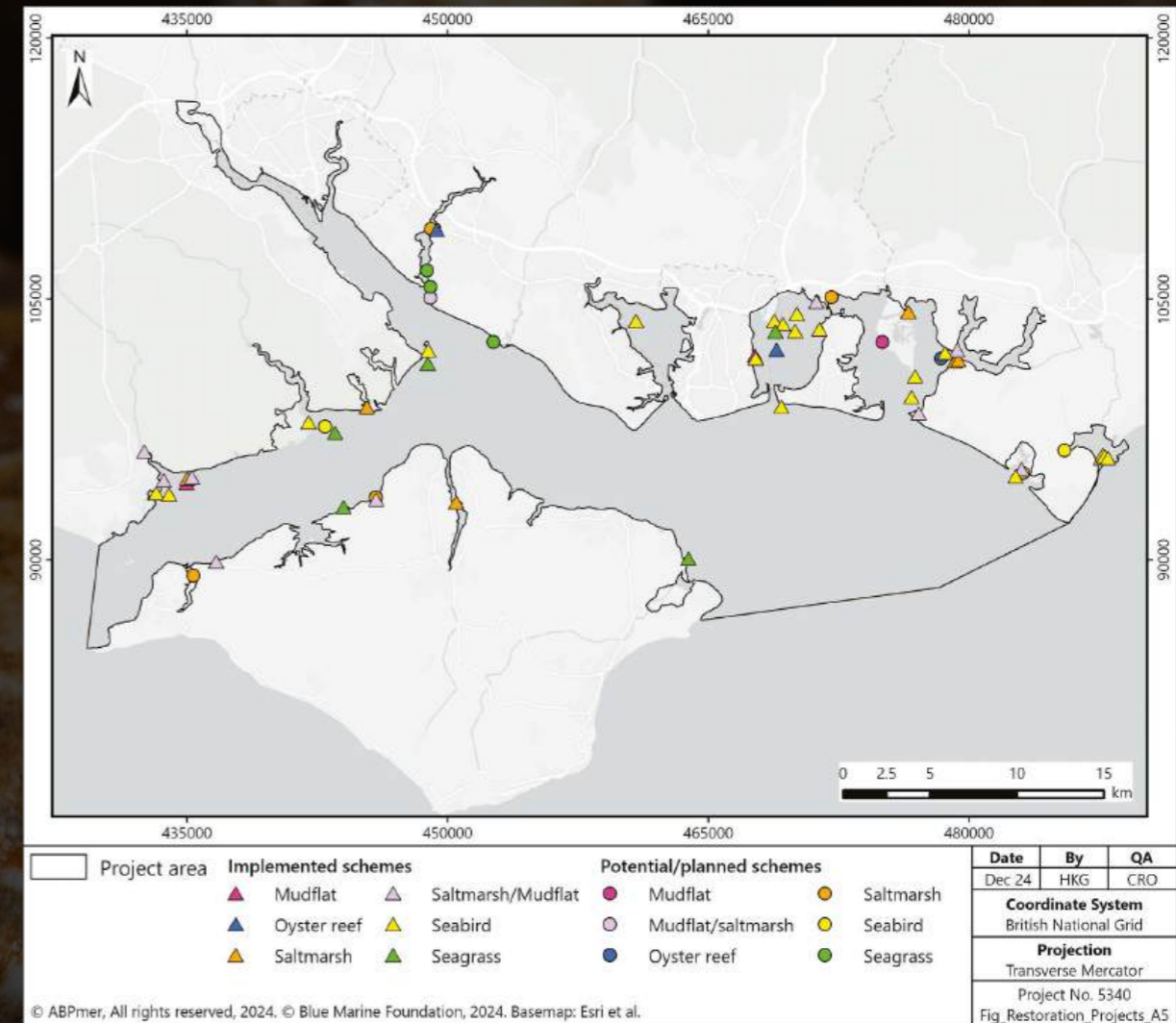


Figure NTS8. Implemented and planned restoration schemes in the Solent

8 Gaps in understanding and evidence

There are many evidence gaps which mean that the understanding of the state of the Solent's nature is not complete.

There is frequently insufficient information on existing numbers and extents of the habitats and species. This is particularly the case for habitats which are always under water, and animals which are difficult to spot; making monitoring difficult and costly. Seagrass and kelp for example are likely to be underreported for these reasons. Several programmes are underway or planned to try and improve this situation. Historic information and mapping is generally not available to help gauge trends, and where it is, it can be inconsistent and difficult to interpret (e.g. for saltmarshes).

Often, monitoring data is collected, but data is either not analysed at all, or only partially; and where analysis is undertaken then this is frequently not made public. These issues apply to a lot of data, including most of the water and sediment quality monitoring undertaken by government organisations, some of the fish monitoring undertaken by the government and authorities/centres, and some of the bird monitoring undertaken by various reserve managers. Valuable insights have been gained from recent studies carried out by the University of Portsmouth, but more detailed and consistent studies would be beneficial for all of these categories. Efforts are also underway to improve the collation and reporting of seabird breeding data across the Solent, led by the RSPB as part of the Solent Seascape Project.

Condition assessments are also not available for many animals and habitats, and where they have been done, the information is often not consistent and does not tend to be mapped. Again, efforts are underway to improve this; with Natural England planning on publishing condition reports for more designated sites in the near future, and also the development of a more standardised assessment approach. Condition assessments are also undertaken by other bodies. For example, as part of the 'Sea the Value' project, Portsmouth University has been undertaking habitat quality assessments for seagrass beds, oyster beds and saltmarshes in Langstone and Chichester Harbours recently (results are not yet available).

Locations where human activities cause particular issues to nature are also often not properly identified, although there is a relatively good level of understanding of this in the Solent largely due to the Solent European Marine Site Management Plan which has been collecting information on activities impacting nature for almost two decades. Efforts have been made in relation to this State of Nature work to collate the knowledge of the different Solent Seascape partner organisations for example. However, more detailed mapping would still be beneficial for most pressures.

With regard to management and restoration, there is frequently not enough information on the individual measures, and in particular lessons learned from them, or consistent approaches for defining success. Again, both within the Solent, and nationally, there are various endeavours to improve this, though more can still be done by all the organisations involved in such measures, to facilitate consistent and efficient exchange of knowledge and evidence.

9 Purpose of this report

This summary Solent State of Nature report has been produced to present a baseline description of the Solent region using best available evidence. This is needed so that relevant stakeholders can see and understand key aspects, such as habitat extent and condition, anthropogenic pressures and existing management measures. **It is accompanied by**

a more comprehensive technical report which includes more detail (and references) for all the aspects summarised above. There is also a supporting Solent State of Nature data viewer, where relevant maps can be interrogated. These information sources will be used to engage with stakeholders to ultimately inform a Recovery Plan for the Solent as part of the Solent Seascape Project.





solentseascape.com

info@solentseascape.com

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Theo Vickers, Matt Jarvis, Paul Adams,
Luke Helmer, James Blake, Louise
MacCallum, Shaun Roster, Hampshire
& Isle of Wight Wildlife Trust

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Prepared (PM) Susanne Armstrong

Approved (QM) Chris Jackson

Authorised (PD) Natalie Frost

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