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Making Space for Sand
Site No 20 - Porthtowan
Ecological Assessment

CEC3683
6 September 2024

Document Control

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Rev A			
Rev B			

Disclosure

The information, opinion and advice which we have prepared and provided is true and has been prepared and provided in accordance with the CIEEM's Code of Professional Conduct and the British Standard for Biodiversity – Code of Practice for Planning and Development (2013). We confirm that the opinions expressed are our true and professional bona fide opinions.

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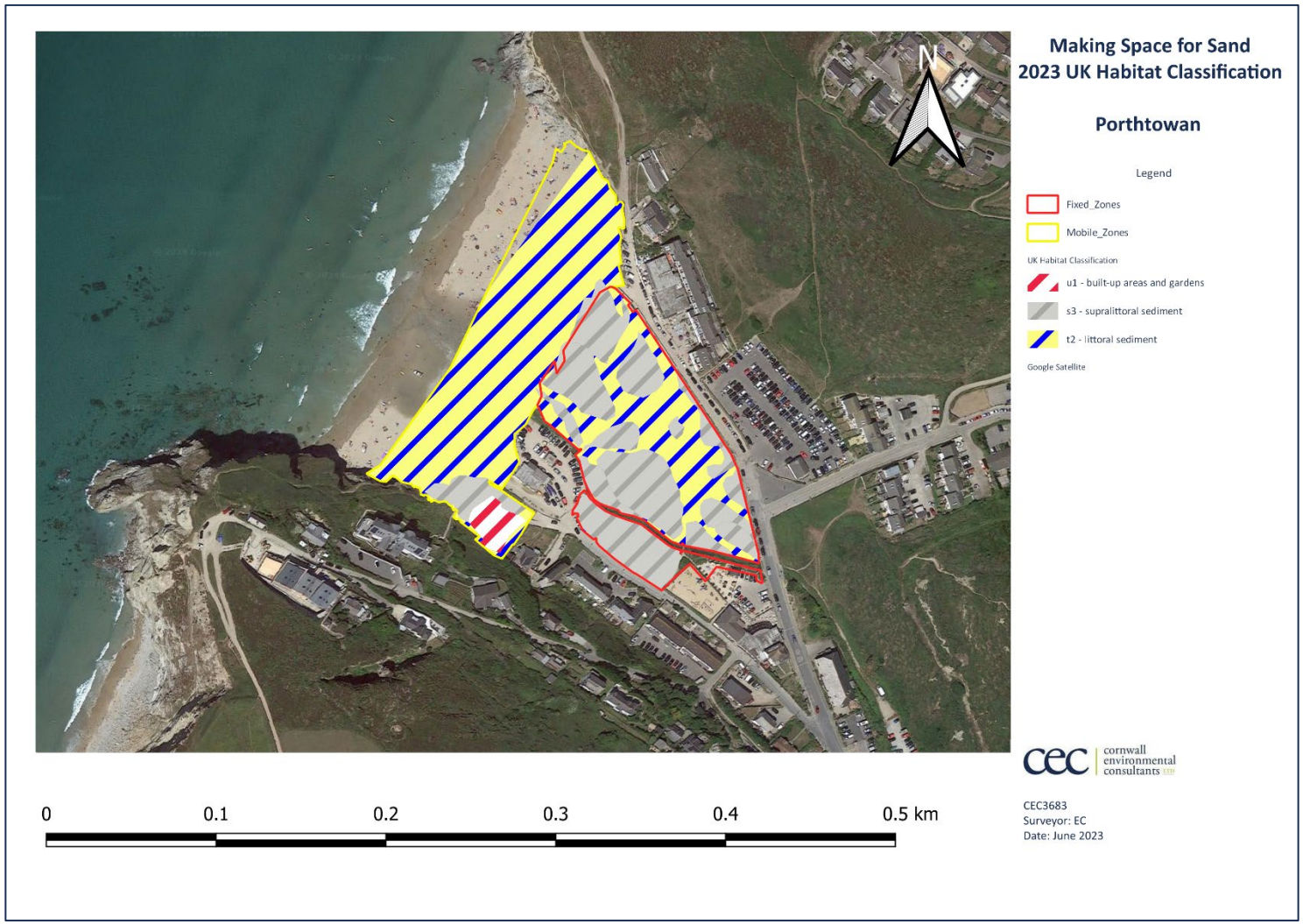
Summary

Site and methods	
Purpose of report	To identify the ecological constraints and opportunities associated with the management of the dune system at Porthtowan.
Site assessed	Porthtowan
Area (ha)	Vegetated area ~1.1ha
Location:	Grid reference: SW 69197 47988 What3words:heaven.employers.rarely
Planning Authority involved	Cornwall Council
Survey methods	Extended Phase 1 Habitat Survey UK Habitat Classification Biodiversity Net Gain Condition Assessment
Surveyor's name	Emily Cooper BSc (Hons), ACSM, PGCert Steve Adams BA(Hons), MSc, MCIEEM, CEnv
Date of assessment	UK Habitat Classification: June 2023 BNG Condition Assessment: December 2023
Weather on date of assessment	UK Habitat Classification - Sunny, ~19°C BNG Condition Assessment - Cold ~5°C

Results	
Designated sites	Godrevy Head to St Agnes SSSI
Important habitats present	Coastal Sand Dunes
Non-native invasive species present	Montbretia, hottentot fig

Protected species present	Nesting Birds
Potential for protected species	Reptiles
Enhancement recommendations	Access Control Nutrient management
Biodiversity Net Gain	Baseline habitat units 12.19

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1. Introduction

1.1. Background

1.1.1. The United Nations General Assembly (UNGA) declared 2021-2030 a 'Decade on Ecosystem Restoration'. The process of ecological restoration involves restoring the biodiversity and integrity of a native reference system (Gann *et al* 2019), to achieve successful restoration, the 'end point' should be defined within the planning stage of a project (Rieger *et al* 2014).

1.1.2. Making Space for Sand is a partnership project from Cornwall Council, with Cornwall Wildlife Trust (CWT), University of Plymouth (UoP) and South West Coastal Monitoring (SWCM). The project is funded by DEFRA as part of the Flood and Coastal Innovation Programmes, which are managed by the Environmental Agency (EA). The programmes will drive innovation in flood and coastal resilience and adaptation to a changing climate.

1.1.3. The purpose of Stage 1 of the project was to conduct an analysis of dune systems at 40 locations around Cornwall, and by using modelling techniques to predict the future of the dunes in relation to climate change and rising sea levels. A 'State of the Dunes' report will be developed which will include the modelling predictions, ecological, social and heritage findings and considerations.

Table 1: Timeline of events

Date	Assessments Undertaken
2006/2007	Phase 1 Habitat Assessment (Spalding Associates)
2016	Beach Dune Management Plan (CH2M)
MS4S Stage 1 - February 2022	Baseline Assessment and Ground truthing
MS4S – Stage 2 – June 2023	Phase 1 Classification, UK Habitat Classification, BNG Baseline

1.1.4. As part of the current stage of works, Stage 2, CEC are working collaboratively with Cornwall Wildlife Trust and the Environmental Records Centres for Cornwall and the Isles of Scilly (ERCCIS) to produce an ecological baseline report for 23 sites which will be used to inform restoration objectives and guide landowners and volunteer groups in these efforts. This will involve the ecological survey of the sites and assessment under Phase 1, UK Habitat Classification and Biodiversity Net Gain survey methodologies, along with the mapping of invasive species recorded on site.

1.1.5. In the recently published DEFRA list of irreplaceable habitats, sand dunes are listed, however an estimated 70% of dune systems have been lost globally during the last century due to anthropogenic pressures such as development and poor habitat management. Sand dunes are an important ecological feature, providing a unique and diverse habitat for flora and fauna, and protection against flooding, storm surges and wave attack (D'Alessandro *et al* 2020). Dunes are a multifunctional landscape and should be managed as such, allowing for interventions. Legally required stabilisation along the Dutch coast has led to a decline in pioneer species and biodiversity, coupled with increased nitrogen deposition and reduction in grazers such as rabbit. This led to a dominant climax community, and it is now recognised that this is creating a fossilised and partly acidified landscape.

1.1.6. The aim of the Making Space for Sand Project is to encourage the more sustainable use and development of the coastal fringe to allow for a more natural, ecosystem approach to coastal management where traditional coastal protection is not possible.

1.2. The Site

1.2.1. Site 20, Porthtowan - Cornish translation 'sand dune cove' (Figure 1) is a northwest-facing cove on the north coast of West Cornwall, opening out at low tide to an expansive beach, bordered by high cliffs at both ends. The site is encroached by Porthtowan village, which extends up the river valley to the south-east; as the crow flies, the cove lies three miles north-northwest of the town of Redruth. There is one watercourse which discharges into the sea at Porthtowan – a small unnamed brook flowing from the southeast and bisecting the dune complex. The site roughly forms a triangle: the northwest-facing side borders the beach and sea; and both the east-facing, and south-facing sides border roads, shops and houses. A small carpark and building – the Porthtowan Surf Life Saving Club – borders the most stable sections of the dune complex to the south.

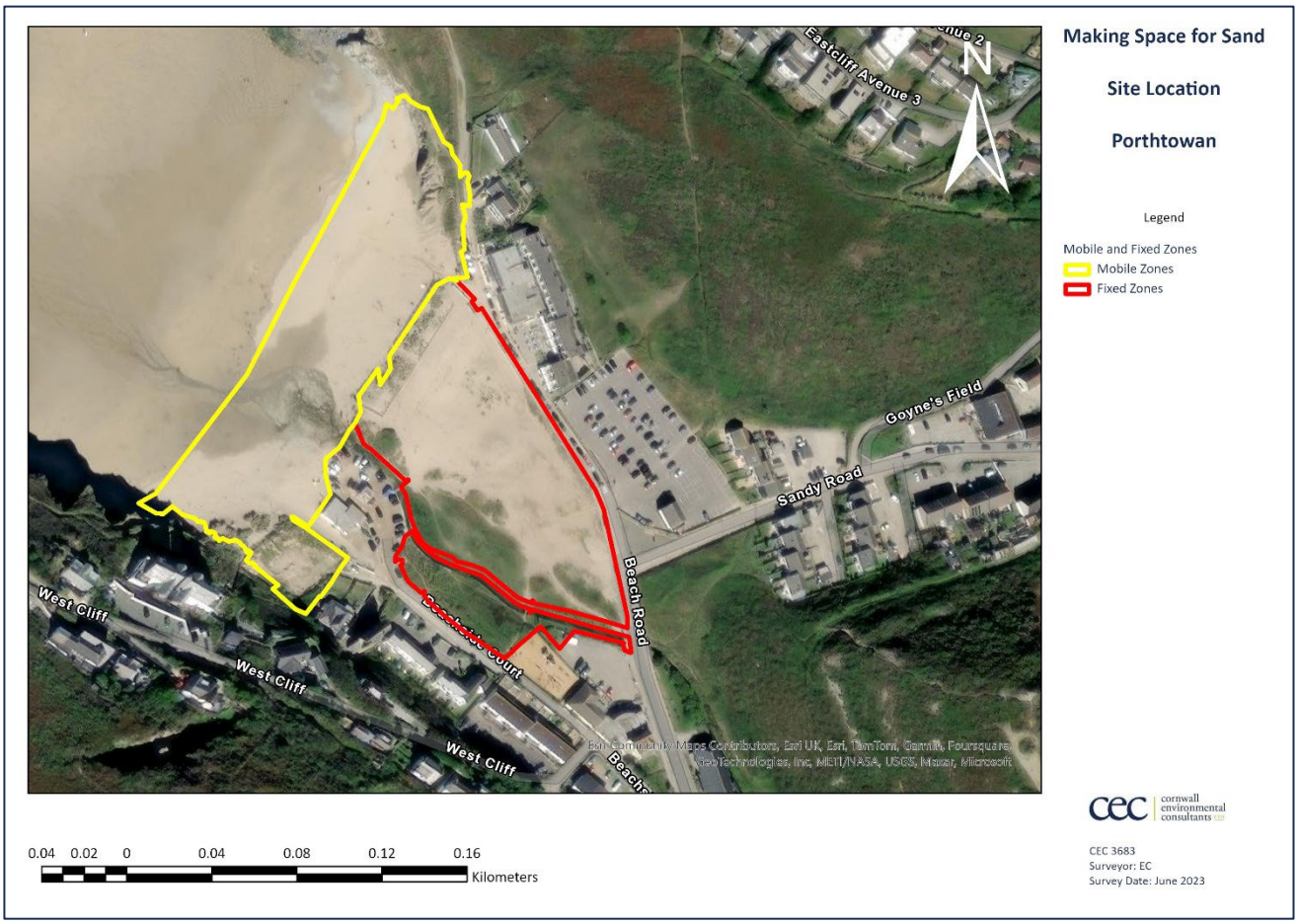


Figure 1: Site location

1.2.2. This report has been prepared by Emily Cooper, who has four years' experience in preparing ecological reports such as this.

1.2.3. This report follows the desk study and ground truthing report 'CEC3683 Making Space for Sand – Porthtowan – Site 3, February 2022' which details the baseline information from Stage 1 of the project.

2. Proposals

2.1.1. At this stage of the project, Stage 2, there are no plans for the site. However, there is potential for this to change as the project progresses.

3. Conservation Designations

3.1. Conservation Designations

Sites of Special Scientific Interest (SSSI)

3.1.1. SSSIs are designated under the Wildlife & Countryside Act 1981 where they support habitats and/or species of national importance, this is overseen by Natural England. SSSIs represent the best sites for wildlife and geology. Many SSSIs are internationally important and play an important part in local culture and economy. The natural wildlife and geological features of SSSI's are considered to be irreplaceable parts of the national heritage. These are protected in order to preserve their importance, and to prevent damage and development.

4. Legislation

4.1. Legislation

4.1.1. The Wildlife and Countryside Act (HM Government, 1981, as amended) is the main piece of legislation relating to nature conservation in Great Britain. It transposes into British law the Berne, Bonn and RAMSAR Conventions, and the European 'Birds Directive' (CEC, 1979). This legislation covers protection of wildlife (birds, other animals and plants), Sites of Special Scientific Interest (SSSI's) (with some SSSI's also designated as Special Protection Areas, SPA's), National Nature Reserves (NNR's) and RAMSAR sites.

4.1.2. The Conservation of Habitats and Species Regulations (HM Government, 2019) transposes into British law the European 'Habitats Directive' (CEC, 1992), and covers Special Areas of Conservation (SAC's) and European Protected Species (EPS) (see below). It also provides further protection for SPA's and RAMSAR sites.

4.1.3. The Countryside and Rights of Way (CRoW) Act (HM Government, 2000) increases protection for SSSIs and threatened species. It specifies the duty of Local Authorities to further the conservation of listed (UK BAP priority) habitats and species.

4.1.4. The Natural Environment and Rural Communities (NERC) Act (HM Government, 2006) confers a legal duty on every public authority to conserve biodiversity under Section 40(1). Section 41 required the publication of lists of habitats and species of principal importance for the conservation of biodiversity in England. This list contains the habitats and species previously known as 'UK BAP' (Biodiversity Action Plan) priorities for conservation, and the terminology of habitats and species of principal importance supercedes the UK BAP terminology. Such features will be referred to as Habitats of Principal Importance (HPIs) and Species of Principal Importance (SPIs), throughout this report.

4.1.5. The Environment Act 2021 (HM Government, 2021) sets clear statutory targets for the recovery of the UK's natural world in four priority areas: air quality, biodiversity, water and waste, and includes an important new target to reverse the decline in UK species abundance by the end of 2030. It will also require new developments to improve and/ or create habitats for nature, and tackle deforestation overseas.

4.1.6. The Hedgerows Regulations 1997 protects historically / ecologically important hedgerows.

4.1.7. The Protection of Badgers Act 1992 provides specific protection for badgers.

5. Policy

5.1.1. Shoreline Management Plan (SMP) is a strategy for managing flood and erosion risk for a particular stretch of coastline over short (0-20 years), medium (20-50 years) and long (50-100 years) term time periods. An SMP is considered to be the most sustainable approach to managing flood and coastal erosions risks. Cornwall adopted SMP2 in 2011, though the epochs date back to a 2005 start. Within SMP there are four policy approaches which have been assigned to stretches of coastlines (known as management units) and will vary between epochs. The four policies as defined by DEFRA are: No Active Intervention (NAI), Hold the Line (HTL), Managed realignment (MR), and Advance the line (ATL). Additional to the main policies, there are five sub policies: Do not Defend (DnD), Repair not Replace (RnR), Local Activity Only (LAO), Natural Features (NF) and Placeholder (P).

5.1.2. Porthtowan is covered under policy unit MA29: 29.1 and 29.4, Table 2 below shows the policy plans under SMP2.

Table 2: Shoreline Management Plan Policies

MA29.1 Undefended Cliffs (including cove at Chapel Porth)

Timeframe	SMP Policy	Sub Policy
Epoch 1 (2005 - 2025)	No Active Intervention	Local Activity Only
Epoch 2 (2025 -2055)	No Active Intervention	Local Activity Only
Epoch 3 (2055 - 2105)	No Active Intervention	Local Activity Only

MA29.4 Porhtowan

Timeframe	SMP Policy	Sub Policy
Epoch 1 (2005 - 2025)	Managed realignment	Natural Features
Epoch 2 (2025 -2055)	Managed realignment	Placeholder
Epoch 3 (2055 - 2105)	Managed realignment	Placeholder

6. Methodology

6.1. Desk Study

6.1.1. As part of Stage 1 of the Making Space for Sand project, a desk study was undertaken recording the key features of the site, including statutory and non-statutory designations, invasive species records, Phase 1 habitat analysis, landscape features and historical features.

6.1.2. Information regarding notable plant species was obtained from the Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS), supplementary to the information provided in Stage 1 of the project.

6.1.3. A desk study search for statutory designated sites within 1km of the site was completed using the online Multi-Agency Geographic Information for the Countryside (MAGIC) mapping tool. In addition, the Cornwall Council Interactive mapping website was used to look for County Wildlife Sites (CWS) within the search area.

6.2. Field Survey

6.2.1. A walkover site survey was undertaken to identify plant species and map habitats present. Signs of faunal species were also searched for; including tracks, prints, droppings, hairs, feeding remains, nests and burrows.

UK Habitat Classification (UK Habs) Survey

6.2.2. UKHabs is a surveying technique which maps parcels of land within a defined area and classifies them according to their habitat type, covering terrestrial, freshwater and coastal habitat types. The UKHabs system largely superseded the previous system of Phase 1 Habitat Classification. UKHabs works by classifying habitats at different levels, with level 1 being the differentiation between terrestrial, coastal and freshwater, there are nine ecosystem types at level 2, which filters down in 20 broad habitat types in level 3. In some cases, the habitat will be further classified under levels 4 and 5.

6.2.3. Secondary codes can be applied to a habitat parcel to signify the presence of other features within that habitat.

6.2.4. The UKHabs survey was carried out by Emily Cooper and Hannah Boylan on 28th June 2023. The study area included mobile and fixed dune areas as shown in Figure 1. The weather conditions at the time of survey were sunny and warm.

Biodiversity Net Gain (BNG)

6.2.5. The Biodiversity Net Gain metric is a tool for development, it measures habitat 'units' through a series of criteria (size, habitat type, condition, strategic significant and habitat distinctiveness). The tool has applications in conservation projects as it provides a quantifiable measure of the habitat as an existing baseline, unit change can be calculated through enhancements to the habitats and baselines can be reassessed to calculate unit difference.

6.2.6. Land parcels are classified by habitat type, and condition assessed against a number of criteria which determine the outcome condition of the parcel (resulting in good/moderate/poor condition).

6.2.7. For the purposes of this study, BNG Metric 4.0 version has been used. At the time this report is being produced, this is considered to be the most suitable version of the metric for conservation use as there is an assigned value to irreplaceable habitats.

6.2.8. The Biodiversity Net Gain Condition Assessment was undertaken by Steve Adams during December 2023, and covered the previously surveyed areas.

6.2.9. The survey work was carried out in accordance with the following documents:

- UKHab Ltd: UK Habitat Classification Version 2.0 (2023)
- CIEEM Guidelines for Preliminary Ecological Appraisal (2017)
- CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (2018)
- BS42020:2013 Biodiversity – Code of practice for planning and development (BSI, 2013)

6.2.10. The scale of habitat classification will be based on the size of the site, where it is considered the site is medium/large (>1ha), the scale of surveying will be approximately 25m x 25m, smaller sites will be surveyed at a finer scale of 5m x 5m.

6.3. Limitations

6.3.1. The conclusions and recommendations presented within this report are based on the current ecological features identified, and the current dune boundary as shown in Figure 1 and in Map 1. Ecological features can change over time, particularly if site management/ use changes, or in the case of a dune system there is a particularly stormy winter; as a guide it is recommended that this report is valid until June 2025.

6.3.2. June is within the optimal season to undertake vegetation surveys: as many plant species are in bloom, accurate identification of the habitats has taken place.

6.3.3. This ecological assessment does not include a search for Tree Preservation Orders (TPOs) or Conservation Area status.

6.4. Habitat Definitions – Key Phase 1 to UK Habitat Classification Translation

6.4.1. Throughout the report, where the habitat polygon/block has been defined as 'scrub' under the Biodiversity Net Gain assessment, this has been defined as the primary habitat under the UK habitats classification system as this is deemed to be the most effective way of quantifiably being able to measure improvements and enhancements in the site in the future. Under the Phase 1 classification system, the scrub will be classified as 'dune scrub', this is owing to the description of dune scrub providing the best match to the underlying habitats.

6.4.2. Open dune within the Phase 1 Classification system comprises three early successional stages of dune formation: fore, yellow and grey dune. Species which are commonly associated within the foredune include sand couch grass, sea sandwort, oraches and sea rocket, this is most closely matched with Embryonic shifting dunes within the UK Habitat Classification system, which is also characterised by the presence of sea rocket, lyme and sand couch grass. Within this category of embryonic dunes, also falls the Phase 1 classification 'strandline vegetation', which feature species detailed above and curled dock, prickly saltwort and sea beet and is an occasional feature across the study.

6.4.3. Yellow dune, which is defined as having partially stabilised ridges and incomplete plant cover which is dominated by marram grass, with some sand couch and lyme grass and a small variety of herbs. This is most closely matched to Shifting dunes with marram within the UK Habitat Classification system which is defined by the species marram, on the seaward edge sand couch and sea sandwort, as the dune extends landward there are less specialised dune plants and an increase in bryophytes and sand tolerant annuals.

6.4.4. Grey dune, within the Phase 1 classification is defined as having stable ridges of sand which are almost entirely vegetated, and features marram, but this is not the dominant species. Dune grassland within

Phase 1 is classified as consolidated and flattened grassland with some areas of marram. Within the UK Habitat classification both are covered by the category 'dune grassland' - which also encompasses the Annex I: H2130 Fixed coastal dunes with herbaceous vegetation 'grey dunes'. This is defined as only occurring in the largest dune systems which are wide enough to allow it to develop. Species which occur within this category are dominated by red fescue, an adaptable grass which is salt tolerant, and lady's bedstraw, and should be rich is calcareous substrate species. Species which are typical in South-West England that occur in this habitat include the pyramidal orchid and wild thyme. This habitat classification has been used extensively over the course of the mapping to cover a broad scope of fixed dune habitats.

6.4.5. .

7. Baseline Ecological Conditions

7.1. Sand Dune Ecology

7.1.1. Sand dunes are formed through a successional process. Embryo dunes form closest to the sea where an obstruction is in place and windblown sand accumulates. Pioneer halophilic (salt tolerant) species then have the capacity to colonise this area, the typical species here being lyme and sand couch grasses.

7.1.2. Fore dunes establish where the embryo dunes have created stability in the substrate, marram grass begins to establish and further stabilise the substrate by allowing more sand to accumulate. There is now the addition of more organic matter where marram dies back. Water retention is increased and microhabitats within the dune area allow a wider diversity of vegetation to colonise.

7.1.3. Within the fixed dunes, the diversity of species will out compete marram, red fescue being a key competitor. The diversity of herbs and grasses leads to an increase in the humic content of the substrate making it more suitable for the establishment of scrub species, and eventually woodland.

7.1.4. 'Blowouts' are areas of bare sand where plant roots have been damaged leading to exposed bare sand. Erosion within these areas can accelerated by excessing trampling, grazing and burrowing. Sand sedge a key coloniser of these areas and starts the process of stabilising the area. Despite this, blowouts and other exposed bare sand areas are an important feature of the dune landscape and ecology.

7.1.5. Dune slacks occur where the terrain drops to the level of the water table and can be seasonally or permanently wet. These areas will support different species to the other areas of the dune including reeds, rushes, sedges and horsetails. Nutrients and organic matter will accumulate in these areas supporting these different plant communities.

7.2. Sand Dune Ecological Management

7.2.1. Sand dune management historically has been to stabilise and prevent erosion. This has been achieved through strategic planting of species such as sea buckthorn, or through preventing access into areas of the dunes. This approach facilitates the stabilising of fixed dune and scrub areas, but limits the establishment of embryo and foredunes, and the key dune features such as blowouts and dune slacks.

7.2.2. Hard management approaches include the placement of rock armour and other sea defences at the toe of the dune, this limits the dunes capacity to establish seaward. Softer management approaches include the placement of old Christmas trees to act as a barrier to allow sand to accumulate against.

7.2.3. Where dunes have become over stabilised through management approaches and limits imposed by human development, within some dune systems artificial recreation of the mosaic of habitats occurs. These approaches include scraping back of scrub and cutting of notches to encourage wind blown erosion to take place.

7.2.4. Low nutrient levels are essential for dune health. Nutrient enrichment is a key management issue facing dune ecology, with species such as bramble, nettle and dock able to thrive in nutrient rich environments and outcompete dune specialist species. Sources of nutrient enrichment include atmospheric deposition, agricultural runoff and dog waste.

7.3. Indicator Species

7.3.1. The National Plant Monitoring Scheme has compiled a list of 30 plant species as indicators of dune health, with 25 being +ve, and 5 being -ve, and 17 being 'wild flower' level. See Table 3below for full list.

Table 3: Dune Indicator Species

Name	Common Name	Wildflower Indicator	Indicator +/-
Alopercurus geniculatus	Marsh Foxtail		+
Carex flacca	Glaucous Sedge		+
Carlina vulgaris	Carline Thistle		+
Cerastium arvense	Field Mouse-ear		+
Cirsium arvense	Creeping Thistle	✓	-
Equisetum palustre	Marsh Horsetail		+
Filago minima	Small Cudweed		+
Geranium sanguineum	Bloody Cranes-bill		+
Lysimachia vulgaris	Yellow Loosestrife	✓	+
Medicago lupulina	Black Medick		+
Ophiglossum vulgatum	Adder's tongue	✓	+
Pilosella officinarum	Mouse-ear Hawkweed	✓	+
Plantago coronopus	Buck's-horn Plantain	✓	+
Potentilla reptans	Creeping Cinquefoil	✓	+
Ranunculus acris	Meadow Buttercup	✓	+
Ranunculus repens	Creeping Buttercup	✓	+
Rosa ruogsa	Japanese Rose	✓	-
Rubus fruiticosus	Bramble	✓	-
Rumex acetosella	Sheep's Sorrel	✓	+
Sagina nodosa	Knotted Pearlwort		+
Salix repens	Creeping Willow	✓	+
Senecio erucifolius	Hoary Ragwort		+
Senecio jacobaea	Common Ragwort	✓	-
Thalictrum minus	Lesser Meadow-rue		+
Trifolium fragiferum	Strawberry Clover		+
Trifolium pretense	Red Clover	✓	+

Name	Common Name	Wildflower Indicator	Indicator +/-
Trifolium repens	White Clover	✓	+
Urtica dioica	Common Nettle	✓	-
Valerianella locusta	Common Cornsalad		+
Vica cracca	Tufted Vetch	✓	+

7.3.2. In addition to these species, Red Valerian (*Centranthus ruber*), Alexanders (*Smyrnium olusatrum*), Tamarisk (*Tamerix*), Hebe (*Veronica x franiscana*) and Sea Buckthorn (*Hippophae rhamnoides*) have been classified as negative indicators for the purposes of this study, this is based on them being non-native species to Cornwall and having capacity to become invasive in the dune environment. This is in addition to the commonly listed and Schedule 9 invasive non-native species.

7.4. Site Description

7.4.1. The dune area at Porthtowan is around 50% vegetated, with shifting dunes bordering the beach which are being managed locally to aid their reestablishment, this transitions to a small area of more stable dune grassland to the south of the site. The dune health is generally poor, with marram being the predominant species within the mobile areas.

7.4.2. UK Habitat Classification habitat distribution is shown in Map 1.

7.5. Statutory and Non-Statutory Designated Sites

7.5.1. Designated sites which are on or in proximity to the site are show in Table 3 and Figure 3 below.

Table 4: Designated Sites

Designation	Qualifying Features	Condition
Porthtowan is adjacent to the Godrevy Head to St Agnes SSSI.	Supralittoral sediment Dwarf Shrub Heath - Lowland	Favourable Unfavourable - Declining

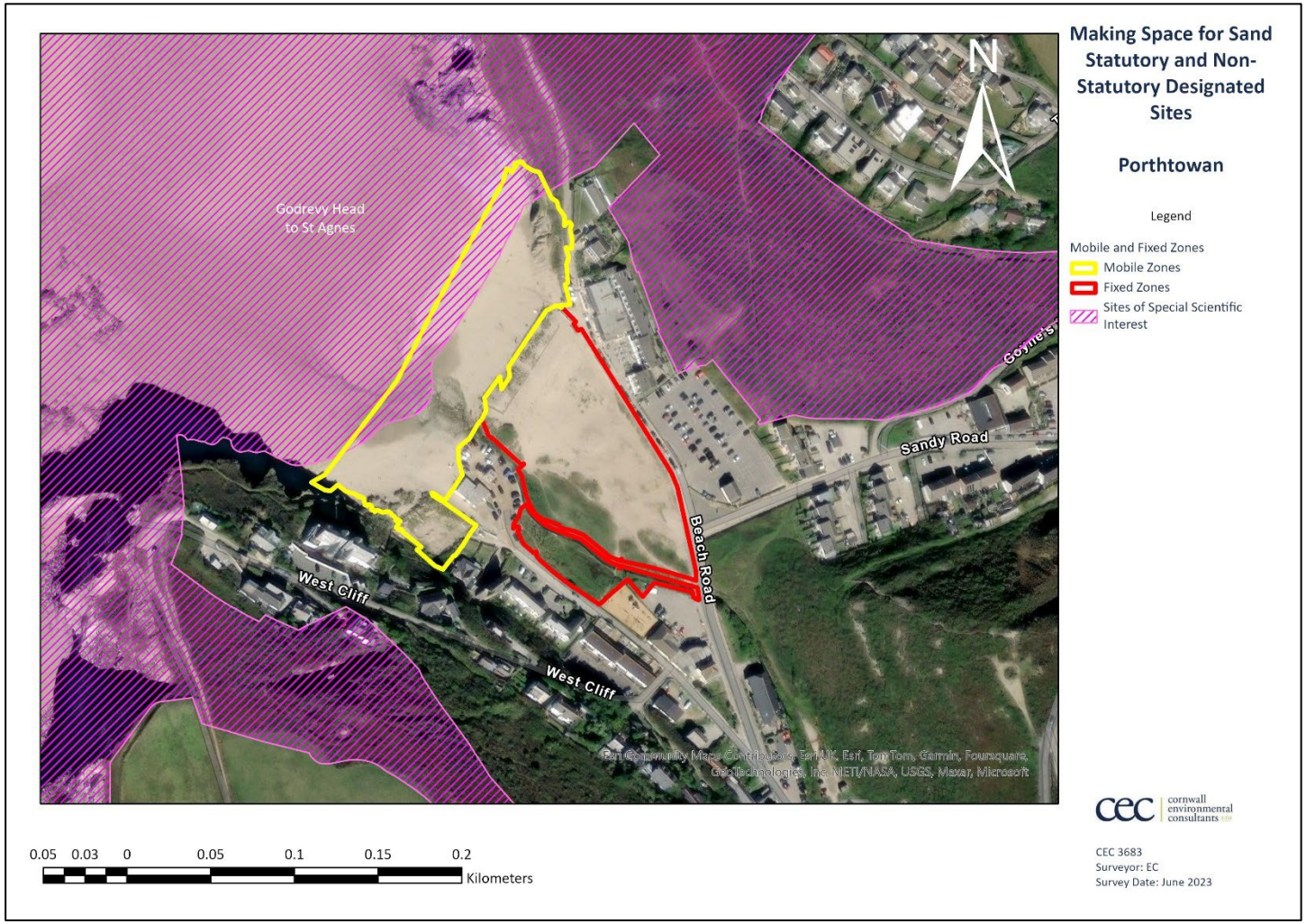


Figure 2: Designated Sites

7.6. Habitats

Habitats of Principle Importance – Coastal Sand Dunes

7.6.1. Coastal Sand Dunes (Broad habitat supralittoral sediment) classify as a Habitat of Principle Importance (HPI) under Section 41 of the Natural Environment and Rural Communities Act 2006.

7.6.2. Sand dune habitats are classified as Annex 1 habitats under the EU Habitats Directive 1992, this is transposed into UK law under The Conservation of Habitats and Species Regulations 2017. This requires member states to designate, protect and manage these habitats.

7.6.3. Within the requirements of BNG, Coastal Sand Dunes are listed as irreplaceable habitat, this means that any classification as HPI must be retained.

7.7. Site survey recorded habitats.

7.7.1. Across the site 1.27ha of vegetated habitat was mapped. Areas of beach extending into the sea were not mapped. See Appendix A for full details of recorded habitats on site and their appropriate classifications.

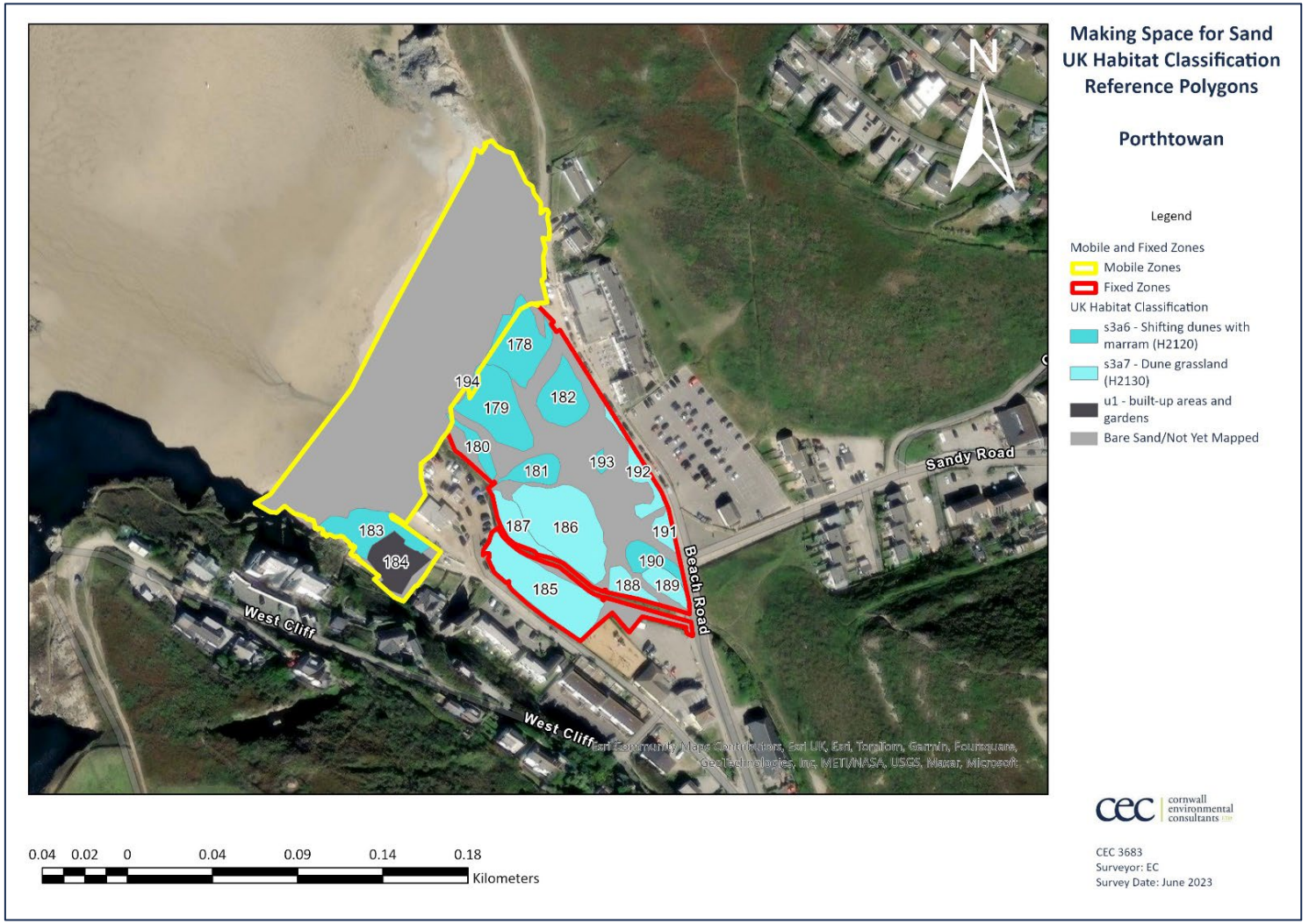


Figure 3: UK Habitat Classification Reference Polygons

Open Dune

7.7.2. Porthtowan's s3a6 habitat, shifting dunes with marram equates to around 45% of the vegetated area at 0.43ha. Much of this habitat is roped off from public access (polygons 178 and 179) as work is being undertaken to reestablish the dunes after suffering heavy erosion during winter storms in 2014. Species recorded in this habitat include marram and sand couch grass, sea holly, sea bindweed, sea carrot, sea knotgrass and rock samphire, much of this is managed planting. The front of the dune is very vulnerable still and erosion can be seen beyond the MHW mark.

7.7.3. This habitat is classified as a habitat of principle importance and has been largely condition assessed as 'good', it demonstrates good species diversity and is free of invasives and scrub. Where areas are accessible to the public, there is significant pressure from visitor footfall which is preventing further development of this habitat and limiting species diversity.

Dune Grassland

7.7.4. Inland of the shifting dunes with marram, are small patches of more establish dune, which classify as dune grassland (s3a7) equating to 0.43ha, ~45% of the vegetated area, this is also a habitat of principle importance. There are areas of scattered bramble scrub within this habitat, with patches of red valerian establishing. There are some scattered halophytic species such as sea holly and sea carrot, with some patches of sand sedge which are helping to bind and stabilise the dune to the rear. Adjacent to the stream, there are some common grasses such as red fescue and perennial rye grass, along with poppies and the near threatened bloody crane's bill.

7.7.5. This habitat has been assessed as being largely in poor condition owing to the high footfall preventing growth.

Built up areas and Gardens

7.7.6. At the southern section of the site there is a property and private garden equating to 0.06ha, <10% of the site area

7.7.7. As this is a private area, no assessment was undertaken.

Table 5: Summary of habitat types and percentage cover

Habitat Type	Percentage Cover
Embryonic Shifting Dunes	45%
Dune Grassland	45%
Built up areas and Gardens	<10%

7.8. Species

Flora

Vascular Plants

7.8.1. The desk study found numerous records for plant species of conservation concern within the 1km search area of the site. Examples of notable records include spotted cat's ear (nationally rare, designated under Cornwall Red Data Book and the England Red List: Vulnerable), the eyebright *Euphrasia vigursii* (NERC Section 41; Biodiversity Action Plan; Cornwall RDB; England RL: Endangered), hairy greenweed (nationally rare; Cornwall RDB; England RL: Near-Threatened), early gentian (endemic; NERC S.41; BAP; Habitat Reg.

Schedule 5; Wildlife and Countryside Act Schedule 8; Cornwall RDB), sea-loch egg wrack (BAP), dodder (Cornwall RDB; England RL: Vulnerable), musk stork's bill (Cornwall RDB), western ramping fumitory (nationally scarce; Cornwall RDB), weasel's snout (Cornwall RDB; England RL: Vulnerable), Portland spurge (Cornwall RDB), small-flowered catchfly (nationally scarce; NERC S.41; BAP; England RL: Endangered), corn spurrey (Cornwall RDB; England RL: Vulnerable), pale dog-violet (nationally scarce; NERC S.41; BAP; Cornwall RDB; England RL: Vulnerable), corn chamomile (Cornwall RDB; England RL: Endangered); corn marigold (Cornwall RDB; England RL: Vulnerable), and field woundwort (Cornwall RDB; England RL: Near-Threatened).

7.8.2. Porthtowan has some notable vascular plants recorded within the surveyed area including the nationally rare sea knotgrass. Additional halophytic species included sea spurge, sea sandwort, prickly saltwort, sand sedge, sea holly, and sea bindweed were also recorded, see target note map for distribution of notable species.

Lower Plants

7.8.3. A specialised survey for non-vascular plants, bryophytes and lichens, was outside the scope of this study. The desk study revealed records for the lower plant species green blackwort (nationally rare; Cornwall RDB), rounded pygmy-moss (nationally rare; Cornwall RDB), slender beard moss (nationally rare; Cornwall RDB) and side-fruited crisp-moss (Cornwall RDB) within 1km of the site.

Non-native Invasive Plants

7.8.4. The Schedule 9 species montbretia and hottentot fig were recorded during the site survey.

7.8.5. The desk study returned results for three-cornered leek, Japanese knotweed, buddleia, montbretia, pampas-grass, winter heliotrope, angular sea-fig, wall cotoneaster, entire-leaved cotoneaster, Mexican fleabane, Himalayan honeysuckle, rhododendron, pink purslane, Japanese rose, and purple dewplant within 1km of the site.

7.9. Target Notes

7.9.1. Target notes refer to areas of ecological interest that were recorded during the survey, both floral and faunal.

7.9.2. Target notes for Porthtowan included recording of species such as the nationally rare sea knotgrass, the notable species sea holly, sea bindweed and the near threatened bloody crane's bill.

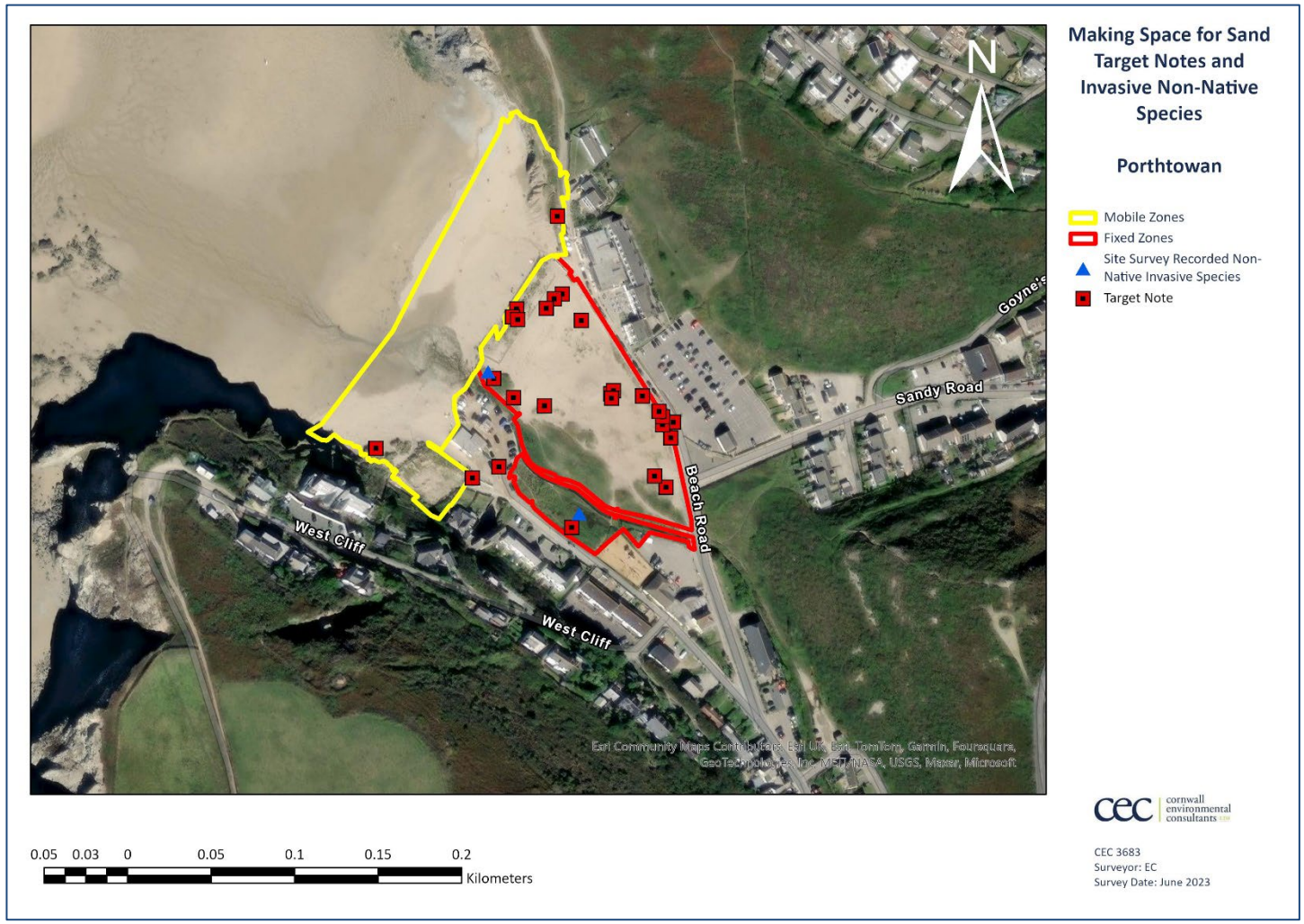


Figure 4: Site Survey Recorded Invasive Species and Target Notes

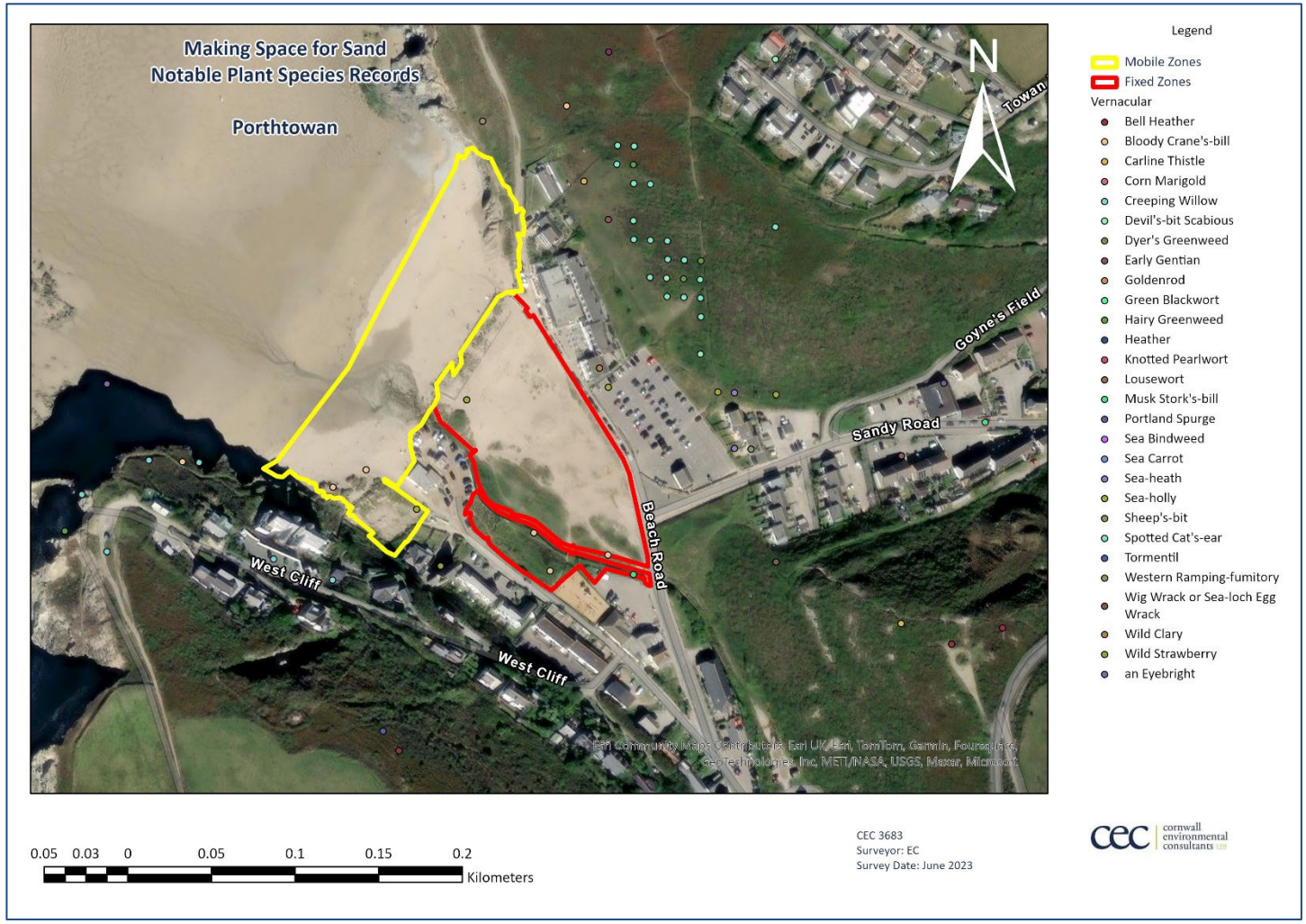


Figure 5: Notable Plant Species Records

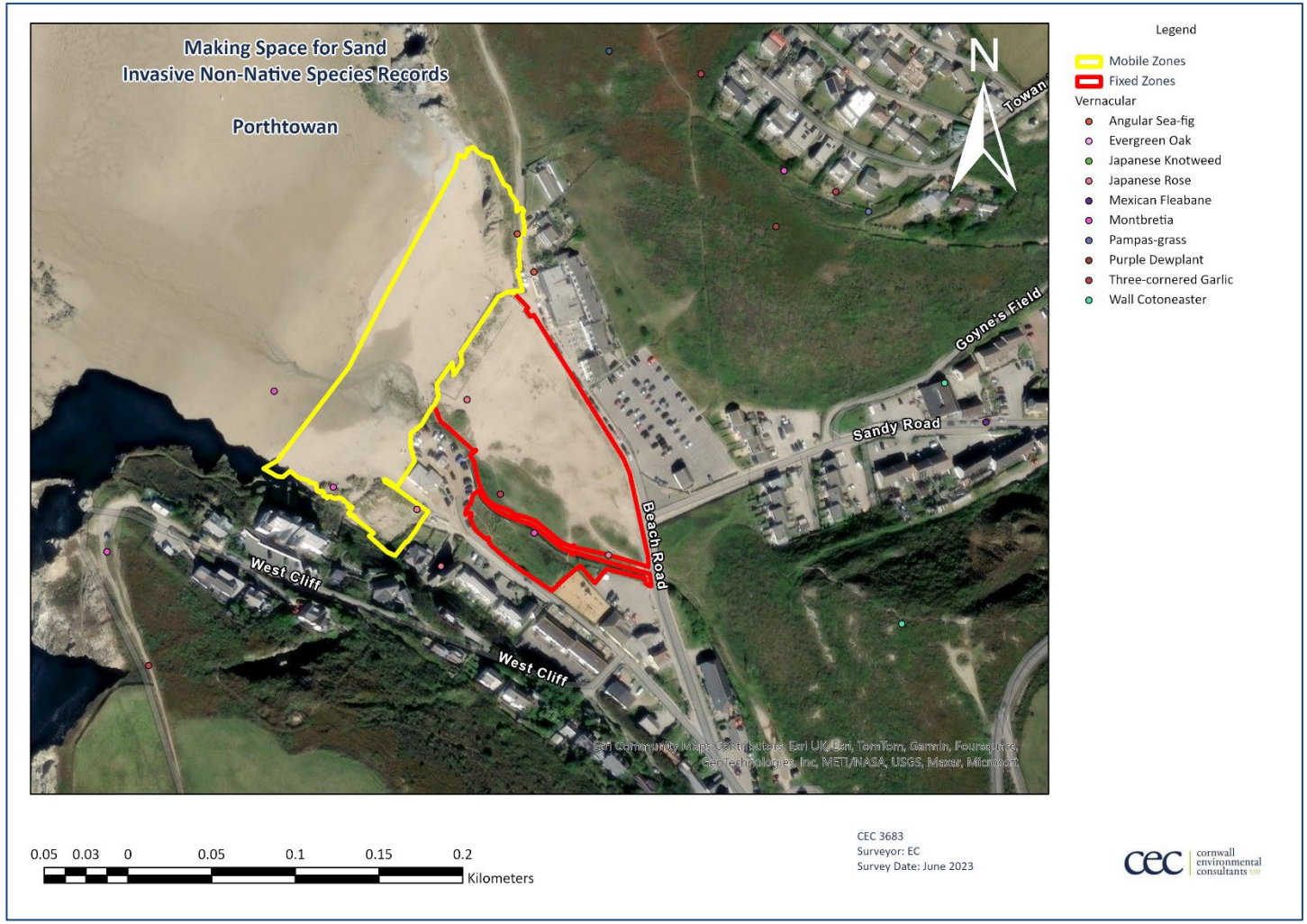
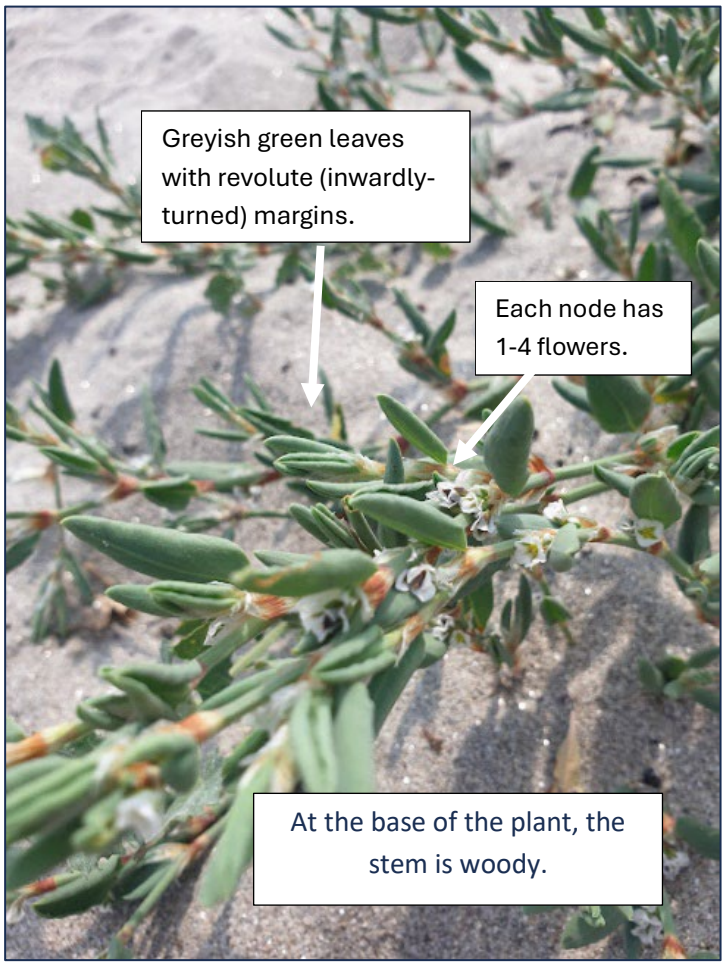
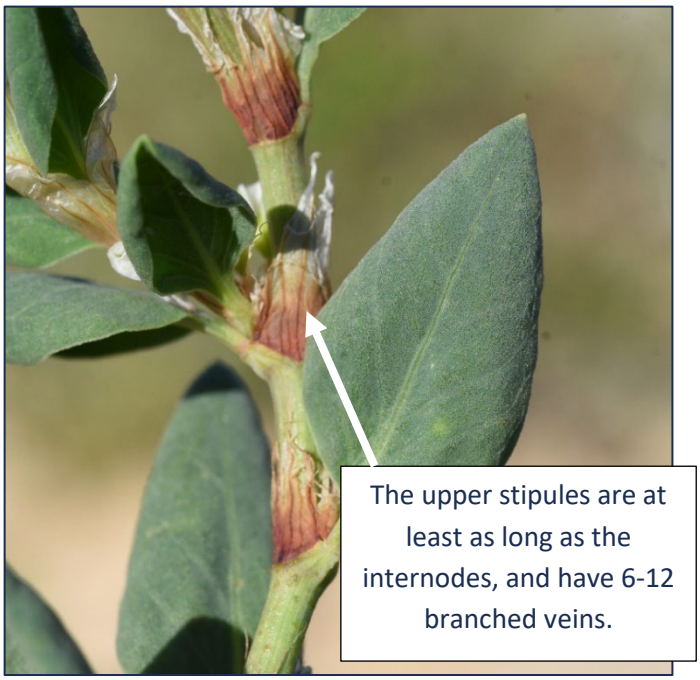


Figure 6: Invasive Non-Native Species Records

8. Species Highlights

8.1. Sea knotgrass *Polygonum maritimum*





A nationally rare species (occurring in 15 or fewer 10x10km hectads) of shingle and fine sand beaches, sea knotgrass is classified as Endangered (GB Red List post-2001), and is protected under Schedule 8 of the Wildlife and Countryside Act, as well as being listed in Cornwall Red Data Book.

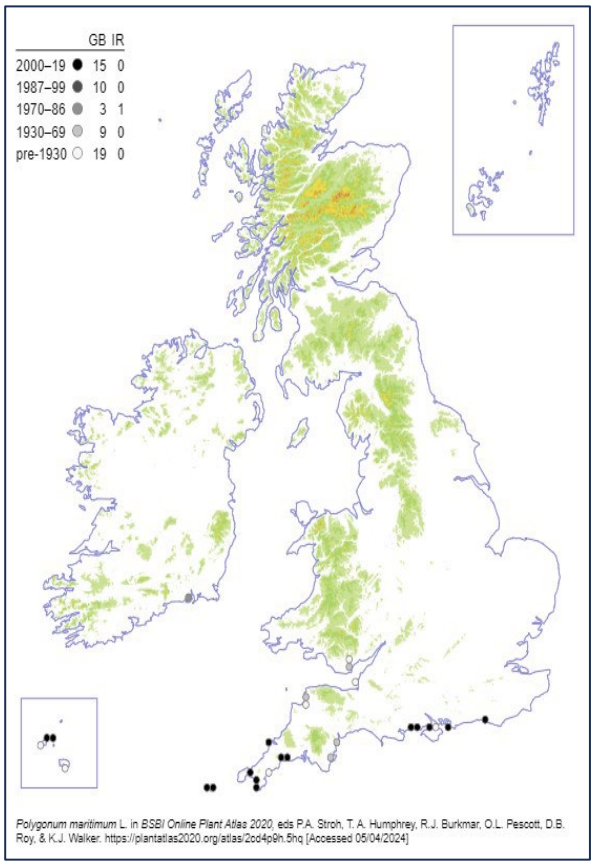
Distribution: Patchy distribution along the South and Southwest coasts of England; strongholds in Cornwall include Par and Gunwalloe.

Habitat: Sand and shingle above high tide.

Size: up to 40cm, leaves up to 15mm.

Flowering Season: June – Sept.

Value to wider habitat: Sea knotgrass has developed strategies to survive in challenging habitats, include salt, drought and sand burial tolerance, and wind resistance. The species is important for the stabilisation of sand, it has a shallow root system which allows it to anchor easily. The organic matter it provides assists in the establishment of other dune species, while it provides food source for insects.



Images (clockwise from top left) – Author's own photograph; iNaturalist (Sea Knotgrass (Polygonum maritimum) · iNaturalist); BSBI (see ref. at base of map).

8.2. Sea Holly *Eryngium maritimum*



Sea Holly is a perennial herb belonging to the Apiaceae or Umbelliferae family (celery, carrot, or parsley). It is native to Europe and North Africa and its status is of within England is near threatened. It is declining and even extinct in some areas of its northern range, largely due to habitat loss and land use changes. It has a distinct appearance of blue flowering head, flowering in June.



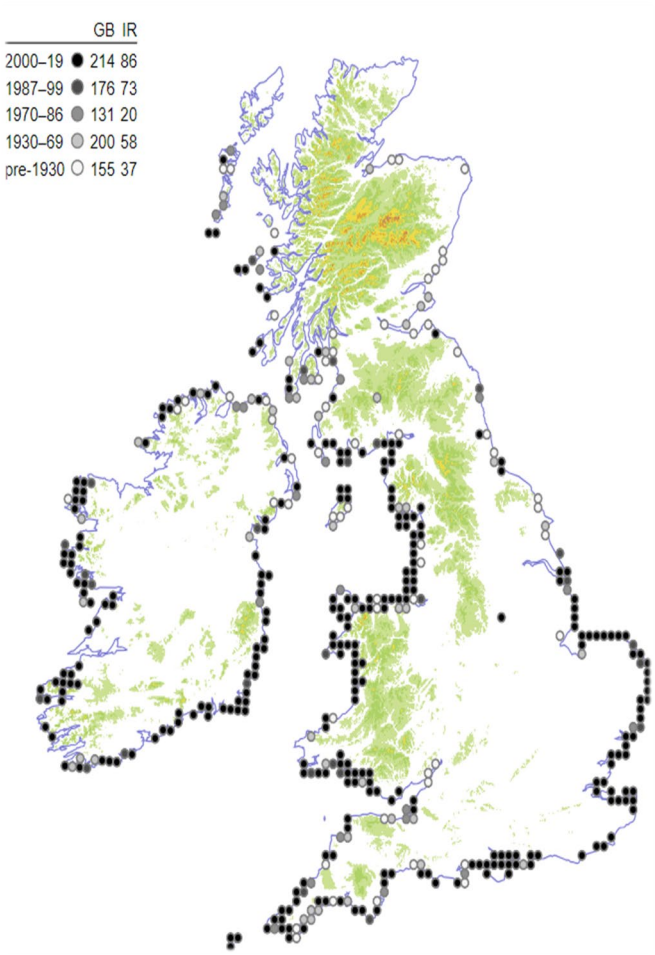


Distribution: Distributed within dune systems along the North and South coast of Cornwall, up to 300m from the coast

Habitat: Sea Holly can be found on coastal dunes, saltmarshes, and rocky shores. This hardy, drought tolerant plant favours well drained, moderately fertile soils, sunny spots and can be found across the UK and Ireland.

Identification: Thistle like, rounded, blue flower heads when in bloom with distinct silvery-blue, spiky edged leaves.

Value to wider habitat: Sea Holly helps to stabilize sand dunes, preventing erosion. The plants deep taproot helps it anchor in the sand, and its spiky leaves and bracts protect the plant from wind and salt spray. The species doesn't support insect herbivores as its protected from grazing by its spininess and chemical defences, however bees and butterflies seek out the species for its nectar.



Images:– Sea Holly, Wildflower web 2024, Six Spotted Burnet on Sea Holly, authors own, map – Plant Atlas 2020

9. Phase One Comparison

9.1. Spalding's Report 2006

9.1.1. A previous Phase 1 assessment of the site has been undertaken in 2006. The imagery from this has been digitally reproduced for the purposes of this assessment, see Figure 5. This digitisation has been clipped to the fixed and mobile site boundary lines, and lain over recent aerial imagery from 2022.

9.1.2. The previous Phase 1 showed that most of the site was open dune and dune grassland, with some cultivated and disturbed land at the southern section of the site. This is supported by a review of high-definition aerial imagery, showing the southeast section of the dune to be vegetated, with very sparce vegetation as the dune moves seaward.

9.1.3. Since this survey was undertaken, there have been significant changes owing to storm damage and high recreational pressure at Porthtowan, images from 2009 show the foredune is becoming increasingly fragmented.

9.1.4. By 2017, following a known time of significant storm damage, there is a very small amount of the dune grassland area to the south of the site, and cordoned off areas for planting on the seaward side, these are extended in 2019.

9.1.5. When comparing the two surveys, the habitats are similar in composition with dune grassland being seen on both, an area of ~0.6ha in 2006 and ~0.4ha in 2023 and shifting dunes with marram/open dune also on both ~0.5ha in 2006 and ~0.45ha in 2023.

9.1.6. The loss of the habitats can be attributed to storm damage and recreation pressure; however the aerial imagery shows that this is recovering, and areas are slowly becoming revegetated.

9.1.7. There has been visible change in the area that is now a building, at the southeast section of the dunes, this was mapped in 2006 as being part of the intertidal zone, aerial imagery shows that the area is vegetated around 2017and construction was undertaken circa 2019.

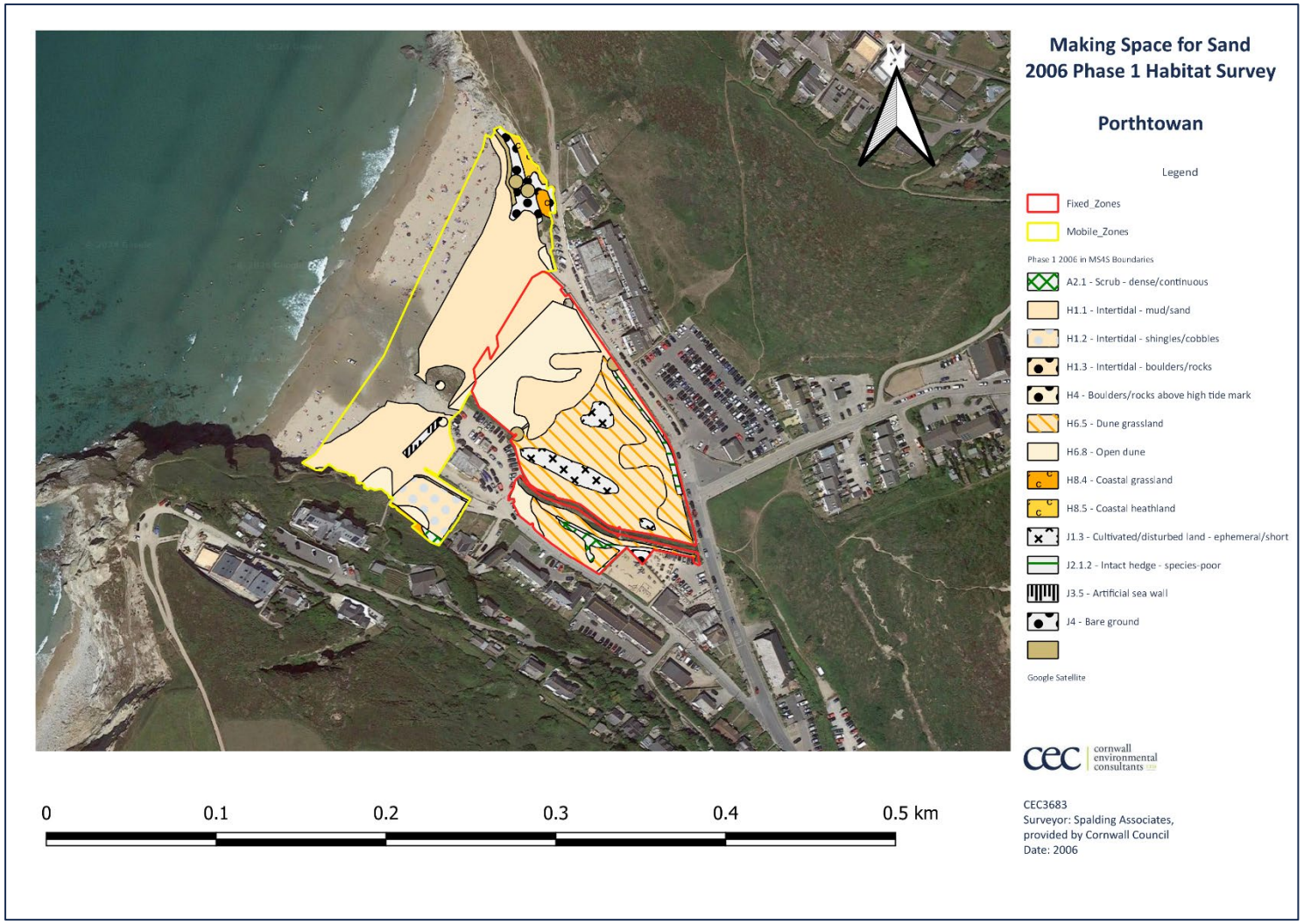


Figure 7: Phase 1 2006

10. Ecological Constraints and Opportunities

10.1. Ecological Constraints

Designated Sites

10.1.1. It is not anticipated that there will be any constraints from designated sites which would impact restoration and enhancement works at Porthtowan.

Invasive Non-Native Species

10.1.2. There are a small number of invasives noted at Porthtowan, montbretia can be removed by hand, ensuring that all underground corms are removed. Hottentot fig, which is located toward the cliffs rather than the main body of the dune, can also be removed by hand. Although the invasive species do not present an immediate problem, early control will help to retain and enhance dune health.

Nutrient Enrichment

10.1.3. Porthtowan is a dog friendly beach all year round, with some restrictions in place over the summer months, however this does not apply to the dune area. Dog waste contributes to a high nutrient load on the dune system. Additional signage to explain to beach users the impact of nutrient enrichment from discarded dog waste and how this is impacting the delicate habitat could be placed on site.

Recreational and Development Pressures

10.1.4. Porthtowan is an extremely busy and popular tourist and recreational area, however the pressure that footfall and development has on the existing dune system is limiting the successional process. Areas which have been cordoned off for planting are starting to develop well, providing additional demarcated access would have additional benefits and allow the habitat to continue develop.

Current control measures

10.1.5. The local community group are active in the restoration of the habitat and actively planting dune species within areas of the site.

11. Biodiversity Net Gain & Ecological Enhancements

11.1.1. The baseline BNG unit score is 12.09 Habitat Units.

Table 6: Biodiversity Net Gain Units

On site baseline	Coastal Sand Dunes	12.09
Total		**12.19**

11.1.2. Key opportunities for enhancement at Porthtown is for the expansion of the habitat across the currently unvegetated area. The dune health at the foredune is good, with diversity, good health and minimal negative intervention.

11.1.3. The health of the dune grassland is limited by the heavy footfall and nutrient loading, this could be improved, and if the condition of these sections of habitat were to be undertaken then this would see an increase in units of 1.92 (15%).

11.1.4. Successfully restoring the areas of bare sand which lie between the vegetated areas could create a habitat unit uplift of circa 0.25 units over a 10-year period.

12. Conclusions

12.1.1. This report details the ecological baseline for the Coastal Sand Dunes at Porthtowan, including UK Habitats Classification, Biodiversity Net Gain Condition Assessment and Invasives mapping.

12.1.2. Porthtowan hosts key dune habitats 'shifting dunes with marram' and 'dune grassland' – the site is highly fragmented and suffers owing to storm damage and recreation pressure, however the local community and site owners are working collaboratively to restore the dune with native dune planting.

12.1.3. There are a small number of possibilities for Biodiversity Net Gain by the enhancement of the dune grassland areas to the rear of the dune, and the expansion of both the shifting dune and dune grassland which can be achieved through access management and additional planting at the site

13. References

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14. List of Appendices

A. Table of Habitat Types

Polygon no	GIS Reference	Phase 1 Classification	UK Habitat Classification	Secondary Codes	BNG Broad Habitat Type	BNG Classification	BNG Condition Assessment	Area (ha)	BNG Habitat Units	Other classification
178	22087266	Open Dune (H6.8)	Shifting dunes with marram (s3a6)	75	Sparsely Vegetated Land	Coastal Sand Dunes	Good	0.09	1.71	Annex 1 – Shifting Dunes along the Shoreline with *Ammophila arenaria* H2120
179	22087267	Open Dune (H6.8)	Shifting dunes with marram (s3a6)	75	Sparsely Vegetated Land	Coastal Sand Dunes	Good	0.11	1.93	Annex 1 – Shifting Dunes along the Shoreline with *Ammophila arenaria* H2120
180	22087268	Open Dune (H6.8)	Shifting dunes with marram (s3a6)	75,10,48	Sparsely Vegetated Land	Coastal Sand Dunes	Good	0.02	0.38	Annex 1 – Shifting Dunes along the Shoreline with *Ammophila arenaria* H2120
181	22087269	Open Dune (H6.8)	Shifting Dunes with Marram (S3a6)	75	Sparsely Vegetated Land	Coastal Sand Dunes	Moderate	0.03	0.42	Annex 1 – Shifting Dunes along the Shoreline with *Ammophila arenaria* H2120
182	22087270	Open Dune (H6.8)	Shifting Dunes with Marram (S3a6)	75	Sparsely Vegetated Land	Coastal Sand Dunes	Moderate	0.06	0.77	Annex 1 – Shifting Dunes along the Shoreline with *Ammophila arenaria* H2120
183	22087271	Open Dune (H6.8)	Shifting Dunes with Marram (S3a6)		Sparsely Vegetated Land	Coastal Sand Dunes	Moderate	0.07	0.86	Annex 1 – Shifting Dunes along the Shoreline with *Ammophila arenaria* H2120
185	22087272	Dune Grassland (H6.5)	Dune grassland (s3a7)	48,10	Sparsely Vegetated Land	Coastal Sand Dunes	Moderate	0.14	1.63	Annex 1 – Fixed coastal dunes with herbaceous vegetation H2130*Ammophila arenaria*

Polygon no	GIS Reference	Phase 1 Classification	UK Habitat Classification	Secondary Codes	BNG Broad Habitat Type	BNG Classification	BNG Condition Assessment	Area (ha)	BNG Habitat Units	Other classification
										H2120
186	22087273	Dune Grassland (H6.5)	Dune grassland (s3a7)	10	Sparsely Vegetated Land	Coastal Sand Dunes	Moderate	0.16	1.91	Annex 1 – Fixed coastal dunes with herbaceous vegetation H2130
187	22087274	Dune Grassland (H6.5)	Dune grassland (s3a7)		Sparsely Vegetated Land	Coastal Sand Dunes	Moderate	0.04	0.45	Annex 1 – Fixed coastal dunes with herbaceous vegetation H2130
188	22087275	Dune Grassland (H6.5)	Dune grassland (s3a7)	16	Sparsely Vegetated Land	Coastal Sand Dunes	Poor	0.02	0.15	Annex 1 – Fixed coastal dunes with herbaceous vegetation H2130
189	22087276	Dune Grassland (H6.5)	Dune grassland (s3a7)	16	Sparsely Vegetated Land	Coastal Sand Dunes	Poor	0.03	0.16	Annex 1 – Fixed coastal dunes with herbaceous vegetation H2130
190	22087277	Dune Grassland (H6.5)	Dune grassland (s3a7)		Sparsely Vegetated Land	Coastal Sand Dunes	Poor	0.03	0.20	Annex 1 – Fixed coastal dunes with herbaceous vegetation H2130
191	22087278	Dune Grassland (H6.5)	Dune grassland (s3a7)		Sparsely Vegetated Land	Coastal Sand Dunes	Moderate	0.02	0.20	Annex 1 – Fixed coastal dunes with herbaceous vegetation H2130
192	22087279	Dune Grassland	Dune grassland		Sparsely Vegetated	Coastal Sand	Poor	0.02	0.22	Annex 1 – Fixed coastal dunes with herbaceous vegetation

Polygon no	GIS Reference	Phase 1 Classification	UK Habitat Classification	Secondary Codes	BNG Broad Habitat Type	BNG Classification	BNG Condition Assessment	Area (ha)	BNG Habitat Units	Other classification
		(H6.5)	(s3a7)		Land	Dunes				H2130
193	22087280	Dune Grassland (H6.5)	Dune grassland (s3a7)		Sparsely Vegetated Land	Coastal Sand Dunes	Moderate	0.008	0.09	Annex 1 – Fixed coastal dunes with herbaceous vegetation H2130
184	22087573	Built-up areas (J3)	Developed land; sealed surface (u1b)	381	Urban	Developed land; sealed surface	N/A	0.06	0.00	

Key Secondary Codes (UK Habs Version 1.1)

10: Scattered Scrub

17: Ruderal/Ephemeral

48: Non-native

75: Management

381 Beaches and Sand Dunes

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