CORE MANAGEMENT PLAN

INCLUDING CONSERVATION OBJECTIVES

FOR
Y TWYNI O ABERMENAI I ABERFFRAW/Abermenai to Aberffraw Dunes SAC
GLANNAU MÔN: CORS HELI/ Anglesey Coast: Saltmarsh SAC
GLANTRAETH SAC
incorporating
NEWBOROUGH WARREN - YNYS LLANDDWYN SSSI
TYWYN ABERFFRAW SSSI
MORFA DINLLE SSSI
GLANTRAETH SSSI

Cyfoeth Naturiol Cymru Natural Resources Wales

NATURA 2000

Noddir gan Lywodraeth Cymru Sponsored by Welsh Government

Version	Date	Summary of changes made	Approved by
Version 3	2022	Edited by John Ratcliffe then Dave Thorpe	Euros Jones
Version 2	2019	Revised format, clarified objectives, added Glantraeth SAC, added SSSI features	
Version 1	2008-04098		Nick Thomas

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4.7 Conservation Objective for N2K Feature 8: Petalwort *Petalophyllum ralfsii* (EU Ref: S1395)

4.8 Conservation Objective for N2K Feature 9: Shore dock *Rumex rupestris* (EU Ref: S1441)

4.9 Conservation Objective for N2K Feature 10: Great crested newt *Triturus cristatus* (EU Ref: S1166)

4.10 Conservation Objective for N2K Feature 11: Estuaries (EU Ref: H1130)

4.11 Conservation Objective for N2K Feature 12: *Salicornia* and other annuals colonising mud and sand (EU Ref: H1310) (includes the lower part of the saltmarsh community SSSI feature)

4.12 Conservation Objective for N2K Feature 13: Mudflats and sandflats not covered by seawater at low tide (EU Ref: H1140) (includes intertidal sandflat and mudflat communities, the sand shrimp *Gammarus chevreuxi* and the marine polychaete worm *Ophelia bicornis* SSSI features)

4.13 Conservation Objective for N2K Feature 14: Atlantic salt meadow (ASM) (EU Ref: H1330) (includes the saltmarsh communities SSSI feature)

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PREFACE

This document provides the main elements of Natural Resources Wales' management plan for the sites named. It sets out what needs to be achieved on the sites, and advice on the action required. This document is made available through Natural Resources Wales' web site and may be revised in response to changing circumstances or new information. This is a technical document that supplements summary information on the Natural Resources Wales' web site.

One of the key functions of this document is to provide Natural Resources Wales' statement of the Conservation Objectives for the relevant Natura 2000 sites. This is required to implement the Conservation of Habitats and Species Regulations 2010, as amended. As a matter of Welsh Government Policy, the provisions of those regulations are also to be applied to Ramsar sites in Wales.

1. VISION FOR THE SITE

This is a descriptive overview of what needs to be achieved for conservation on the sites. It brings together and summarises the Conservation Objectives (part 4) into a single, integrated statement about the site.

The purpose of designation of Natura 2000 (N2K) sites is to secure the maintenance or restoration of habitats and species to favourable conservation status *for the foreseeable future*. As we foresee a changing climate, despite uncertainty of the nature, degree, or timing of those variations, we must ensure the resilience of each site to a changing environment. This will be achieved firstly by ensuring favourable condition of the important features, as a healthy feature is likely to be more resilient to the effects of climate change than one already stressed. Secondly, consideration must be given to the structures, functions and processes which maintain or boost the resilience of ecosystems to climate stress, including avoidance, reduction or mitigation of other stress factors such as invasive species, nutrient enrichment, habitat and population fragmentation.

These sites form part of a wider network and are ecologically connected with their surroundings and with other designated sites in the region. Although the focus of this document is on individual sites, the conservation objectives and management requirements need to be considered in the wider context. A connected network of sites is more robust than sites in isolation, and more resilient to pressures such as climate change.

Abermenai to Aberffraw dunes and Glannau Môn saltmarshes, with Glan-traeth together form a complex coastal sedimentary geo-system. These coastal landforms should demonstrate the natural processes of sediment transfer, erosion and deposition within the local coastal system. These geomorphological processes (which move shingle, sand and mud to create beaches, dunes, slacks, estuarine flats and shingle ridges) also create the physical template upon which biological features develop. The sequence of coastal habitat zones is an important aspect to the integrity of these sites.

The sites should exhibit typical rocky shore, shingle, dune and estuarine communities, normally including mudflats and sandy foreshore, strandline, foredunes, mobile and fixed dunes, dune heath, humid dune slacks and saltmarsh. These will vary in their relative proportion and location in response to naturally changing landforms but should not diminish in total (aggregate) extent. Sandbanks occur offshore, controlled by cycles of currents, tides and waves in Caernarfon Bay and the Menai Strait, while mudflats accumulate in sheltered estuaries. There should normally be a strandline with embryonic dunes on the windward shore each summer, areas of mobile dune, “blowout” and areas of newly formed wet slack to provide early successional phases of these habitats. Dune grassland should be herb rich with short grasses, including early sand grass and a rich invertebrate fauna. Native dune woodland and scrub, composed of locally native species, may develop on inland parts of the fixed dunes where organic rich soils have naturally formed. Dune heath should be maintained wherever it occurs and encouraged on appropriate areas where leaching and acidification of dune soils has occurred. Shingle ridges should support coastal plants and birds typical of this habitat such as yellow-horned poppy, sea spurge, oraches,

sea campion and sea mayweed, with nesting ringed plover and oystercatcher. On older, stable shingle ridges and dry hollows, lichen-dominated dune grassland characterised by abundant lichens including *Cladonia* species, often called “lichen heath”, should thrive.

Newborough forest forms part of the coastal ecosystem in the SAC. The maturing mixed pine forest has had and continues to impact on the conservation status of the sand dune and species features and to deprive the soft coastal frontage of the capability to react to storms and changing climatic events. This reduces the dune system’s ability for natural recovery. Future management should seek to reduce impacts, restore remnant dune vegetation and allow both the habitats and the forest to adapt to climate change and sea level rise.

Llyn Coron and Llyn Rhos-ddu should be clear-water lakes supporting a rich aquatic flora and fauna, such as eight-stamen waterwort, hairlike pondweed and swan mussel while the Afon Ffraw is free to meander naturally and supports river water crowfoot.

The sites should contain viable populations of shore dock and petalwort along with other rare and uncommon native species (both plants and animals) typical of these habitats. Great crested newt and medicinal leech should occur in numerous pools.

The estuaries should contribute to the support of wintering populations of wildfowl and waders, particularly pintail, and there should be breeding populations of, notably, cormorant, lapwing and skylark. The sites should also support foraging chough on dunes and strandlines. Coniferous may provide shelter to roosting ravens and, where compatible with other objectives, red squirrels. The connection of these sites to other parts of the landscape should be enhanced by, for example, corridors or “stepping stones” of woodland habitat or, by the restoration of adjacent dune or intertidal habitats.

The Precambrian bedrock geology at Ynys Llanddwyn should continue to be one of the best localities in Great Britain for the study of rocks of this period and type and NRW should maintain or increase the current level and continuity of exposure.

All this should be achieved through a holistic approach to management, which recognises that critical processes, such as sediment supply, erosion and deposition, groundwater (quantity, quality and movement) and plant and animal dispersion are dynamic and occur on a landscape scale. Thus, the specific location of some individual features may vary periodically, but populations should be maintained over time reflecting these natural processes. Where human land use or human-induced changes have damaged or stabilised site features, active intervention may be appropriate to assist or restart natural processes.

2. SITE DESCRIPTION

2.1 Area and Designations Covered by this Plan

Unitary authorities: Ynys Môn / Isle of Anglesey, Gwynedd.

Total area (hectares): 2942.78 ha

Site (SAC)	Grid reference (Centroid)	Area (hectares)
Y Twyni o Abermenai i Aberffraw / Abermenai to Aberffraw Dunes	SH413642	1870.89
Glannau Môn: Cors Heli / Anglesey Coast: Saltmarsh	SH380655	1058.00
Glan-traeth	SH417666	13.89

Designations covered: This plan covers Y Twyni o Abermenai i Aberffraw / Abermenai to Aberffraw Dunes Special Area of Conservation (SAC), Glannau Môn: Cors Heli /Anglesey Coast Saltmarsh SAC and Glantraeth SAC which are spatially and functionally interlinked. These 3 SACs are underpinned by 4 SSSIs, notably Newborough Warren – Ynys Llanddwyn SSSI (which underpins the major part of the saltmarsh SAC and much of the sand-dune SAC), Tywyn Aberffraw SSSI, (which underpins a small fraction of the saltmarsh SAC and much of the sand-dune SAC), Morfa Dinlle SSSI on the south side of the Menai Strait, which underpins part of the sand-dune SAC and Glantraeth SSSI which abuts Newborough Forest part of Newborough Warren - Ynys Llanddwyn SSSI. Much of the Newborough Warren -Ynys Llanddwyn SSSI (outside the afforested area) is also a National Nature Reserve.

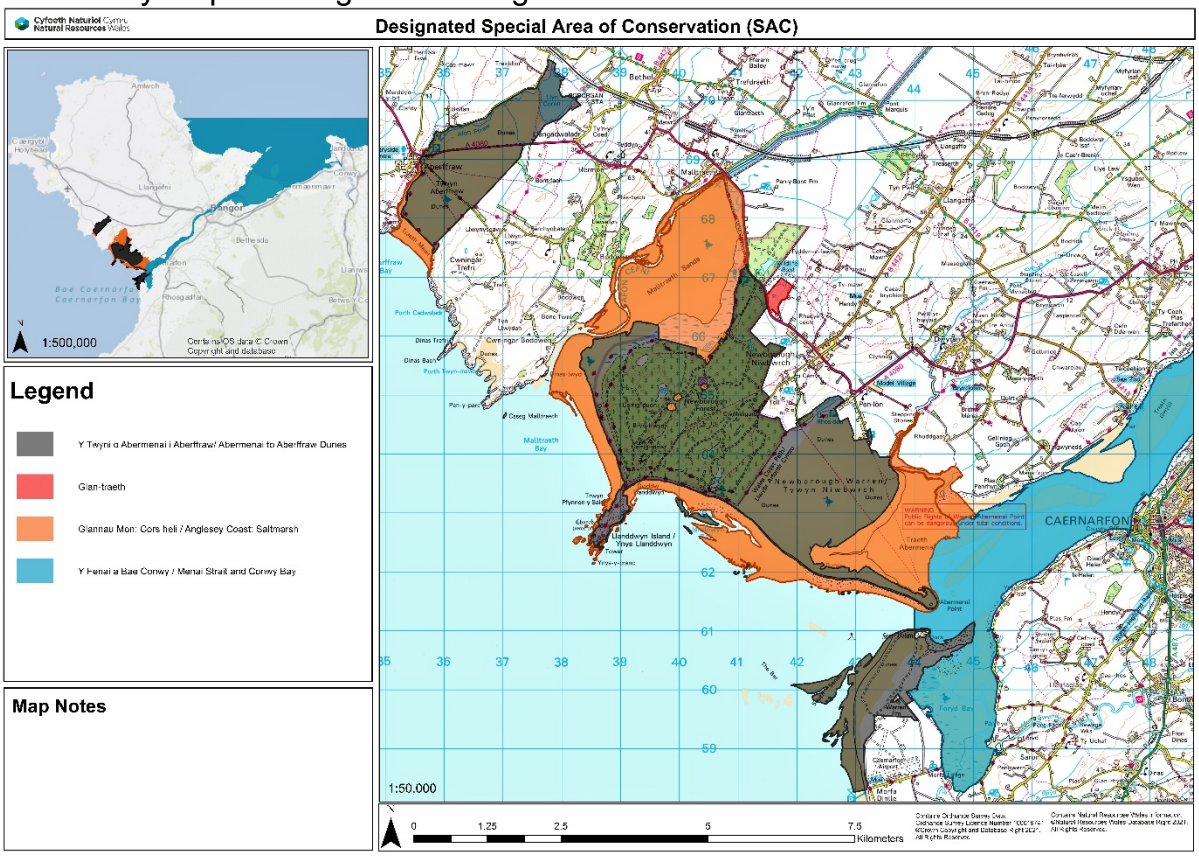
Parts of the Abermenai to Aberffraw Dunes SAC are also within the Anglesey Terns / Morwenoliaid Ynys Môn Special Protection Area (SPA) and reference should be made to that site for conservation objectives and management recommendations for those features.

Tywyn Aberffraw SSSI and Newborough Warren – Ynys Llanddwyn SSSI lie within the Anglesey Area of Outstanding Natural Beauty (AONB).

The sites also abut the Menai Strait – Conwy Bay marine SAC, Malltraeth Marsh / Cors Ddyga SSSI and Y Foryd SSSI.

Detailed maps of the designated sites are available on the Natural Resources Wales website. https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-land-and-seas/?lang=en

A summary map showing the coverage of this document is shown below



2.2 Outline Description

The Abermenai to Aberffraw Dunes SAC lies at the southern end of the Menai Strait in Ynys Môn and Gwynedd, Wales. It comprises 3 main areas. Tywyn Aberffraw is a large and relatively intact calcareous hind-shore dune system enclosing a shallow lake (Llyn Coron). Newborough Warren is a large sand-dune system, partly afforested, located between the estuaries of the Afon Cefni and the Afon Braint including the shingle spit of Abermenai. Morfa Dinlle, on the south side of the Strait, is a large shingle spit and dune system.

Abermenai to Aberffraw Dunes SAC lies adjacent to, and is functionally integrated with, the Anglesey Coast Saltmarsh SAC. This includes the estuaries of the Afon Ffraw (within Tywyn Aberffraw SSSI) Afon Cefni and Afon Braint (within Newborough Warren – Ynys Llanddwyn SSSI).

Glan-traeth SAC, selected for its population of great crested newts, is adjacent to the Abermenai to Aberffraw Dunes dune SAC and Newborough Warren Ynys Llanddwyn SSSI.

In addition, Y Fenai a Bae Conwy / Menai Strait and Conwy Bay Marine SAC, selected for its reefs, bays, mudflats and sandflats, subtidal sandbanks and caves lies between Newborough Warren and Morfa Dinlle, while the intertidal areas of both the Cefni estuary and Tywyn Aberffraw fall within the Anglesey Terns / Morwenoliaid Ynys Môn Special Protection Area (SPA).

Tywyn Aberffraw SSSI
Is a large and intact calcareous dune system with dune ridges (both mobile and consolidated) damp slacks and dune grassland together with a shallow lake (Llyn Coron) and respective outflow stream. Inland of the relatively mobile fore-dunes, low-lying slacks occur between more stable dune ridges and at the landward end of the system, (where Llyn Coron is situated) there is an extensive tract of fixed-dune grassland. Livestock graze much of the site in winter and there is a range of typical dune vegetation communities, many of which are floristically rich. Llyn Coron is a relatively nutrient-rich lake with an interesting aquatic macrophyte community; several uncommon species, e.g. eight-stamen waterwort (*Elatine hydropiper*) and hairlike pondweed (*Potamogeton trichoides*) are present as well as a diverse invertebrate fauna. The Afon Ffraw, flowing from the lake, is tidal in its lower reaches (with small areas of associated saltmarsh) and its flora includes a water crowfoot (*Ranunculus fluitans*) uncommon in North Wales.

Tywyn Aberffraw is an important site for coastal geomorphology. It comprises an area of blown sand and dunes occupying a confined valley site. Due to physical constraints, there is little possibility of sand entering the bay from alongshore and the bounding cliffs supply little material to the beach. Tywyn Aberffraw therefore offers an excellent opportunity for the study of beach and dune relationships in an area of restricted sediment supply. A further important feature is the relative isolation of individual grey parabolic dunes upon a sand plain, a landform assemblage that has few comparable equivalents in England and Wales.

Newborough Warren – Ynys Llanddwyn SSSI
This SSSI encompasses the estuaries of the Afon Cefni and the Afon Braint, which exert controlling influences on the physical development of the intervening dune system as well as supporting important biological communities in their own right. The dunes mask the central rock ridge leaving only Ynys Llanddwyn and a few exposures of the underlying solid geology. Many of these outcrops are obscured by conifers, scrubby vegetation, needle litter and soil. Afforestation of the western half of the dune system has altered the ecological development of those dunes; however, the area remains an integral part of the site due to shared lithology, landforms, hydrology, relic dune communities and many rare species. The juxtaposition of ancient rocks, dynamic coastal processes and diverse biological communities make Newborough Warren – Ynys Llanddwyn a site of outstanding importance, which has been extensively used for scientific research.

Newborough Warren is the largest sand dune system in Wales, showing the full development from strandline and shingle flora, dune ridges, wet and dry slacks to dune grassland, dune heath and scrub development along with a dune-dammed lake, freshwater fen, saltmarsh and mudflats. Although ecological development in the afforested dunes has been substantially modified by the non-native commercial conifer crop, some of the unplanted slacks still retain remnant sand-dune vegetation. Ponds and streams within and behind the forest support great crested newt, charophyte species, medicinal leech and shore dock populations.

Morfa Dinlle SSSI

Morfa Dinlle SSSI is of special interest for sand dune and shingle plant communities and geomorphological interest. Morfa Dinlle comprises a complex shingle / dune spit which formed as a result of erosion of glacial deposits, primarily to the south of the site, and their transport northwards and subsequent deposition. At the seaward boundary much of the site is characterised by bare shingle, which gives way inland to vegetated shingle and sand dunes.

Morfa Dinlle is one of the last active drift-aligned gravel ridge systems in western Britain, supporting a fine example of a “dry-core” dune. The geomorphological interest of the site complements that for which Newborough Warren was notified, and the two sites form part of the same geomorphological system. The present alignment of the shingle coastline is a function of the complex interaction of the wave climate, tidal-regime and sediment availability and is of particular value for the study of coastal processes. The dune system, which has developed on top of the shingle ridges, is a ‘dry core’ or ‘perched’ dune system and is a result of isolation from the water table by the highly permeable shingle. The dry valleys in the dunes, supporting “lichen heath” provide an interesting contrast to the wet slacks present at Newborough Warren.

Together, these sites provide a unique opportunity for research both into the development of the Menai Strait itself, tidal inlets generally, past sea level and climate change. The coastline of Morfa Dinlle and the adjacent Newborough Warren will respond to changing sea levels, which makes them particularly important for understanding future coastal changes induced by fluctuations in climate and sea level.

Glantraeth SSSI
Glantraeth SSSI occurs on an area of sand dune which was quarried for sand in the past and is of special interest for its large population of great crested newts *Triturus cristatus*, and its other breeding amphibia. It also supports typical sand dune species including early sand grass *Mibora minima* and meadow saxifrage *Saxifraga granulata*.

The structure and functions of the site

Achieving favourable conservation status depends on maintaining, or restoring, the coherence of the site's ecological structure and functions. This section describes objectives for the significant structures and functions, including processes that shape the site and its habitats.

Coastal landform structures demonstrate the natural processes of sediment transfer and deposition within the local coastal system. Sand drying on exposed beaches is generally transported onshore by the prevailing wind and accumulates around obstacles such as seaweed, driftwood or plants to form dunes. Specialised plants such as marram grass, which tolerate sand inundation, trap further sand and enable substantial deposits to be fixed, often as ridges of sand dune behind the foreshore. Sand also accumulates in hind shore areas including the adjacent estuaries.
Tidal exchange in the estuaries of the Menai Strait, Afon Cefni and Afon Ffraw is responsible for remobilising and pumping some of this material back into coastal waters where complex local movements occur. The sand supply for Newborough Warren and Morfa Dinlle appears to be shared across the mouth of the Menai Strait, while that for Tywyn Aberffraw is considered to be a more isolated system.

Instability and breakdown of high dune ridges leads to the development of erosion episodes as dry sand is scoured by wind down to the water table (or shingle) and transported inland in a series of gradually advancing parabolic fronts. Sand deposited on the lee of the ridge is colonised by marram grass, while the revealed wet ground or “slack” forms the basis for distinctive wetland communities.

These geomorphological processes (which move sand, shingle and mud to create beaches, dunes, slacks and associated estuarine flats) create the physical template upon which biological features develop. The resulting pattern of sandy foreshore, shingle bars, strandline, foredunes, mobile and fixed dunes and humid dune slacks (in association with the adjacent estuarine mudflats and saltmarsh) is a critical feature of the dune ecosystem. The components will vary over time in their proportion and precise location in response to natural forces and ecological succession but should exhibit the typical zonation of sand dunes. There should normally be a strandline at some location on the shore each summer, areas of mobile dune “blowout” and areas of newly formed wet slack to provide early successional phases of these habitats. Fixed dune grassland develops inland on dry calcareous sand and can be very flower-rich. Bare sand continues to play a part in all these habitats providing nesting and foraging space for many invertebrates and reptiles. Dune woodland and scrub, composed largely of native species, may occur on some inland parts of the fixed dunes. Dune heath including lichen heath also occurs. The site should also demonstrate natural transitions to the adjacent estuarine saltmarsh, mudflats and shingle. In accepting natural dynamic variation, some limits are set to trigger a review and re-evaluation of change since key elements of the coastal features are the objective of Natura 2000 sites and may require revised intervention.

The site has 4 discrete hydrological catchments: Aberffraw (Afon Ffraw, Afon Gwna and Afon Frechwen) Newborough North (Afon Cefni) Newborough South (including Llyn Rhos-ddu and Afon Braint) and Morfa Dinlle. Water supply to the dunes is largely from rainfall, though there would appear to be some down-slope supply to Aberffraw dunes from the southeast slopes and from Llyn Coron and Afon Gwna. Both Aberffraw and Newborough dunes appear to be underlain by impermeable material (mostly boulder clay) whilst Morfa Dinlle dunes (and Abermenai spit) are underlain by extensive shingle deposits. Water loss occurs via canopy interception, evapo-transpiration and lateral (seaward) groundwater movement. The water table of the dunes is essentially domed and defines the base of the intervening wind scoured valleys or "slacks" between the dune ridges. The distribution and condition of the dune slacks is thereby partially determined by the water table.

At Aberffraw, Llyn Coron is supplied with water from the Afon Gwna – with consequential risks to water quality from a large agricultural catchment. At Newborough, Llyn Rhos-ddu receives drainage from a small adjacent agricultural catchment but also supports the water table of the adjacent dunes. The shallow pools at Glantraeth (and elsewhere) dry out occasionally, which eliminates fish and enables the meta-population of great crested newts to thrive.

These calcareous dunes within the Y Twyni o Aberffraw i Abermenai SAC are formed from lime-rich (shelly) sands and support a characteristic flora and fauna as a result. Soil acidification, by leaching of lime from surface horizons, results in locally acidic areas leading to dune heath on old dunes and shingle ridges.

Dune soils are naturally infertile. Typical dune plants are therefore adapted to conditions of low fertility. Increased nutrient levels, particularly nitrogen levels, are associated with the development of common competitive "weed" species such as Yorkshire fog grass, fireweed, bramble and nettles, to the detriment of typical dune flora and fauna.

Grazing removes excess herbage and reduces competition from coarse grasses or scrub, allowing typical sand dune species to flourish. Grazing with ponies, cattle or sheep (in winter) also enables rabbits to establish sustainable colonies (they cannot maintain a viable population, while suffering outbreaks of myxomatosis, in the absence of larger grazing animals) and create a patchwork of grazing patterns and sward height. The bare sand patches caused by hoofed animals and rabbits are also important for many invertebrates and creates opportunities for renewed sand movement. With the exception of small areas at Tywyn Aberffraw, none of the saltmarshes are normally grazed by livestock.

Soft coasts are naturally dynamic environments. The structure, functions (including environmental processes) and species populations of these habitats are inextricably linked and are inherently dynamic, often showing spatial and temporal variation. This dynamism is primarily driven by environmental and physical factors, including sediment supply, movement and quality, prevailing weather conditions, storm events, water level etc. Apparently “natural” variation may be driven by human influenced changes to factors such as prevailing weather conditions or sea level. Changes in the alignment of the coast due to sea level rise are forecast by Pye & Saye (2007). The Newborough frontage has had periods of advance and retreat, these have been mapped (Pye and Blott 2020). Coastal changes need to be taken into account in managing this geosystem. For the purpose of these conservation objectives, “natural” is taken to encompass climate change and sea level rise (despite the likelihood of their anthropogenic origin) since similar changes have, in the past, been attributable to entirely natural causes. Human action has modified habitats and species populations in various ways, to varying degrees and at varying spatial scales. Continuing human intervention such as the introduction of grazing, sand mobilisation by frontal dune notches or scrape excavation in the dune grassland and slacks and invasive species or conifer removal may be necessary to overcome the damaging effects of past and present human intervention.

2.3 Outline of Past and Current Management

Tywyn Aberffraw is a popular recreational site. During the 1960s and 1970s, with the growth of motor traffic, vehicle access and resultant erosion tracks were evident across wide swathes of the site. With the gradual restriction of vehicle access, parking has been largely contained to the bridge area. The result is a renewed growth of the frontal dunes in response to reduced visitor pressure and arguably an improved experience for visitors. Tywyn Aberffraw is registered Common Land with a long history of common grazing; registered rights exist for the equivalent of 272 livestock units on 280ha of dune land. Traditional cattle grazing was virtually abandoned after 2000, but winter grazing was re-established in 2008 under a management agreement. Rabbit grazing complements the use of livestock and helps maintain the short sward and bare patches necessary for many of the interest features. Groundwater contamination from adjacent

agricultural land has been shown to influence the ecology of wet slacks here (Rhymes et al. 2014) and nutrient enriched runoff from cattle feeding areas into the site is evident along the southern boundary. Llyn Coron is a shallow lake used for trout fishing; it is regularly re-stocked with brown trout since feeder streams do not support good spawning grounds. Nutrient pollution from the lake catchment is evident in high P levels and resultant algal blooms. The Afon Ffraw and the Afon Frechwen have a history of dredging and apparent straightening and the water level in Llyn Coron has to be retained by a small sluice.

Ynys Llanddwyn was the base for the Newborough Pilots (guiding ships to Caernarfon) until the early 20th century and later became the first RSPB reserve in Wales when a tern colony thrived there. It retains a (disused) lighthouse and an exhibition centre and has become a "honey-pot" recreational attraction while the open dunes provide for quiet recreational use. Newborough village was famed for its marram weaving industry up to the early 20th century, the grass being harvested from the dunes. Between 1947 – 1965 over half of the dune system was afforested with Corsican pine to stabilise the mobile sands, smothering most of the original dune vegetation, lowering the water table and preventing further geomorphological development (Hill & Wallace 1989, Bristow 2003). The remainder of the dunes (along with Ynys Llanddwyn and the adjacent estuaries) are managed as a National Nature Reserve. Small parts are registered as Common Land and there are defined public rights of way across the dunes, but from 1955 to 1986 there was virtually no livestock grazing of the dunes which, in conjunction with the decline of rabbits due to myxomatosis disease and nitrogen deposition (Phoenix et al 2012) led to a thick grass cover, stabilisation of the sand and decline in the floristic richness of the dunes. The reintroduction of light grazing (first by sheep, then with variously sheep, cattle and ponies) now to over 80% of the open dunes, has been accompanied by some recovery of the rabbit population and increased diversity of the sward. However, the stabilisation of the dunes and the lack of new erosion cycles led to a drastic contraction of the earlier dune zonation, a loss of bare sand and early successional habitats, notably of mobile dune habitat and embryonic dune slacks, and extinction or decline in the specialist biota associated with these areas. (Rhind et.al. 2001, Jones et al. 2010, Pye & Blott 2012, Loxton 2013, Callaghan 2014).
At Newborough major works were carried out to establish the plantation including construction of a major sand bund along the Malltraeth frontage and the importation of brash to establish a mulch for tree planting. As well as providing a saleable timber crop the plantation has become a popular recreational asset and provides the main access point to Newborough beach. Reintroduction of red squirrel *Sciurus vulgaris* to the plantation in 2003 has restored populations of a priority species. Corsican pine suffers from red-band needle blight *Dothistroma septosporum* and efforts are now underway to manage this by thinning to reduce humidity levels and by diversification of the crop. Rapid erosion of frontal dunes in the winter storms of 2013/14 have shown the site's vulnerability to rapid change in storm events. Dunes in front of the beach car park retreated by roughly 1m/year between 1960 and 2020 but much faster (up to 5m per year) between 2009 and 2020. Storms in 2019/20 eroded the Car Park frontage still further (Pye 2020).

The construction of the Malltraeth "Cob" embankment in about 1824 (and smaller embankments on the Afon Braint) led to the constriction of the Cefni estuary, reducing the tidal prism, constraining the river channel and initiating a phase of rapid

sedimentation, the build-up of mudflats and saltmarsh and the growth of the northern lobe of dunes. Some 20 km² of intertidal habitat was reclaimed for agriculture. The invasion of cord grass, *Spartina anglica*, may have accelerated this accumulation. A "three estuaries" agreement between the then Nature Conservancy and the Wildfowl Association of Great Britain & Ireland (now BASC) in 1965 established that wildfowling would be permitted on Y Foryd and Traeth Cefni (the latter under a CCW permit system) whilst the Braint estuary (Traeth Melynog) would be managed as a sanctuary.

A brief tidal "washover" of the Abermenai shingle spit in the early 1970s prompted the reinforcement of the spit with slate boulders by the Caernarfon Harbour Trust in an attempt to ensure that a second channel into the Menai Strait (which could threaten the depth of navigation) did not arise. The ensuing stability led to the accumulation of dunes on the spit and reduction of shingle habitat, contributing to the loss of the little tern *Sterna hirudo* colony there by 1979, perhaps abetted by the arrival of foxes *Vulpes vulpes* on the island.

Morfa Dinlle, like Aberffraw and Newborough dunes, was used for wartime military training including bomb disposal. Mine fields existed at Morfa Dinlle – a potential constraint to site management. The spit at Morfa Dinlle supported the last little tern colony in NW Wales until 1988 (Lovegrove et al 1994). Sheep grazing has predominated for many years and, with a large rabbit population, maintained the short sward of the lichen heath. Parts of the site were used for sewage sludge disposal prior to SSSI notification. Coastal defence works at Dinas Dinlle installed boulder fish tailed groynes and a retreat area north of the village in the early 1990s. This could disrupt sediment supply to the spit. Beach nourishment was carried out to reduce impact.

The mudflats of the Cefni and Braint estuaries support designated shellfish beds managed by the Welsh Government as public fisheries. Both estuaries (and the adjacent Y Foryd) support beds of the seagrass *Zostera noltii*, and shellfish management is modified to protect this valuable habitat.
Glan-traeth SAC is privately owned. Historically the site was used for sand extraction and later as a tip for waste rubble and topsoil with a view to reclaim the dunes for agricultural use. The infill areas have vegetated over and probably provide valuable hibernacula and foraging areas for amphibians and reptiles. It is partly grazed by cattle. There are two main breeding ponds on this site. These can dry out in exceptionally dry summers which eliminates fish (to the benefit of the newts) and in wet seasons further ponds form in the depressions on the land.

All these areas are extensively used for scientific research and training, as well as multiple recreational and aesthetic uses.

In recent years management of the sites has encompassed extensive provision for recreational use, particularly at Newborough, including car parks, marked trails, zoning of activities by location and season as well as habitat and species management. Restoration of livestock grazing has been achieved at both Newborough and Aberffraw and maintained at Morfa Dinlle.

Stabilisation of the dunes, compression of the typical habitat zones and consequential loss of biodiversity (Bristow 2003, Pye & Blott 2012, Howe et al 2012, Stratford 2014, Bosanquet 2012) has promoted a more radical approach to management. Areas of

afforestation have been removed from the frontal dunes at Newborough to restore some natural dune habitat and several large scrapes undertaken to rejuvenate old dune slacks. Notches have been excavated in frontal dune ridges harnessing the power of the wind to remobilise the sand and restore dynamic processes (Pye & Blott 2016). Removal of some 3 ha of conifers on the frontage southeast of the beach carpark was carried out in 2014/15 with monitoring by CEH to look at botanical and invertebrate recovery of the site (Wallace and Jones. 2019). Conifers have been removed from part of the rocky ridge geological feature north of Ynys Llanddwyn to reveal the geology of the site. A hydrological experiment removed another block of conifers on the eastern edge of the forest to monitor changes in ground water. The unlicensed introduction of sand lizard *Lacerta agilis* to Aberffraw and Newborough dunes has established another European Protected Species which must be considered alongside management works. The Sands of Life Project is removing invasive scrub and restoring or creating ponds for great crested newts and Shore Dock in 2020/21. Further sand mobilization works are planned. Further conifer removal in the western frontage was agreed in the Forest Management Plan 2010-15. Storms and salt spray has killed many of these trees since 2014. This plan also identified areas of low and limited intervention and areas for forest protection where canopies would be underplanted to create “Atlantic Dune Woodland”. It should be noted that no Atlantic Dune Woodland currently occurs in Wales but also that it is a natural or semi natural habitat (Ratcliffe, Rothwell and Latham 2013) expected to be found at the back of a mobile and dynamic dune system where conditions allow. Most of the works identified in the Forest Management Plan 2010-15 have yet still to be carried out, and are subject to a Welsh Government Science review. The new Forest Resource Plan will also review all future works and forest operations.

The West Wales Shoreline Management Plan (2014) and Pye & Saye (2007) have forecast changes in the coastline as a result of climate change-induced sea level rise and Curelli et al (2013) have considered changes likely to dune slack habitats as a result of expected climate change. These factors may require further radical management responses to mitigate the deleterious effects of man-made climate change.

2.4 Management Units

The area covered by this plan has been divided into management units to enable practical communication about features, objectives, and management. This will also allow us to differentiate between the different designations where necessary. In this plan the management units have been based on physiographic features, landowner/occupier, grazing units and common land boundaries.

Maps showing the management units referred to in this plan are on this site’s web page.

The following table confirms the relationships between the management units and the designations covered:

Table x. Management units at each site covered by the Core Management Plan.

Unit reference	Unique unit number	SAC	SSSI	Natural Resources Wales owned/managed	Other *Add columns as required, e.g. NNR, SPA, Ramsar*
Newborough Warren – Ynys Llanddwyn SSSI					
	1338	✔	✔	✔	NNR
	1339	✔	✔	✔	
	1340	✔	✔	✔	NNR, SPA
	1341	✔	✔	✔	NNR
	1342	✔	✔	✔	
	1343	✔	✔	✔	NNR, SPA
	1344	✔	✔	✔	NNR
	1345	✔	✔	✔	NNR
	1877	✔	✔	✔	NNR
	1901	✔	✔	✔	
	1902	✔	✔	✔	NNR
	1903	✔	✔	✔	NNR
	1904		✔	✔	NNR
	1905	✔	✔		
	1906	✔	✔	✔	NNR
	1907	✔	✔	✔	NNR
	1908	✔	✔	✔	NNR
	1909	✔	✔	✔	NNR
	1910	✔	✔	✔	NNR
	1911	✔	✔	✔	NNR
	1912	✔	✔	✔	NNR
	1913	✔	✔	✔	NNR
	1926	✔	✔	✔	NNR
	2980	✔	✔		
	2981	✔			
	7039		✔		
Tywyn Aberffraw SSSI					
	1805	✔	✔		SPA
	1806	✔	✔		SPA
	1919	✔	✔		
	1920	✔	✔		
	1921	✔	✔		
	1922	✔	✔		
	1923	✔	✔		
	1924	✔	✔		
	1925	✔	✔		
	7037		✔		
	7053		✔		
	7054		✔		
Morfa Dinlle SSSI					
	1915	✔	✔		
	1916	✔	✔		
	1917	✔	✔		
	1918	✔	✔		
	2785	✔	✔		
Glan-Traeth SSSI					
	439	✔	✔		
	440	✔	✔		
	441	✔	✔		

2.5 Position within an ecological network

This estuarine geosystem is part of a series of UK west coast dune systems within the Atlantic biogeographical region representing variations in form and structure, from dune spits, primary dunes and slacks to mobile hind shore dunes with secondary (reworked) dune landforms. These generally calcareous systems contrast with the often more acidic sands of UK east coast dunes. The intertidal habitats similarly represent a point of variation to other west coast mudflats and saltmarshes, here with ungrazed saltmarsh contrasting with the grazed examples at Morfa Harlech to the south and Morecambe Bay to the north. These sites represent a key geographical element in this range of variation. The estuaries also provide important feeding grounds for migrant waders on the Atlantic flyway and wildfowl arriving from breeding grounds in northern Europe and Russia. The sites sit within a local sedimentary coastal cell (SMP2 2014) and to landward are influenced by water catchment issues (particularly affecting Llyn Coron and Llyn Rhos ddu) and potential connections to former dune and marsh areas around Dywran and to the grazing marshes and former estuarine habitats of Cors Ddyga.

3. THE FEATURES

3.1 Confirmation of Features

Designated feature	Relationships, nomenclature etc.	Conservation Objective in part 4
Y Tywni o Abermenai i Aberffraw / Abermenai Aberffraw Dunes SAC features		
Annex I habitats that are a primary reason for selection of this site		
Embryonic shifting dunes (EU habitat code H2110)	Part of SSSI "Strandline, foredune and mobile dune communities" feature and the "Coastal landforms and the processes controlling beach and dune development" feature.	4.1
Shifting dunes along the shoreline with Ammophila arenaria ("white dunes") (EU habitat code H2120)	Part of SSSI "Strandline, foredune and mobile dune communities". Coastal landforms and the processes controlling beach and dune development.	4.2
Fixed dunes with herbaceous vegetation (`grey dunes`)* (Habitats Directive priority feature) (EU habitat code H2130)	Includes the SSSI "Semi-fixed/fixed dune grassland communities" feature and part of the "Coastal landforms and the processes controlling beach and dune development" feature.	4.3
Dunes with Salix repens *ssp.* argentea (Salicion arenariae*).* (EU habitat code H2170)	Part of the SSSI "Dune slack / mire communities" feature and the "Coastal landforms and the processes controlling beach and dune development" feature.	4.4
Humid dune slacks (EU habitat code H2190)	Part of the SSSI "Dune slack / mire communities" feature and the "Coastal landforms and the processes controlling beach and dune development" feature.	4.4
Annex I habitat present as a qualifying feature, but not a primary reason for site selection		
Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation (EU habitat code H3150)	Llyn Coron (Tywyn Aberffraw) & Llyn Rhos-ddu (Newborough Warren). There are numerous other small ponds and temporary water bodies.	4.5
Transition mires and quaking bogs	Other SAC feature found on site. Adjacent to Llyn Rhos-ddu	4.6

Designated feature	Relationships, nomenclature etc.	Conservation Objective in part 4
(EU habitat code H7140)		
Annex II species that are a primary reason for selection of this site		
Petalwort Petalophyllum ralfsii (EU species code S1395)	A nationally rare liverwort listed as Vulnerable in the Red Data Book of European Bryophytes (European Committee for the Conservation of Bryophytes, 1995) and is protected by Schedule 8 of the Wildlife and Countryside Act 1981.	4.7
Shore Dock Rumex rupestris (EU species code S1441)	A nationally rare vascular plant	4.8

Designated feature	Relationships, nomenclature etc.	Conservation Objective in part 4
Glan-traeth SAC features		
Annex II species that are a primary reason for selection of this site		
Great crested newt Triturus cristatus (EU species code S1166)	Also part of the SSSI "assemblage of amphibians including great crested newt" feature on Newborough Warren – Ynys Llanddwyn SSSI.	4.9
Glannau Môn Cors Heli / Anglesey Coast saltmarsh SAC features		
Annex I habitats that are a primary reason for selection of this site		
Estuaries (EU habitat code H1130)	Afon Ffraw, Cefni, Braint.	4.10
Salicornia and other annuals colonizing mud and sand (EU habitat code H1310)	Part of the SSSI "Saltmarsh communities from the lower to the upper zones including glasswort (*Salicornia spp*)" feature.	4.11
Mudflats and sandflats not covered by seawater at low tide (EU habitat code H1140)	Includes the SSSI "Intertidal sandflat and mudflat communities" feature and the "Coastal landforms and the processes controlling beach and dune development" feature.	4.12
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (EU habitat code H1330)	Part of SSSI "Saltmarsh communities from the lower to the upper zones including glasswort (*Salicornia*)" feature.	4.13

Designated feature	Relationships, nomenclature etc.	Conservation Objective in part 4
Vegetated sea cliffs of the Atlantic and Baltic coasts (EU habitat code H1230)	Includes SSSI “Precambrian rocks exposed in coastal cliffs, foreshore exposures and inland outcrops.” feature	4.14
SPA features		
See Anglesey Terns SPA		
Ramsar features		
Not applicable		
SSSI features		
Coastal landforms and the processes controlling beach and dune development.	Underpins and drives all SAC features	4.15
Precambrian rocks exposed in coastal cliffs, foreshore exposures and inland outcrops.	Forms central rock ridge of Newborough Warren	4.16
Intertidal rocky shore communities and rock pools	Mostly at Ynys Llanddwyn.	4.17
Shingle / boulders above high water mark	Morfa Dinlle and Abermenai.	4.18
Intertidal sandflat and mudflat communities.	Newborough Warren & Tywyn Aberffraw. Inc SAC H1140 “Mudflats and sandflats not covered by seawater at low tide” Seagrass *Zostera noltii* and the polychaete worm *Ophelia bicornis* occur here.	4.12
Saltmarsh communities from the lower to the upper zones including glasswort (*Salicornia spp*).	Newborough Warren & Tywyn Aberffraw. Inc SAC H1310 “*Salicornia* and other annuals colonising mud and sand, and H1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) and H1320 Spartina swards (*Spartinion maritimae*)”.	4.11 & 4.13
Sand dunes, including strandline, foredune, mobile dune, fixed dune grassland, wet slacks and dune heath communities.	Morfa Dinlle, Newborough Warren & Tywyn Aberffraw. Inc SAC H2110 “Embryonic shifting dunes”, H2120 “Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")” H2130 “Fixed dunes with herbaceous vegetation (`grey dunes`)*” (Habitats Directive priority feature),H2170 Dunes with *Salix repens* ssp.	4.1-4.4

Designated feature	Relationships, nomenclature etc.	Conservation Objective in part 4
	argentea (*Salicion arenariae*)" & H2190 Humid dune slacks	
Standing water (mesotrophic)	Llyn Coron, Llyn Rhos-ddu, includes SAC feature H3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation Medicinal leech *Hirudo medicinalis* occurs here.	4.5
The nationally rare shore dock.	In Newborough forest and formerly in Newborough Warren, Inc. SAC S1441 "Shore Dock *Rumex rupestris*" feature.	4.8
An assemblage of nationally rare and nationally scarce vascular plant species.	Newborough Warren & Tywyn Aberffraw.	4.20
Field gentian *Gentianella campestris*	Tywyn Aberffraw.	4.20
Dune helleborine *Epipactis dunensis*	Newborough Warren / Forest & Tywyn Aberffraw	4.20
Yellow bird's nest *Monotropa hypopitys*	Newborough Warren / Forest	4.20
Crowberry *Empetrum nigum*	Ynys Llanddwyn	4.20
Fir clubmoss *Huperzia selago*	Newborough Warren & Tywyn Aberffraw	4.20
Welsh marsh orchid *Dactylorhiza purpurella* ssp *cambrensis*	Newborough Warren	4.20
An assemblage of nationally rare and nationally scarce lower plants (mosses, liverworts, fungi).	Newborough Warren & Tywyn Aberffraw.	4.4
Nail fungus. *Poronia punctata*	Newborough Warren	4.21
Petalwort *Petalophyllum ralfsii* (a liverwort).	Newborough Warren & Tywyn Aberffraw. Inc. SAC S1395 "Petalwort *Petalophyllum ralfsii*" feature. Associated with humid dune slack feature.	4.7
A moss *Bryum callophyllum*	Tywyn Aberffraw. Associated with humid dune slack feature.	4.4
A moss *Bryum warneum*	Tywyn Aberffraw. Associated with humid dune slack feature.	4.4
A liverwort *Southbya tophacea*	Tywyn Aberffraw. Associated with humid dune slack feature.	4.4
An assemblage of nationally rare and nationally scarce	Newborough Warren. associated with new and ephemeral water bodies.	4.22

Designated feature	Relationships, nomenclature etc.	Conservation Objective in part 4
stoneworts (large freshwater algae).		
Baltic stonewort.	Newborough Warren associated with new and ephemeral water bodies.	4.22
Golden hair lichen. *Teloschistis flavicans*	Newborough Warren (Ynys Llanddwyn), associated with dune heath N2K feature H2150.	4.19
An assemblage of dune invertebrate species.	Newborough Warren & Tywyn Aberffraw.	4.2, 4.3, 4.4
Medicinal leech. *Hirudo medicinalis*	Newborough Warren, Llyn Rhos-ddu and smaller water bodies	4.23
Sandhill rustic *Luperina nickerlii* (a moth).	Newborough Warren, associated with shifting dunes / upper saltmarsh transition.	4.2
Vernal sand bee, *Colletes cunicularis*	Newborough Warren & Tywyn Aberffraw. Associated with semi-fixed dunes.	4.3
A marine polychaete worm *Ophelia bicornis*.	Traeth Cefni mudflats	4.10, 4.12
A sand shrimp *Gammarus chevreuxi*	Tywyn Aberffraw. (Afon Ffraw)	4.10
Great crested Newt *Triturus cristatus*	Glantraeth SAC and SSSI, Newborough Warren, Aberffraw	4.9
An assemblage of amphibians including great crested newt.	Newborough Warren – Ynys Llanddwyn SSSI. (Common frog, common toad, palmate newt, great crested newt) Glantraeth SSSI	4.9
Over-wintering waders/wildfowl including pintail *Anas acuta*.	Newborough Warren (Traeth Cefni, Traeth Melynog)	4.10, 4.12 4.11
A non-breeding population of raven *Corvus corax*	Newborough Warren (forest and foreshore)	4.25
Breeding cormorant *Phalacrocorax phalacrocorax*.	Newborough Warren (Ynys Adar)	4.26

3.2 Features and Management Units

This section sets out the relationship between the designated features and each management unit. This is intended to provide a clear statement about what each unit should be managed for, taking into account the varied needs of the different special features. All features are allocated to one of seven classes in each management unit. These classes are:

Key Features

KH - a 'Key Habitat' in the management unit, i.e. the habitat that is the main driver of management and focus of monitoring effort, perhaps because of the dependence of a key species (see KS below). There will usually only be one Key Habitat in a unit but there can be more, especially with large units.

KS – a 'Key Species' in the management unit, often driving both the selection and management of a Key Habitat.

Geo – an earth science feature that is the main driver of management and focus of monitoring effort in a unit.

Other Features

Sym - habitats, species and earth science features that are of importance in a unit but are not the main drivers of management or focus of monitoring. These features will benefit from management for the key feature(s) identified in the unit. These may be classed as 'Sym' (sympathetic) features because:

(a) they are present in the unit but may be of less conservation importance than the key feature; and/or

(b) they are present in the unit but in small areas/numbers, with the bulk of the feature in other units of the site; and/or

(c) their requirements are broader than and compatible with the management needs of the key feature(s), e.g. a mobile species that uses large parts of the site and surrounding areas: and/or

(d) key features (KH, KS) are closely associated with these features, and the conservation of key features depends on them being managed appropriately.

Nm - an infrequently used category where features are at risk of decline within a unit as a result of meeting the management needs of the key feature(s), i.e. under Negative Management. These cases will usually be compensated for by management elsewhere in the plan and can be used where minor occurrences of a feature would otherwise lead to apparent conflict with another key feature in a unit.

Mn - Management units that are essential for the management of features elsewhere on a site e.g. livestock over-wintering area included within designation boundaries, buffer zones around water bodies, etc.

x – Features not known to be present in the management unit.

The table(s) below sets out the relationship between the features and management units identified in this plan:

Site Newborough Warren – Ynys Llanddwyn SSSI	Management unit												
Unique unit number	**1338**	**1339**	**1340**	**1341**	**1342**	**1343**	**1344**	**1345**	**1877**	**1901**	**1902**	**1903**	**1904**
Unit reference													
SAC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
NNR/Natural Resources Wales managed	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SAC features													
Embryonic shifting dunes	x	x	x	x	x	x	Sym	x	x	KH	KH	Sym	KH
Shifting dunes along the shoreline with Ammophila arenaria - white dunes	x	x	x	x	x	x	x	x	x	KH	Sym	Sym	KH
Fixed dunes with herbaceous vegetation -grey dunes	x	x	x	x	x	x	x	x	x	KH	x	KH	Sym
Dunes with Salix repens ssp. argentea –(Salicion arenariae)	x	x	x	x	x	x	x	x	x	KH	x	Sym	-
Humid dune slacks	x	x	x	x	x	x	x	x	x	KH	-	Sym	-
Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation	x	x	x	x	x	x	x	x	x	x	x	x	x
Transition mires and quaking bogs	x	x	x	x	x	x	x	x	x	x	x	x	x
Estuaries	x	x	KH	Sym	x	Sym	x	KH	x	x	KH	x	x
Salicornia and other annuals colonising mud and sand	x	x	KH	Sym	x	x	x	KH	x		Sym	x	-x
Mudflats and sandflats not covered by seawater at low tide	x	x	KH	x	x	KH	KH	KH	Sym	x	KH	x	Sym
Atlantic salt meadows - Glauco Puccinellietalia maritimae	x	x	KH	KH	x	x	x	KH	x	Sym	KH	x	x
Vegetated sea cliffs of the Atlantic and Baltic coasts	x	x	x	x	x	x	x	x	KH	x	x	KH	x
Petalophyllum ralfsii	x	x	x	x	x	x	x	x	x	Sym	x	x	-
Rumex rupestris	x	x	x	x	KS	x	x	x	x	-	x	x	x

Site Newborough Warren – Ynys Llanddwyn SSSI	Management unit												
Unique unit number	**1905**	**1906**	**1907**	**1908**	**1909**	**1910**	**1911**	**1912**	**1913**	**1926**	**2980**	**2981**	**7039**
Unit reference													
SAC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
NNR/Natural Resources Wales managed		✔	✔	✔	✔	✔	✔	✔	✔				
SAC features													
Embryonic shifting dunes	x	Sym	KH	x	x	x	x	x	x	KH	x	x	x
Shifting dunes along the shoreline with Ammophila arenaria - white dunes	x	Sym	KH	x	x	x	x	x	x	KH	x	x	x
Fixed dunes with herbaceous vegetation -grey dunes	x	KH	Sym	KH	KH	KH	x	x	x	Sym	x	x	x
Dunes with Salix repens ssp. argentea -Salicion arenariae	x	KH	Sym	x	Sym	Sym	x	x	x	x	x	x	x
Humid dune slacks	x	KH	Sym	x	Sym	Sym	x	x	x	x	x	x	x
Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation	x	x	x	x	Mn	Mn	KH	Mn	Mn	x	x	x	x
Transition mires and quaking bogs	x	x	x	x	KH	x	Sym	x	x	x	x	x	x
Estuaries	x	x	x	x	x	x	x	x	x	x	x	x	KH
Salicornia and other annuals colonising mud and sand	x	x	Sym	x	x	x	x	x	x	x	x	x	Sym
Mudflats and sandflats not covered by seawater at low tide	x	x	x	x	x	x	x	x	x	x	x	x	KH
Atlantic salt meadows - Glauco Puccinellietalia maritimae	x	x	Sym	x	x	x	x	x	x	x	x	x	x
Petalophyllum ralfsii	x	KS	x	x	x	x	x	x	x	x	x	x	x
Rumex rupestris	x	x	x	x	x	x	x	x	x	x	x	x	x

Site Newborough Warren – Ynys Llanddwyn SSSI	Management unit												
Unique unit number	**1338**	**1339**	**1340**	**1341**	**1342**	**1343**	**1344**	**1345**	**1877**	**1901**	**1902**	**1903**	**1904**
Unit reference													
SAC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
NNR/Natural Resources Wales managed	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI features													
Coastal Landforms and the processes controlling beach and dune development. (GCR ref 1878)	x	x	Geo	Geo	Geo	Geo	Geo	x	Sym	Geo	Geo	x	Geo
Precambrian rocks exposed in coastal cliffs foreshore exposures and inland outcrops. (GCR ref 754)	x	x	x	x	x	x	Sym	x	KH Geo	KH Geo	x	KH Geo	Sym
Rock pools	x	x	x	x	x	x	Sym	x	KH	x	x	KH	x
Vascular plant assemblage, (also including Fir clubmoss *Huperzia selago*, Yellow bird's nest *Monotropa hypopitys,* dune helleborine *Epipactis dunensis,* Welsh Marsh Orchid *Dactylorhiza purpurella* var *cambrensis*, Field gentian *Gentianella campestris* , Crowberry *Empetrum nigrum*.	KS??	x	x	KS	KS	x	x	x	x	KS	x	KS	x
Nail Fungus *Poronia punctata*	Sym	x	x	x	Sym	x	x	x	x	Sym	x	KS	x
Assemblage of nationally rare and nationally scarce stoneworts (*Chara ssp*) including *Chara baltica*	??	x	x	Sym	Sym	x	x	x	x	KS	x	Sym	x
Medicinal leech, *Hirudo medicinalis*	-	x	x	x	Sym	x	x	x	x	KS	x	x	x
Over-wintering waders/wildfowl including pintail *Anas acuta*	KS	x	KS	Sym	x	x	x	KS	x	x	x	x	x

Site Newborough Warren – Ynys Llanddwyn SSSI	Management unit												
A non-breeding population of raven *Corvus corax*	Sym	x	Sym	Sym	Sym	Sym	Sym	Sym	Sym	KS	Sym	Sym	Sym
Breeding cormorant. *Phalacrocorax phalacrocorax*	Sym	x	Sym	x	x	Sym	Sym	Sym	KS	x	x	x	x
Anas acuta - non-breeding	KS	x	KS	Sym	x	x	x	Sym	x	x	x	x	x
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes	x	x	x	x	x	x	x	-	x	Sym	-	Sym	-
Assemblage of RDB and/or Nationally Scarce vascular plants	Sym	x	Sym	KS	KS	x	x	Sym	x	Sym	-	KS	Sym
Breeding bird assemblage of sand-dunes and saltmarshes	Sym	x	KS	Sym	-	-		KS	x	-	Sym	KS	Sym
Amphibian assemblage	Sym	x	x	x	Sym	x	x	x	x	Sym	x	Sym	-
Chara baltica	x	x	-	-	-	-		-	x	Sym	-	??	-
Dactylorhiza purpurella subsp. *cambrensis*	??KS	x	x	KS	x	x	x	x	x	Sym	-	-	-
Dune invertebrate assemblage	x	x	x	x	x	x	x	x	x	KS	KS	Sym	KS
Empetrum nigrum	x	x	x	x	x	x	x	x	x	-	x	KS	x
Epipactis dunensis	x	x	x	x	x	x	x	x	x	KS	x	x	x
Huperzia selago	x	x	x	x	x	x	x	x	x	x	x	x	x
Mibora minima	x	x	x	x	x	x	x	x	x	Sym	x	x	x
Taraxacum palustre													
Colletes cunicularis										Sym			
Inter-tidal	x	x	Sym	Sym	x	Sym	Sym	Sym	KH	x	Sym	x	x
Luperina nickerlii	x	x	x	x	x	x	x	x	x	x	KS	x	Sym
Moderately exposed sand	x	x	Sym	x	x	Sym	Sym	Sym	x	x	x	x	x

Site Newborough Warren – Ynys Llanddwyn SSSI	Management unit												
Unique unit number	**1905**	**1906**	**1907**	**1908**	**1909**	**1910**	**1911**	**1912**	**1913**	**1926**	**2980**	**2981**	**7039**
Unit reference													
SAC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
NNR/Natural Resources Wales managed		✔	✔	✔	✔	✔	✔	✔	✔				
SSSI features													
Coastal Landforms and the processes controlling beach and dune development. (GCR ref 1878)	x	Geo	Geo	x	x	x	x	x	x	Geo	x	x	Sym
Precambrian rocks exposed in coastal cliffs foreshore exposures and inland outcrops. (GCR ref 754)	x	x	-	x	x	x	x	x	x	x	x	x	x
Rock pools	x	x	-	x	x	x	x	x	x	x	x	x	x
Vascular plant assemblage, (also including Fir clubmoss *Huperzia selago*, Yellow bird's nest *Monotropa hypopitys,* dune helleborine *Epipactis dunensis,* Welsh Marsh Orchid *Dactylorhiza purpurella* var *cambrensis*, Field gentian *Gentianella campestris* , Crowberry *Empetrum nigrum* (SSSI qualifying features)	x	KS	Sym	Sym	Sym	x	Sym	x	x	Sym	x	x	x
Nail Fungus *Poronia punctata*	x	KS	x	Sym	x	Sym	x	x	x	x	x	x	x
Assemblage of nationally rare and nationally scarce stoneworts (*Chara ssp*) including *Chara baltica*	x	KS	x	x	Sym	x	x	x	x	x	x	x	x
Medicinal leech, *Hirudo medicinalis*	x	x	x	x	x	x	KS	x	x	x	x	x	x
Over-wintering waders/wildfowl (including pintail *Anas acuta)*	x	x	x	x	x	x	KS	x	x	x	x	x	Sym

Site Newborough Warren – Ynys Llanddwyn SSSI	Management unit												
A non-breeding population of raven *Corvus corax*	-	Sym	Sym	Sym	-	Sym	x	x	x	Sym	x	x	Sym
Breeding cormorant *Phalacrocorax phalacrocorax*	x	x	x	x	x	x	Sym	x	x	x	x	x	Sym
Anas acuta - non-breeding	x	x	x	x	x	x	Sym	x	x	x	x	x	Sym
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes	x	KS	Sym	Sym	Sym	Sym	x	x	x	x	x	x	-
Assemblage of RDB and/or Nationally Scarce vascular plants	x	KS	Sym	Sym	Sym	Sym	Sym	x	Sym	Sym	x	x	-
Breeding bird assemblage of sand-dunes and saltmarshes	x	KS	Sym	Sym	Sym	Sym	x	x	x	Sym	x	x	Sym
Amphibian assemblage	x	Sym	x	Sym	Sym	Sym	Sym	KS	Sym	x	x	x	x
Chara baltica	x	Sym	x	x	x	x	x	x	x	x	x	x	x
Dactylorhiza purpurella subsp. *cambrensis*	x	x	x	x	x	x	x	x	x	x	x	x	x
Dune invertebrate assemblage	x	KS	KS	Sym	Sym	Sym	x	x	x	Sym	x	x	x
Empetrum nigrum	x	-	x	x	x	x	x	x	x	x	x	x	x
Epipactis dunensis	x	Sym	x	x	x	x	x	x	x	x	x	x	x
Huperzia selago	x	Sym	x	x	x	x	x	x	x	x	x	x	x
Mibora minima	x	x	x	x	x	x	x	x	x	x	x	x	x
Taraxacum palustre	x	Sym	x	x	Sym	x	x	x	x	x	x	x	x
Colletes cunicularis	x	Sym	Sym	x	x	x	x	x	x	x	x	x	x
Inter-tidal	x	x	x	x	x	x	x	x	x	x	x	x	Sym
Luperina nickerlii	x	Sym	KS	x	x	x	x	x	x	KS	x	x	x
Moderately exposed sand	x	x	x	x	x	x	x	x	x	x	x	x	Sym

Site Newborough Warren – Ynys Llanddwyn SSSI	Management unit												
Unique unit number	**1338**	**1339**	**1340**	**1341**	**1342**	**1343**	**1344**	**1345**	**1877**	**1901**	**1902**	**1903**	**1904**
Unit reference													
SAC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
NNR/Natural Resources Wales managed	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI features													
Monotropa hypopitys	x	x	x	x	x	x	x	x	x	Sym	x	x	x
Ophelia bicornis	Sym	x	KS	x	x	Sym	x	x	x	-	x	x	x
Petalophyllum ralfsii	x	x	x	x	x	x	x	x	x	Sym	x	x	x
Phalacrocorax carbo (Breeding)	Sym	x	Sym	x	x	Sym	Sym	Sym	KS	x	x	Sym	x
Poronia punctata	x	x	x	x	Sym	x	x	x	-	Sym	x	Sym	x
Rumex rupestris	x	x	x	x	KS	x	x	x	x	Sym	x	x	x
Salt-marsh	Sym	x	KH	Sym	x	x	x	KH	x	x	Sym	x	x
Sand-dune	x	x	x	x	Sym	x	x	x	x	Sym	Sym	Sym	KS
Standing water	Sym	x	x	Sym	Sym	x	x	x	x	Sym	x	x	x
Stonewort assemblage	x	x	x	x	Sym	x	x	x	x	Sym	x	x	x
Teloschistes flavicans	x	x	x	x	x	x	x	x	x	x	x	KS	x

Site Newborough Warren – Ynys Llanddwyn SSSI	Management unit												
Unique unit number	**1905**	**1906**	**1907**	**1908**	**1909**	**1910**	**1911**	**1912**	**1913**	**1926**	**2980**	**2981**	**7039**
Unit reference													
SAC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
NNR/Natural Resources Wales managed		✔	✔	✔	✔	✔	✔	✔	✔				
SSSI features													
Monotropa hypopitys	x	Sym	x	x	x	x	x	x	x	x	x	x	x
Ophelia bicornis	x	x	x	x	x	x	x	x	x	x	x	x	x
Petalophyllum ralfsii	x	KS	x	x	x	x	x	x	x	x	x	x	x
Phalacrocorax carbo	x	x	x	x	x	x	Sym	x	x	x	x	x	Sym
Poronia punctata	x	KS	Sym	Sym	Sym	KS	x	x	x	x	x	x	x
Rumex rupestris	x	x	x	x	x	x	x	x	x	x	x	x	x
Salt-marsh	x	x	x	x	x	x	x	x	x	Sym	x	x	Sym
Sand-dune	x	KH	KH	Sym	Sym	Sym	x	x	x	Sym	x	x	x
Standing water	x	x	x	x	Sym	Sym	Sym	Sym	KS	x	x	x	x
Stonewort assemblage	x	KS Sym	x	x	Sym	x	Sym	x	Sym	x	x	x	x
Teloschistes flavicans	x	x	x	x	x	x	x	x	x	x	x	x	x

Site Tywyn Aberffraw SSSI	Management unit											
Unique unit number	**1805**	**1806**	**1919**	**1920**	**1921**	**1922**	**1923**	**1924**	**1925**	**7037**	**7053**	**7054**
Unit reference												
SAC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
NNR/Natural Resources Wales managed												
SAC features												
Embryonic shifting dunes	x	Sym	x	x	x	x	x	x	KH	x	x	x
Fixed dunes with herbaceous vegetation - grey dunes	x	x	x	x	x	x	KH	-	KH	x	x	x
Shifting dunes along the shoreline with *Ammophila arenaria* - white dunes	x	x	x	x	x	x	x	x	KH	x	x	x
Atlantic salt meadows -*Glauco-Puccinellietalia maritimae*-	Sym	-	x	x	x	x	x	x	-	x	Sym	x
Estuaries	KH	Sym	x	x	x	x	x	x	x	x	KH	x
Humid dune slacks	x	x	x	x	x	x	x	-	KH	x	x	x
Mudflats and sandflats not covered by seawater at low tide	Sym	Sym	x	x	x	x	x	x	x	x	x	x
Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation	x	x	KH	Sym	Sym	Sym	x	x	x	KH	x	x
Transition mires and quaking bogs	x	x	x	KH	x	x	x	x	x	x	x	x
Petalophyllum ralfsii	x	x	x	x	x	x	x	x	KS	x	x	x
Salicornia and other annuals colonising mud and sand	Sym	x	x	x	x	x	x	x	x	x	x	x

Site Tywyn Aberffraw SSSI	Management unit											
Unique unit number	**1805**	**1806**	**1919**	**1920**	**1921**	**1922**	**1923**	**1924**	**1925**	**7037**	**7053**	**7054**
Unit reference												
SAC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
NNR/Natural Resources Wales managed												
SSSI features												
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes	x	x	x	x	x	x	x	x	KS	x	x	x
Assemblage of RDB and/or Nationally Scarce vascular plants	Sym	x	KS	Sym	Sym	Sym	Sym	x	KS	x	x	x
Bryum calophyllum	x	x	x	x	x	x	x	x	KS	x	x	x
Bryum warneum	x	x	x	x	x	x	x	x	KS	x	x	x
Coastal geomorphology of Wales		Geo	x	x	x	-	x	x	Geo	x	x	x
Colletes cunicularius	x	x	x	x	x	x	Sym	x	KS	x	x	x
Dune invertebrate assemblage	x	x	x	x	x	x	Sym	x	KS	x	x	x
Gentianella campestris	x	x	x	x	x	x	x	x	KS	x	x	x
Mibora minima												
Petalophyllum ralfsii	x	x	x	x	x	x	x	x	KS	x	x	x
Salt-marsh	Sym	x	x	x	x	x	x	x	-	x	Sym	x
Sand-dune	x	Sym	x	x	x	-	Sym	x	KH	x	-	x
Southbya tophacea	x	x	x	x	x	-	x	x	KS	x	x	x
Standing water -Mesotrophic	x	x	KH	Sym	Sym	KH	x	x	-	KH	x	x

Site Morfa Dinlle SSSI	Management unit				
Unique unit number	**1915**	**1916**	**1917**	**1918**	**2785**
Unit reference					
SAC	✔	✔	✔	✔	✔
SSSI	✔	✔	✔	✔	✔
NNR/Natural Resources Wales managed					
SAC features					
Fixed dunes with herbaceous vegetation -"grey dunes-*"	KH	KH	KH	x	x
"Shifting dunes along the shoreline with Ammophila arenaria -"white dunes"	KH	KH	x	x	x
Embryonic shifting dunes	KH	KH	x	Sym	Sym
SSSI Features					
Coastal Geomorphology of Wales	Geo	Geo	Geo	Geo	x
Sand dune	KH	KH	Sym	x	x
Shingle / boulders above HMW	KH	KH	x	x	x
Botrychium lunaria	KS	KS	Sym	x	x

Site Glantraeth SSSI	Management unit		
Unique unit number	**439**	**440**	**441**
Unit reference			
SAC	✔	✔	✔
SSSI	✔	✔	✔
NNR/Natural Resources Wales managed			
SAC features			
Triturus cristatus	KS	KS	KS
SSSI Features			
Triturus cristatus	KS	KS	KS

4. CONSERVATION OBJECTIVES

Background to Conservation Objectives:

a. Outline of the legal context and purpose of conservation objectives.

Conservation objectives for individual SACs and SPAs are required by the 1992 'Habitats' Directive (92/43/EEC). The aim of the Habitats Directive is the maintenance, or where appropriate the restoration, of the 'favourable conservation status' (FCS) of habitats and species listed in the Annexes to the Directive (see Box). Therefore, FCS provides the overarching framework for defining the conservation objectives for individual SACs.

Although neither the Birds Directive nor the Ramsar Convention refer to FCS, Natural Resources Wales considers that the overall aim of both those legal instruments is sufficiently similar to FCS to make it practical and proportionate to use the same guiding principle when establishing the conservation objectives for SPAs and Ramsar sites, as well as SACs. Therefore, the Habitats Directive definition of FCS is considered to provide the overarching framework for conservation objectives for all SACs, SPAs and Ramsar sites in Wales.

Favourable conservation as defined in Articles 1(e) and 1(i) of the Habitats Directive

"The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

- its natural range and areas it covers within that range are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The conservation status of a species is the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' when:

- population dynamics data on the species indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain

its population on a long-term basis.

The achievement of FCS is not an objective that applies at the level of the individual sites. Rather it is a wider objective to which each individual site contributes. Therefore, the conservation objectives for an individual site are intended to express what is considered to be that site's appropriate contribution to achieving FCS. Since SACs are the most important mechanism in the Habitats Directive for achieving FCS, and the sites represent the most important areas for conservation of the Annex I habitat types and Annex II species, the objectives for each individual SAC should seek to ensure that the site makes a substantial contribution which properly reflects its importance in a local, national and European context and the particular reasons why the site was selected for inclusion in the network. A similar approach is taken to setting conservation objectives for SPAs and Ramsar sites.

Achieving the conservation objectives of individual sites requires appropriate management and the control of factors which are influencing, or may influence the features.

The conservation objectives have a number of specific roles:

- Communication
  The conservation objectives should help convey to stakeholders what are the reasons for the designation and what it is intended to achieve.

- Site planning and management
  The conservation objectives guide management of sites, to maintain or restore the designated habitats and species. They provide the basis for identifying what management is required both within the site boundary, and outside it, where achieving the objectives requires action to be taken outside the site.

- River Basin Management Planning
  Conservation Objectives for aquatic and water dependent Natura 2000 features are also used as the "standards and objectives" referred to in Article 4 (1c) of the Water Framework Directive (WFD) (2000/60/EC). In 2009, Welsh Ministers decided that where Natura 2000 conservation objectives are more stringent than 'Good Ecological Status' (GES) as defined in the WFD, they (and the standards they contain) are the objectives referred to in Article 4(1c) of the WFD.

- Assessing plans and projects
  Article 6(3) of the 'Habitats' Directive requires the assessment of proposed plans and projects in view of a site's conservation objectives. Subject to certain exceptions, plans or projects may not proceed unless it is established that they will not adversely affect the integrity of sites. There are similar requirements for the review of existing decisions and consents.

- Monitoring and reporting

In addition to foregoing purposes, conservation objectives provide the basis for defining the evidence that will be used for assessing the condition of a feature and the status of factors that affect it. That evidence is contained in a separate but closely related set of ‘performance indicators’ which provide the basis for monitoring and reporting. To avoid confusion between the conservation objectives and the measures specified in performance indicators, the performance indicators are set out in an Appendix to this document.

The conservation objectives in this document reflect Natural Resources Wales’ current information and understanding of the site and its features and their importance in an international context. The conservation objectives are subject to review by Natural Resources Wales in the light of new knowledge.

b. Format of the conservation objectives

Each conservation objective is a composite statement defining a site-specific aspiration for each designated feature. This composite statement contains clauses that correspond to all the elements of FCS, namely:

For habitat features:

- Extent should be stable in the long term, or where appropriate increasing.
- Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.
- Populations of the habitat's typical species must be being maintained or where appropriate increasing.
- Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.

For species features:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- The distribution of the population should be being maintained*;
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.
- Factors affecting the population, or its habitat should be under appropriate control.

*In some cases, the conservation objectives can accommodate reductions, if that is necessary to achieve the objectives for other features which are considered a higher priority on this site.

The elements above constitute a generic checklist or guide to the elements that should normally be included in the conservation objectives, in order to ensure that the site makes an effective and appropriate contribution to achieving favourable conservation status for the habitats and species for which it is designated.

There is one conservation objective for each designated feature listed in part 3. In some cases, where there are distinct areas or forms of a designated habitat or separate populations of a designated species within a site, the conservation objective is sub-divided into different sections to enable different aspirations to be expressed for different occurrences of the features within the site.

As well as describing the aspirations for the condition of the feature, each conservation objective contains a statement that the factors which significantly affect the feature are under appropriate control.

4.1 Conservation Objective for Feature 1: Embryonic shifting dunes (EU Ref: H2110)

Extent should be stable in the long term, or where appropriate increasing.	There shall be no decrease in the total (aggregate) area of dune habitats for which this site was designated (i.e., the sum total of 675 Ha of dune habitat should not diminish). The extent and location of embryonic shifting dune features may be subject to periodic and seasonal variation. Embryonic shifting dunes should be evident along the beach in late summer wherever sediment accretion and organic strandline material permits.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The typical dune zonation, from beach (through embryonic shifting dunes, white dunes, dune slacks) to fixed dune, shall be intact along 95% of the soft coastal frontage. There should be active erosion and deposition of the embryonic shifting dunes with at least 50% bare sand on these foredunes.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	The strandline and embryonic dune vegetation should be made up of the typical species listed below. *Cakile maritima, Honkenya peploides*, *Salsola kali, Atriplex* spp., *Beta vulgaris, Matricaria matricoides, Elytrigia juncea (Elymus farctus), Leymus arenarius, Festuca rubra, Sonchus asper*
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	This feature requires a supply of sediment, opportunity for aeolian transport and naturally occurring organic strandline material. Sediment supply and mobility shall be maintained. Man-made obstructions shall be absent. A regular deposit of strandline organic material is required to initiate development. All factors affecting the achievement of these conditions are under control.

4.2 Conservation Objective for Feature 2: Shifting dunes along the shoreline with Ammophila arenaria ("white dunes") (EU Ref: H2120)

Extent should be stable in the long term, or where appropriate increasing.	There shall be no decrease in the total (aggregate) area of qualifying dune habitats for which this site was designated (i.e., the sum total of 675 Ha of qualifying dune habitat should not diminish). The extent and location of individual dune habitat features may be subject to periodic and seasonal variation. Shifting dunes should ideally be 30% of the total dune habitat and not less than 15%. The distribution of shifting dunes with *Ammophila arenaria* within the site may vary in response to dynamic processes and changes to other qualifying dune habitats for the site.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The typical dune zonation, including shifting dunes with *Ammophila arenaria*, from beach to fixed dune shall be intact along 95% of the soft coastal frontage. Bare sand should be present over at least 20% of the shifting dune habitat. This should include at least "occasional" active blow-outs and mobile sands. Active mechanical intervention may be appropriate to mobilise sand. Invasive species, especially Sea Buckthorn (*Hippophae rhamnoides)* Traveller's joy (*Clematis vitalba*) and Japanese rose (*Rosa rugosa*) should be rare or absent.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	The shifting dunes should be vegetated by the typical species listed below. *Ammophila arenaria, Elytrigia juncea (Elymus farctus), Festuca rubra, Senecio jacobaea, Hypochoeris radicata Carex arenaria. Eryngium maritimum, Euphorbia portlandica,* and *Calystegia soldanella*. *Euphorbia paralias, Phleum arenarium.* *There should be regular occurrence of: Hypocaccus rugiceps, Broscus cephalotes, Hypocaccus rugiceps*, *Hydnobius punctatus*, *Aegialia arenaria* and *Xanthomus pallidus* Viable population of sandhill rustic moth *Luperina nickerlii* should be present at Newborough Warren
Factors affecting the extent and quality of the habitat and its	Sand supply and mobility shall be maintained or restored. Man-made obstructions should be absent.

typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	All factors affecting the achievement of these conditions are under control.

4.3 Conservation Objective for Feature 3: Fixed dunes with herbaceous vegetation (`grey dunes`)* (Habitats Directive priority feature) (EU Ref: H2130)

Extent should be stable in the long term, or where appropriate increasing.	There shall be no decrease in the total (aggregate) area of qualifying dune habitats for which this site was designated (i.e., the sum total of 675 Ha of qualifying dune habitat should not diminish). The extent and location of individual dune habitat features may be subject to periodic variation in response to dynamic processes and changes to other qualifying dune habitats for the site. The extent of fixed dune grassland habitat feature should not fall below 40% of total dune area (circa 58% in 2021).
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The fixed dunes element of the typical zonation from beach to fixed dune shall be intact along 95% of the soft coastal frontage. Bare ground should be present over 5-15% of the fixed dune habitat comprising small blowouts and erosion scars. All successional stages of fixed dune grassland should be present, from early semi-fixed dune grassland to scattered scrub (no more than 5% cover) and dune heath where conditions allow.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	The typical species of the fixed dune vegetation include *Aira praecox*, *Anacamptis pyramidalis, Carex arenaria*, *Carex flacca*, *Cerastium fontanum, Crepis capillaris, Cladonia* spp., *Erodium cicutarium, Euphrasia officinalis, Festuca rubra, Galium verum, Geranium molle, Hypnum cupressiforme, Hypochaeris radicata, Linum catharticum, Lotus corniculatus, Luzula campestris, Odontites verna, Ononis repens, Peltigera spp., Pilosella officinarum, Plantago lanceolata, Prunella vulgaris, Rhinanthus minor, Rhytidiadelphus squarrosus, R triquetrus, Sedum acre, Syntrichia* (Tortula) *ruralis* spp. *Ruraliformis, Thymus polytrichus, Veronica chamaedrys, Viola canina, V. riviniana* and *V. tricolor* Skylark *Alauda arvensis* should breed regularly in each main fixed dune grassland block. Viable populations of vernal bee *Colletes cunicularis* should be present on semi-fixed dunes at Newborough Warren and Tywyn Aberffraw.
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the	Appropriate levels of grazing by livestock and/or rabbits should be maintained. Water levels should be appropriate and generally >50cm below ground surface. Invasive species (e.g. *Hippophae rhamnoides* and *Rosa*

habitat's future prospects) should be under appropriate control.	*rugosa*) should be rare or absent. Active mechanical intervention may be needed to create bare mobile sand.

4.4 Conservation Objective for Feature 4 & 5 : Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae and* Humid dune slacks) (EU Ref: H2170, & H2190 respectively)

including the SSSI feature mosses *Bryum callophyllum*, *B. warneum* and *Southbya tophacea* and an assemblage of other bryophytes typical of early succession dune slacks.

Extent should be stable in the long term, or where appropriate increasing.	There shall be no decrease in the total (aggregate) area of qualifying dune habitats for which this site was designated (i.e. the sum total of 675 Ha of qualifying dune habitat should not diminish). The extent of individual dune habitat features may be subject to periodic variation due to dynamic processes. There should be no long-term loss of extent of these features (currently registered as 25% of total dune habitat on Abermenai to Aberffraw dunes SAC). The distribution of humid dune slacks and dunes with *Salix repens ssp argentea* should be consistent with the typical pattern of dune zonation. The location of humid dune slacks and dunes with *Salix repens ssp argentea* within the site may vary periodically in response to dynamic processes and changes to other qualifying dune habitats for the site.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	All successional stages of Humid dune slacks and Dunes with *Salix repens* shall be present, with >10% of each overall. **Embryo dune slacks** are defined as damp areas of bare sand with very sparse vegetation within the immediate area of an active blowout. *Salix repens* may occur in distinct clonal patches. **Successionally young dune slacks** habitat typically comprises a small amount of open ground with several pioneer dune slack species present including variegated horsetail *Equisetum variegatum*, brookweed *Samolus valerandi* and small-fruited yellow sedge *Carex viridula*. In optimum habitat, thalloid liverworts should also be present. **Mature dune slacks** form closed vegetation communities. *Salix repens* is generally present, sometimes abundant and canopy forming with a dense cover of bryophytes including *Calliergon cuspidatum* and *Pseudocalliergon lycopodiodes*

	Where there appears to be an imbalance towards more mature stages of dune succession, management interventions are likely to be required to create or promote earlier successional dune slack stages.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	*Agrostis stolonifera, Anagallis tenella, Calliergon cuspidatum, Carex arenaria, Carex flacca, Carex nigra, Epipactis leptochila* spp *dunensis, Equisetum variegatum, Filipendula ulmaria, Galium palustre, Galium verum, Hydrocotyle vulgaris, Iris pseudacorus, Juncus acutus, Juncus articulatus, Juncus conglomeratus, Lotus corniculatus, Mentha aquatica, Myosotis scorpioides, Ononis repens, Petalophyllum rafsii, Potentilla anserina, Potentilla palustris, Ranunculus flammula, Sagina nodosa, Salix repens, Veronica scutellata,* Petalwort *Petalophyllum rafsii* should occur in embryo and successionally young dune slacks at Aberffraw and Newborough. *Bryum callophyllum, B warneum*, *Meesia uliginosa* and *Southbya tophacea* should be present at Tywyn Aberffraw. The typical dune Coleoptera *Dyschirius politus, Bembidion pallidipenne, Bledius subniger, Gabrius osseticus, Dryops nitidulus* should be present.
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	Opportunities for the initiation of embryonic dune slacks by wind erosion (such as bare erosion scars) should exist. The groundwater level should be appropriate in winter (<50cm below surface) and summer. (50 to 130 cm below surface depending on slack type). Different slack communities have different hydrological requirements , wetter dune slack communities have prolonged surface water in winter. Groundwater quality should be unaffected by pollution.

4.5 Conservation Objective for Feature 6: Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation (EU Ref: H3150)

Extent should be stable in the long term, or where appropriate increasing.	The extent (area) of the habitat shall be at least 30ha, except if reduced by natural succession to swamp or bog. The distribution of the lakes reflects their physiographic status as dune-dammed lakes of shallow valleys; Llyn Coron and Llyn Rhos-ddu.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	Water quality should be characteristic of maritime, high alkalinity shallow lakes, such as to maintain pH 7-9, alkalinity 1500-2500µeq/l, dissolved oxygen and annual geometric mean Total Phosphorus ≤35µg/l. Nitrogen N 90%ile <1.5mg/l No significant cyanobacteria blooms Chlorophyll α values should be low, and sufficient to allow both lakes to be passed as 'Good' or better for a 'high alkalinity shallow lake' using Water Framework Directive classification methods.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	The typical species Submerged aquatic plants including *Elatine hydropiper, Potamogeton trichoides, P. pectinatus, P. perfoliatus, P. lucens, Ranunculus circinatus, Eleocharis acicularis, Myriophyllum spicatum, Callitriche hermaphroditica,* and *Chara* spp.. Emergent aquatic plants, typically *Phragmites australis, Schoenoplectus lacustris, Sparganium erectum, Typha latifolia, Alisma plantago-aquatica*, and *Littorella uniflora* should be present on the shoreline. Invasive or disruptive species such as *Crassula helmsii*, *Impatiens glandulifera* or coarse fish (especially bream, carp) or rainbow trout should be rare or absent. Other invasive non-native species (e.g. *Elodea nutalii*) should be no more than "occasional" in abundance
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future	Appropriate water level should be maintained throughout the year, (seasonal fluctuation +/- 30cm). The catchment of the lakes continues to provide adequate quality and quantity of water. There should be adequate stream spawning grounds connected to Llyn

prospects) should be under appropriate control.	Coron to maintain native brown trout within the catchment. All factors affecting the achievement of these conditions are under control

4.6 Conservation Objective for Feature 7: Transition mires and quaking bogs (EU ref: H7140)

This is a minor SAC feature and no specific conservation objectives are required at this stage.

Extent should be stable in the long term, or where appropriate increasing.	The extent of the habitat should be determined by naturally defined factors, notably topography and water level. The habitat should be found adjacent to Llyn Coron and Llyn Rhos-ddu.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The habitat should comprise a mosaic of mesotrophic mire communities with scattered willow scrub. Water level should be at or close to the surface throughout the year.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	*Carex rostrata, Calliergonella cuspidata, Comarum palustre,* and *Menyanthes trifoliata* should be abundant. Grasshopper warbler *Locustella naevia and* Willow warbler *Phylloscopus trochilus* should be resident in summer.
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	Invasive non-native species (e.g. *Impatiens glandulifera*) should be absent or rare. *Typha latifolia* (indicative of nutrient enrichment) should be no more than "frequent" in overall abundance. Willow scrub (*Salix* spp.) should cover no more than 50% of the habitat. Water quality and quantity should be appropriate for the mesotrophic mire communities.

4.7 Conservation Objective for Feature 8: Petalwort *Petallophyllum ralfsii* (EU Ref: S1395)

The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.	The population of petalwort shall be stable or increasing.
The distribution of the population should be being maintained or where appropriate increasing.	Petalwort shall occur in humid dune slacks (in which *Equisetum variegatum* or *Anagallis tenella* are frequent), across both Aberffraw and Newborough dunes.
There should be sufficient habitat, of sufficient quality, to support the population in the long term.	Early successional Humid dune slacks with bare sand or humus crust and short vegetation characterised by *Equisetum variegatum* should be present at both Aberffraw and Newborough dunes.
Factors affecting the population, or its habitat should be under appropriate control.	New embryonic dune slacks should be developing at Aberffraw and Newborough. The water table should be free to fluctuate with seasonal changes in rainfall and water quality should be appropriate for humid dune slacks. Competition (including shading) from other species should be controlled by light grazing and by periodic winter flooding. All factors affecting the achievement of these conditions should be under control.

4.8 Conservation Objective for Feature 9: Shore dock *Rumex rupestris* (EU Ref: S1441)

The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.	The population of shore dock should be viable and dynamic, colonising new sites and periodically achieving high seed-outputs (over 500 fruiting plants)
The distribution of the population should be being maintained or where appropriate increasing.	Shore dock occurs across the site as a 'meta-population' or series of mobile, self-perpetuating colonies, intermittently linked by dispersal and / or cross-pollination.
There should be sufficient habitat, of sufficient quality, to support the population in the long term.	Adequate dynamic habitat (consisting of open streamside, coastal soft cliff seepages, shingle banks or dune slack) is available. Lateral water movement should occur unhindered to allow connectivity of the populations with the open coastline. Bare ground or disturbed areas (e.g. poaching by grazing animals, trampling or coastal erosion) are available to permit germination.
Factors affecting the population or its habitat should be under appropriate control.	Competition (including shading) from other species, especially trees, does not threaten the colonies. Selective tree removal and grazing (in key stream corridors and fossil slacks) occurs to restore both open habitat and hydrology to allow population increase. Overshading must be avoided and over-deepened streams restored. Adequate quantity and quality of fresh-water supply is maintained. Opportunities occur for dispersal of seed to suitable habitat within and beyond the SAC. The threat of hybridization with other *Rumex* spp is minimised (absence of *R conglomeratus, R obtusifolius. R. crispus*) All factors affecting the achievement of these conditions are under control.

4.9 Conservation Objective for Feature 10: Great Crested newt (EU Ref S1166)

The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.	There shall be a breeding great crested newt population present on the Glan-traeth SAC with >100 adults noted each year as part of a wider meta-population. There should be breeding great crested newts recorded elsewhere in the Abermenai to Aberffraw dunes SAC including Newborough Forest to maintain a nationally important meta-population.
The distribution of the population should be being maintained or where appropriate increasing.	There shall be at least 5 breeding ponds present on the combined SACs with at least 2 within Glan-traeth SSSI/SAC. Great crested newt larvae should be found in all of the breeding ponds,
There should be sufficient habitat, of sufficient quality, to support the population in the long term.	The terrestrial habitat surrounding breeding ponds shall comprise refuge areas for newts, foraging areas, hibernacula and corridors that will aid the movement of great crested newts for migration, dispersal, foraging and genetic exchange purposes. There should be adequate areas of bare pond bottom for displaying newts and adequate native water plants (macrophytes) for egg laying. There should be early succession pond habitat for newt egg laying and lekking. Surrounding vegetation will not heavily shade the breeding ponds.
Factors affecting the population or its habitat should be under appropriate control.	There should be no significant loss of great crested newts as a result of road engineering, such as gully-pots. Most of the display/breeding ponds on the sites should have standing water during the summer months. The breeding ponds should dry out by mid-summer occasionally (5-10year intervals). Fish should be absent or rare in breeding/display ponds. Algal blooms and surface sheens should be absent from display/breeding ponds. Non-native aquatic species should be absent or if present, not at more than “occasional” frequency. Highly invasive plant species such as *crassula helmsii* and *hydrocotyle ranunculoides* should be absent. Wildfowl should be absent or rare on the ponds. All factors affecting the achievement of the above conditions should be under control.

4.10 Conservation Objective for Feature 11: Estuaries (EU Ref H1130)

Extent should be stable in the long term, or where appropriate increasing.	The extent of the 4 estuaries (Afon Ffraw, Afon Cefni, Afon Braint, Afon Rhyddgaer should be maintained, or increasing (where man-made structures are removed or eroded).
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The typical zonation of sand, muddy sands, mud, and saltmarsh with terrestrial transition should be present. The granulometry (range of particle size) and structure of the *estuaries'* sediments, and their variation, distribution and extent, are determined predominantly by natural sediment supply and transport processes. The quality of habitat structure is not significantly degraded as a consequence of human action or by materials of anthropogenic origin The habitats continue to provide adequate undisturbed feeding and breeding opportunities for migratory and resident birds and fish, including Northern pintail *Anas acuta* and sea bass *Dicentrarchus labrax*. Non-native invasive species (e.g. *Crepidula fornicate* but excluding cord grass *Spartina anglica*) are absent or rare.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	The typical species associated with the habitat are determined predominantly by inherent population dynamics and ecological processes The species richness, population dynamics, abundance, biomass, population structures and their physiological health, reproductive capacity, recruitment, range and mobility are maintained *Zostera noltii* and *Ruppia maritima* are present on Traeth Cefn and Traeth Melynog. Viable and regularly occurring populations of *Ophelia bicornis* should be present at Traeth Cefni. Viable and regularly occurring populations of *Gammarus chevreuxi* should be present in the upper estuary at Aberffraw. Regular and long-term stable (or increasing) populations of migratory waders and wildfowl are present.

Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	The environmental processes necessary for the long-term maintenance of the *estuaries*, their encompassed habitats and their typical species are maintained. Water & sediment chemistry are determined predominantly by natural hydrodynamic, hydrological and meteorological processes. The salinity regime and gradients within the *estuaries* are determined predominantly by natural hydrodynamic, hydrological and meteorological processes. The management of commercial fisheries for typical species ensures that species exploitation is at or below maximum sustainable yield and is secure in the long-term. Invasive non-native species (excluding Spartina) are absent or rare The management of activities or operations likely to degrade the distribution, extent, structure, function or typical species populations of the feature, is appropriate for maintaining favourable condition and is secure in the long-term;

NB. Detailed requirements for the maintenance of favourable condition for the component estuarine habitat features[4] and their typical species are provided under their respective conservation objective

4.11 Conservation Objective for Feature 12: *Salicornia* and other annuals colonising mud and sand (EU Ref H1310) (includes the lower part of the saltmarsh community SSSI feature)

Extent should be stable in the long term, or where appropriate increasing.	The extent of Salicornia and other annuals colonising mud and sand is maintained or increasing unless constrained by natural structures and / or environmental processes The distribution of the feature within the estuary is consistent with the typical zonation of this feature.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The feature is characterised by glasswort *Salicornia spp* and annual seablight *Sueda maritima*. The natural habitat structures necessary for the long-term maintenance of Salicornia and other annuals and their typical species are maintained. The granulometry and structure of Salicornia and other annuals' sediments, and their natural variation, distribution and extent, are determined predominantly by natural sediment supply and transport processes. Nutrients in the water column and sediments remain within ranges that are not potentially detrimental to the long-term maintenance of the Salicornia and other annuals' communities, their distribution and range. Contaminants in the water column and sediments derived from human activity remain below levels potentially detrimental to the long-term maintenance of the Salicornia and other annuals' communities, their distribution and range;
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	Communities of typical species e.g. *Aster tripolium*, *Puccinellia maritima*, *Salicornia* spp and *Suaeda maritima* are maintaining their conservation status on a long-term basis as viable components of the Salicornia and other annuals' habitats
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be	The natural environmental processes necessary for the long-term maintenance of the "Salicornia and other annuals" feature and its typical species, are maintained. The management of activities or operations likely to degrade the distribution, extent, structure, function or typical species communities of the feature, is appropriate

under appropriate control.	for maintaining favourable condition and is secure in the long-term.

4.12 Conservation Objective for Feature 13: Mudflats and sandflats not covered by seawater at low tide (EU Ref H1140) (includes intertidal sandflat and mudflat communities, the sand shrimp *Gammarus chevreuxi* and the marine polychaete worm *Ophelia bicornis* SSSI features)

Extent should be stable in the long term, or where appropriate increasing.	The distribution and extent of the *mudflats and sandflats,* and their encompassed habitat, are determined predominantly by natural environmental processes.
Quality (including ecological structure and function) should be being maintained, or where appropriate improving.	The natural habitat structures necessary for the long-term maintenance of the *mudflats and sandflats,* and their encompassed habitat and typical species are maintained The granulometry and structure of the *mudflats and sandflats'* sediments, and their natural variation, distribution and extent, are determined predominantly by natural sediment supply and transport processes The quality of habitat structure is not further degraded as a consequence of human action or by materials of anthropogenic origin The natural environmental processes necessary for the long-term maintenance of the *mudflats and sandflats*, their encompassed habitats and their typical species are maintained Water & sediment chemistry are determined predominantly by natural hydrodynamic, hydrological and meteorological processes The salinity regime and gradients within the *mudflats and sandflats* are determined predominantly by natural hydrodynamic, hydrological and meteorological processes
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	Typical species are determined predominantly by inherent population dynamics and ecological processes The species richness, population dynamics, abundance, biomass, population structures, physiological health, reproductive capacity, recruitment, range and mobility are maintained Seagrass *Zostera noltii* and tasselweed *Ruppia maritima* are present on Traeth Cefn and Traeth Melynog. *Ophelia bicornis* is present in Traeth Cefni..

	The sand shrimp *Gammarus chevreuxi* should be present in the Aberffraw estuary Regular and long-term stable (or increasing) populations of migratory waders and wildfowl are present.
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	The management of activities or operations likely to degrade the distribution, extent, structure, function or typical species populations of the feature, is appropriate for maintaining favourable condition of the feature and is secure in the long term.

4.13 Conservation Objective for Feature 14: Atlantic salt meadow (ASM) (EU Ref: H1330) (includes the saltmarsh communities SSSI feature)

Extent should be stable in the long term, or where appropriate increasing.	The distribution and extent of the saltmeadows is determined predominantly by natural structure and environmental processes.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The natural habitat structures necessary for the long-term maintenance of the saltmeadows and typical species are maintained. The granulometry and structure of the saltmeadows' sediments, and their natural variation, distribution and extent, are determined predominantly by natural sediment supply and transport processes. The geomorphology of the saltmeadows, and their natural variation, distribution and extent, are determined predominantly by the underlying geology and natural environmental processes. The hydrographic and meteorological processes necessary for the long-term maintenance of the saltmeadows and their typical species are determined predominantly by natural environmental processes. The salinity regime and gradients within the salt-meadows are determined predominantly by natural hydrodynamic, hydrological and meteorological processes. Nutrients in the water column and sediments are within ranges that are not potentially detrimental to the long-term maintenance of the salt-meadows' communities, their distribution and range. Contaminants in the water column and sediments derived from human activity remain below levels potentially detrimental to the long-term maintenance of the salt-meadows' communities, their distribution and range. Dissolved oxygen levels in the water column and sediments are determined predominantly by natural environmental processes.

	Non-native invasive species (excluding *Spartina anglica* at this time) are rare or absent. The habitat continues to provide adequate feeding and breeding opportunities for migratory and resident birds and fish, including Northern pintail *Anas acuta* and sea bass *Dicentrarchus labrax*.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	The zonation of saltmarsh from pioneer, lower mid marsh and upper mid marsh and their transitions to fresh water and terrestrial vegetation are maintained or, where possible, restored. Communities of typical species, including *Limonium spp, Atriplex portulacoides, Juncus gerardii, J maritimus, Sueda maritima, Armeria maritima and Pucinellia maritima* are maintaining their conservation status on a long-term basis as viable components of the salt-meadows' habitats. Low-mid marsh: *Aster tripolium*, *Atriplex portulacoides*, *Plantago maritima*, *Puccinellia maritima*, *Salicornia* spp., *Spergularia maritima*, *Suaeda maritima*, *Triglochin maritima*, turf fucoids. Mid-upper marsh: *Agrostis stolonifera*, *Armeria maritima*, *Artemisia maritima*, Aster tripolium, *Blysmus rufus*, *Carex extensa*, *Carex flacca*, *Eleocharis uniglumis*, *Festuca rubra*, *Glaux maritima*, *Juncus gerardii*, *Juncus maritimus*, *Leontodon autumnalis*, *Limonium vulgare*, *Plantago maritima*, *Seriphidium maritimum*, *Triglochin maritima*, turf fucoids. The species richness, community dynamics, abundance, biomass, community structures, physiological health, reproductive capacity, recruitment and range are maintained:
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	The management of activities or operations likely to degrade the distribution, extent, structure, function or typical species and communities of the feature, is appropriate for maintaining favourable condition and is secure in the long-term.

4.14 Conservation Objective for Feature 15: Vegetated sea cliffs of the Atlantic and Baltic coasts (EU Ref: H1230)

This is a minor SAC feature on this site and no specific conservation objectives are required at this stage

Extent should be stable in the long term, or where appropriate increasing.	Cliff and crevice vegetation, maritime grassland and maritime heath communities occurs on hard rock coast and their relative extent and zonation are determined by topography, exposure, grazing and natural stochastic events (e.g. storms).
Quality (including ecological structure and function) should be being maintained, or where appropriate improving.	The zonation of sea-cliff vegetation, maritime grassland and heath is determined by topography, exposure, grazing and natural stochastic events (storms, rockfall, coastal erosion etc). Storm periods lead to salt-burning of heather and grass and sometimes dramatic changes in vegetation for periods of years. Invasive non-native species, such as Hottentot fig *Carpobrotus edulis* or purple dew-plant *Disphyma crassifolium* are absent
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	The cliff vegetation is composed of native plants such as *Spergularia rupicola* Sea lavenders *(Limonium britannicum, L procerum, L. binervosum)* and sea samphire *Crithmum maritimum*. The following plants are common in the maritime grassland: *Festuca rubra*, *Armeria maritima; Scilla verna* and *Plantago maritima* The following plants are common in the maritime heathland: *Calluna vulgaris*; *Erica cinerea*, *Ulex gallii, Armeria maritima*, *Plantago maritima*, *Plantago coronopus* or spring *Scilla verna.*
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	Maritime heath is maintained by exposure to wind and salt and, in some cases light grazing. Heather or grass burning is inappropriate in most cases. All factors affecting the achievement of the above conditions should be under control.

4.15 Conservation Objectives for Feature 16: Coastal Landforms and the processes controlling beach and dune development. (GCR ref 1878)

Extent should be stable in the long term, or where appropriate increasing.	Extent of the key geomorphological features is not diminished through physical damage or fragmentation.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	Physical composition, morphology and internal structure of the key landforms and natural sediments remain intact. Landform elements should be visible for research study and educational use.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	Biological elements, including strandline flora which contribute to the geomorphological processes, are maintained.
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	Natural geomorphological processes are unimpeded, the levels of activity of the geomorphological processes and their spatial domain retain the capacity to operate across their full range of natural variability. All factors affecting the achievement of the above conditions should be under control.

4.16 Conservation Objectives for Feature 17: Precambrian rocks exposed in coastal cliffs foreshore exposures and inland outcrops. (GCR ref 754)

Extent should be stable in the long term, or where appropriate increasing.	Extent of key geological exposure has not diminished: both vertical and lateral extent of features is constant or preferably increasing unless diminished by natural geomorphological processes.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	Geological exposures remain intact and unmodified by further anthropogenic intervention (including tree planting close to outcrops). Some key exposures should be visible and accessible for research, study and educational use. Trees, scrub and needle litter/ turf should be removed on or around outcrops that have been obscured.
Factors affecting the extent and quality of the feature (and thus affecting the feature's future prospects) should be under appropriate control.	All factors affecting the achievement of the above conditions should be under control.

4.17 Conservation Objectives for Feature 18: Intertidal rocky shore communities

Extent should be stable in the long term, or where appropriate increasing.	There shall be no decrease in the extent of rocky shore and under-boulder communities
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The physical supporting features of the habitat, including rock reefs, boulders etc are maintained. Typical zonation of rocky shore and marine under-boulder communities is maintained Alien invasive species (e.g. *Sargassum muticum*) do not attain more than occasional frequency and do not endanger typical species of the habitat.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	Typical component species of rocky shore and under-boulder marine communities is maintained and their abundance in the long term is secure.
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	The management of activities or operations likely to damage or degrade the population dynamics, natural range and supporting habitat of the feature is appropriate for maintaining favourable condition of the habitat and is secure in the long-term.

4.18 Conservation Objectives for Feature 19: Vegetated shingle / boulders above high water mark.

Extent should be stable in the long term, or where appropriate increasing.	The long-term extent of the vegetation of shingle banks should be maintained, unless altered by natural (e.g. storm) events. There will be periodic fluctuation in extent. Ensure that natural processes govern the system, allowing changes in extent and distribution as a result of re-distribution of shingle sediments and changes in sediment composition.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The habitat should comprise >50% bare shingle with <5% grass cover. Invasive alien species (e.g. *Fallopia japonica*) should be absent. Signs of trampling or vehicle damage should be rare. There should be no anthropogenic constraints to shingle movement (e.g. groynes, barriers).
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	The following species should normally be present; *Atriplex* spp., *Beta vulgaris maritima, Cakile maritima, Crambe maritima, Galium aparine, Glaucium flavum, Honckenya peploides, Matricaria maritima, Polygonum oxyspermum, Rumex crispus, Salsola kali, Silene uniflora* Ringed plover *Charadrius hiaticula* should breed successfully here in most years.
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	The management of activities or operations likely to damage or degrade the population dynamics, natural range and supporting habitat of the feature should be appropriate for maintaining favourable condition and secure in the long-term.

4.19 Conservation Objectives for Feature 20: Sand-dune heath community (including crowberry *Empetrum nigrum* and Golden hair lichen *Teloschistes flavicans*)

Extent should be stable in the long term, or where appropriate increasing.	The extent of the dune heath should be maintained or increased. Dune heath should occur on Ynys Llanddwyn (where it is associated with *Teloschistes flavicans*) and at the landward extent of Newborough Warren, patches within Newborough forest, at the landward parts of Tywyn Aberffraw and, in its lichen-rich form, in hollows at Morfa Dinlle.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The habitat should comprise <50% grass cover Signs of trampling or vehicle damage should be rare. Invasive alien species (e.g. *Crocosmia spp* and *Cotoneaster*) should be absent. Native scrub (gorse *Ulex europaeus* and blackthorn *Prunus spinosa*) should not be spreading on this habitat.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	The community is characterised by *Carex arenaria, Calluna vulgaris, Erica cinerea* and *Empetrum nigrum* at Newborough, by *Carex arenaria* and *Calluna vulgaris* at Aberffraw and by *Hypochaeris radicata, Thymus praecox, Cornicularia muricata, Cladonia portentosa*, and *Cladonia arbuscula*, at Morfa Dinlle. Golden hair lichen *Teloschistes flavicans* should be present (currently at Ynys Llanddwyn).
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	The management of activities or operations likely to damage or degrade the natural range and component species of the feature should be appropriate for achieving and maintaining favourable condition and secure in the long-term.

4.20 Conservation Objectives for Feature 21: Vascular plant assemblage, (also including Fir clubmoss *Huperzia selago*, Yellow bird's nest *Monotropa hypopitys,* dune helleborine *Epipactis dunensis,* Welsh Marsh Orchid *Dactylorhiza purpurella* var *cambrensis*, Field gentian *Gentianella campestris*, Crowberry *Empetrum nigrum* (SSSI qualifying features)

The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.	The populations of: Lanceolate spleenwort *Asplenium obovatum subsp. lanceolatum*, Seaside century *Centaurium littorale*, Dune helleborine *Epipactis dunensis,* Portland spurge *Euphorbia portlandica,* Cat's ear *Hypochaeris glabra*, Golden samphire *Inula crithmoides*, Early sand grass *Mibora minima*, Round-leaved wintergreen *Pyrola rotundifolia*, Dune fescue *Vulpia fasciculata*, Small adder's tongue fern *Ophioglossum azoricum*, Sticky stork's bill *Erodium libelii*, Narrow leaved helleborine *Cephalanthera longifolia*, Dwarf eel-grass *Zostera noltii,* Fir clubmoss *Huperzia selago,* Field gentian *Gentianella campestris*, Dune helleborine *Epipactis dunensis*, Yellow bird's nest *Monotropa hypopitys,* Crowberry *Empetrum nigrum*, Welsh marsh orchid *Dactylorhiza purpurella* var *cambrensis,* Ivy broomrape *Orobache hederae* and should be stable or increasing, viable and where necessary dynamic, colonising new sites and periodically achieving high seed-outputs.
The distribution of the population should be being maintained or where appropriate increasing.	The species should occur across the site as 'meta-populations' or a series of self-perpetuating colonies, intermittently linked by dispersal and / or cross-pollination, to avoid the risk of chance or accidental extinction in one location.
There should be sufficient habitat, of sufficient quality, to support the population in the long term.	Relevant habitats should support their respective species.
Factors affecting the population or its habitat should be under appropriate control.	All factors affecting the achievement of these conditions are under control.

4.21 Conservation Objectives for Feature 22: Nail Fungus *Poronia punctata*

The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.	Nail fungus shall occur each year at Newborough Warren. Abundance should be at least “frequent”.
The distribution of the population should be being maintained or where appropriate increasing.	The fungus should occur across the Warren where pony dung occurs near bare sand in fixed dune grassland.
There should be sufficient habitat, of sufficient quality, to support the population in the long term.	Untreated pony dung on fixed dune grassland with abundant bare sand patches should be abundant on the site.
Factors affecting the population or its habitat should be under appropriate control.	Pony grazing should be maintained year-round. Use of anti-fungal veterinary products should be controlled. All other factors affecting the achievement of these conditions are under control.

4.22 Conservation Objectives for Feature 23: The assemblage of nationally rare and nationally scarce stoneworts (*Chara* ssp) including *Chara baltica*.

The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.	Viable and regularly occurring populations of *Chara baltica, C aspera, C pedunculata, C contraria, C hispida, Tolypella glomerata, C globularis / virgate*, shall be present
The distribution of the population should be being maintained or where appropriate increasing.	The species should occur frequently in new or ephemeral water bodies and dune slacks.
There should be sufficient habitat, of sufficient quality, to support the population in the long term.	Embryonic dune slacks, pools and scrapes should occur at both Aberffraw and Newborough dunes.
Factors affecting the population or its habitat should be under appropriate control.	All factors affecting the achievement of these conditions are under control.

4.23 Conservation Objectives for Feature 24: Medicinal leech, *Hirudo medicinalis*

The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.	Viable populations of *Hirudo medicinalis* shall occur at Newborough.
The distribution of the population should be being maintained or where appropriate increasing.	The species should occur in at least 3 water bodies (Llyn Rhos-du, “Canada” pool, Pwll pant mawr/“Dune–slack” pool)
There should be sufficient habitat, of sufficient quality, to support the population in the long term.	Permanent water bodies should be present with abundant amphibians and/or livestock access (for blood supply). They should be relatively shallow or have extensive shallow areas to enable water temperature to rise and feeding to occur, with partial aquatic macrophyte cover.
Factors affecting the population or its habitat should be under appropriate control.	All factors affecting the achievement of these conditions are under control. Disturbance and pollution by visitors should be discouraged (e.g. dogs swimming introducing pesticides such as tick control agents) .

4.24 Conservation Objectives for Feature 25: Over-wintering waders/wildfowl including pintail *Anas acuta*.

The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.	There shall be regularly occurring feeding and roosting flocks of typical migratory and overwintering waders and wildfowl. Numbers of each species should be at least maintained (on a 5-year running mean) in line with national population estimates.
The distribution of the population should be being maintained or where appropriate increasing.	The three estuaries of the western Afon Menai (Traeth Cefni, Traeth Melynog & Y Foryd SSSI) should together support these wintering populations
There should be sufficient habitat, of sufficient quality, to support the population in the long term.	The three estuaries of the western Afon Menai (Traeth Cefni, Traeth Melynog & Y Foryd SSSI) should maintain extensive areas of feeding mudflats and saltmarsh and their associated invertebrate prey. There should be safe and undisturbed high-water roosting areas nearby.
Factors affecting the population or its habitat should be under appropriate control.	Disturbance of feeding and roosting birds should be under control to avoid significant detrimental impact on the wader or wildfowl populations. A viable undisturbed sanctuary area (Traeth Melynog) should be maintained. Cockle harvesting should be controlled to retain an adequate prey supply. All other factors affecting the achievement of these conditions are under control.

4.25 Conservation Objectives for Feature 26: A non-breeding population of raven *Corvus corax*

The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.	Newborough Forest should contribute to the maintenance of a winter roosting flock of ravens. Population counts have exceeded 2000 birds but were last recorded as circa 400 birds (Brown, 2018-19).
The distribution of the population should be being maintained or where appropriate increasing.	The roosting flock currently uses Newborough Forest and Pentraeth Forest. Other sites (e.g. Cefni) may be available.
There should be sufficient habitat, of sufficient quality, to support the population in the long term.	Adequate, relatively undisturbed woodland should be present (in winter). (Note currently ravens are using **coniferous** woodland)
Factors affecting the population or its habitat should be under appropriate control.	Disturbance (human) at twilight and during the night should be minimal. All other factors affecting the achievement of these conditions are under control.

4.26 Conservation Objectives for Feature 27: Breeding cormorant. *Phalacrocorax phalacrocorax*

The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.	There shall be regularly occurring breeding cormorant. Numbers should be maintained (on a 5-year running mean) above 60 (SSSI feature threshold).
The distribution of the population should be being maintained or where appropriate increasing.	The colony occurs on Ynys Yr Adar off Ynys Llanddwyn or adjacent and at Bodorgan.
There should be sufficient habitat, of sufficient quality, to support the population in the long term.	
Factors affecting the population or its habitat should be under appropriate control.	Disturbance should be under control during the nesting season. All other factors affecting the achievement of these conditions are under control.

5. ASSESSMENT OF STATUS AND MANAGEMENT REQUIREMENTS

This section provides:

- A summary of the assessment of the status of each feature.
- A summary of the management issues that need to be addressed to maintain or restore each feature.

5.1 Status and Management Requirements of Feature 1: Embryonic shifting dunes

Status of Feature 1: Unfavourable (2012)

The embryonic shifting dunes at Y Twyni o Abermenai i Aberffraw / Abermenai to Aberffraw Dunes SAC, are in an unfavourable condition (Creer 2012a) largely due to failure to meet the target for the range of habitat zones associated occurrences of the feature (a CSM mandatory attribute), i.e. the zonation between embryonic dunes through yellow dune to fixed dune grassland along 95% of the frontage. This is primarily due to the afforestation of unit 20 (001901).

Management Requirements of Feature 1

Embryonic shifting dunes are ephemeral features, often removed in winter storms and re-forming in varying locations and amounts in the summer. Management requirements include the retention of a natural organic strandline and the avoidance of, e.g. mechanical beach cleaning to remove seaweed which has become a problem elsewhere, or artificial shoreline defences (groynes, revetments) which may encourage beach scouring and alteration of the sediment supply. Heavy recreational trampling can also damage the feature; this is apparent on small sections of Llanddwyn beach but is generally within tolerable limits.

This feature is threatened by climate-change induced “coastal squeeze” unless the shoreline is enabled to roll back over time. The forestry plantation should not be regarded as an immovable hard line against which this habitat should be compressed as the coastline retreats.

The main action required to restore the feature to favourable conservation status is the restoration of typical dune zones from beach to fixed dune grassland. Removal of conifers near the Newborough shoreline and its restoration to mobile dune and fixed dune grassland is necessary. This action was agreed in the 2010-15 Forest Management Plan and has been partly implemented. Further removal of conifers to restore the feature to favourable condition is to be reviewed by the new Forest Resource Plan.

5.2 Status and Management Requirements of Feature 2: Shifting dunes along the shoreline with Ammophila arenaria

Status of Feature 2: Unfavourable (2012)

The shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") at Abermenai to Aberffraw Dunes SAC are in an unfavourable condition (Creer 2012b) largely due to failure to meet the target for the range of typical associated dune habitat zones within the vegetation structure (a CSM mandatory attribute), i.e. the intact zonation between embryonic dunes through yellow dune to fixed dune grassland along 95% of the frontage. This is primarily due to the afforestation of unit 20 (001901).

The area of shifting dunes has contracted dramatically over the past half century (Rhind et al 2001) and is now largely concentrated in a narrow band about 100- 200m wide behind the embryonic dunes, with smaller outliers at the landward edge of some slacks where dune ridges maintain some residual mobility. There is particularly good representation of this feature at Tywyn Aberffraw, including some inland examples, whereas at Newborough Warren the feature is additionally compromised by the conifer plantation, which has truncated the normal zonation from embryo dune to yellow dune to fixed dune grassland in Unit 20, an example of climate-change induced "coastal squeeze", while shelter from the tree crop may also reduce wind speed, an important factor in creating and maintaining this feature, in the adjacent unit 25 (Newborough Warren).

Management Requirements of Feature 2

Shifting dunes require a regular sand supply and the opportunity for mobility – both wind erosion and periods of marine erosion can occur naturally. Mobile dunes are very resilient to disturbance if permitted to recover naturally. Problems may occur where persistent recreational access is concentrated (e.g. at car parks or access points) where special measures or structures may be required to facilitate recovery. This feature (and its related zonation) is also subject to "coastal squeeze" as a result of sea level rise. The application of the shoreline management plan (SMP2) policy of "no active intervention" (in relation to defence structure) actually requires intervention to permit this feature and these zones to roll inland.

An action required to restore the feature to favourable conservation status is the restoration of typical dune zones from beach to fixed dune grassland along most of the southwest facing coast. Removal of conifers near the shoreline at Newborough and its restoration to mobile dune and fixed dune grassland is necessary. This is also required to pre-empt forecasted shoreline retreat which will further "squeeze" this habitat, and to help convey the sand inland. This action is in accordance with the Shoreline Management Plan (SMP2) and agreed in the 2010-15 Forest Management Plan and has been partly implemented. Further removal of conifers to restore the feature to favourable condition is to be reviewed by the new Forest Resource Plan.

Secondly, action is required to remobilise coastal dunes which have become over-stabilised. This may involve creation of wind-blow notches in the frontal dunes and/or the removal of vegetation from selected areas. Management intervention at

Newborough has been successful in increasing habitat mobility and increasing the proportion of this feature. More may be required to meet the target.

5.3 Status and Management Requirements of Feature 3: Fixed dunes with herbaceous vegetation ("grey dunes")

Status of Feature 3: Unfavourable (2012)

The fixed dunes with herbaceous vegetation ("grey dunes") are in an unfavourable condition due to decline in the species richness and increase in species of higher nutrient status in samples at Newborough, the truncation of the natural zonation by the conifer plantation at Newborough and to the preponderance of grassy conditions in the fixed dune – lichen heath vegetation on Morfa Dinlle (Creer 2012c)

Management Requirements of Feature 3
The fixed dunes with herbaceous vegetation ("grey dunes") require light grazing to maintain open conditions. There is a dynamic relationship between large herbivores (currently sheep, cattle and ponies) and small grazers, notably rabbits. Large herbivores remove the coarse vegetation and enable rabbits to thrive on the short turf.

The restoration of livestock grazing to Newborough dunes from 1986 onwards has been instrumental in restoring the condition of much of this feature from its former coarse grass dominated state. This site has accordingly become a demonstration area for dune conservation management throughout the UK and abroad. However, levels of livestock grazing declined on Tywyn Aberffraw and a dense grass thatch has developed in parts since 2000. Restoration of cattle grazing in 2008 has improved the situation, but sward density remains a constraint on conservation objectives. Levels of grazing on Morfa Dinlle should be reviewed to ascertain whether there is long-term decline in commensal rabbit grazing.

Continuation of grazing, by livestock and rabbits, is necessary on all three dune sites to maintain the habitat feature. Pony grazing should be a component of this to benefit the nail fungus *Poronia punctata.* Rejuvenation of the dunes may also be necessary to restore earlier successional stages of fixed dune grassland

5.4 Status and Management Requirements of Feature 4 & 5: Dunes with *Salix repens* ssp *argentea* (*Salicion arenariae*) and Humid dune slacks

Status of Feature 4: Unfavourable (2012)

The dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*) at Abermenai to Aberffraw Dunes SAC are in an unfavourable condition (Creer 2012d).

Status of Feature 5: Unfavourable

The humid dune slacks at Y Twyni o Abermenai I Aberffraw / Abermenai to Aberffraw Dunes SAC are in an unfavourable condition. (Creer 2012d).

This is attributed to general lowering of the water table at both sub-sites and consequential succession to drier vegetation. There is also an indication that groundwater may be contaminated at Aberffraw and further compromise the achievement of favourable conservation status (Creer 2012d, Rhymes, 2014, 2015a, 2015b, 2016).

Management Requirements of Feature 4 & 5

Dune slacks require high water levels – notably prolonged periods of standing water in winter, but groundwater levels should not be lower than 0.5m below the surface in the winter and not lower than 1.3m below the surface in the summer (Currelli et al 2013). Wetter dune slacks need a higher minimum summer level (<70cm below ground surface for SD15 community). Humid dune slacks and dunes with *Salix repens* represent a range of variation related to increasing water table depth and age of the slack. Variations in rainfall and climate change notwithstanding, there have been a number of past management actions which may have directly or indirectly lowered the groundwater table. Where ditching and river deepening (e.g. Afon Frechwen) has affected the water table, this should be rectified by appropriate action which may include ditch blocking, riverbed realignment etc. Where evidence suggests that tree cover has led to increased evapotranspiration and interception of rainwater, resulting in a lowered water table below the stated thresholds, woodland management (including conifer removal and/ or conversion to broadleaf) should seek to restore Favourable Conservation status of dune slacks.

High groundwater quality is required, with low nutrient and high base status to support this distinctive wetland community. Further action may be required to reduce Nitrogen (NH_3, NO_3) contamination (Rhymes et al 2016). This feature is threatened by climate-change with a likely lowering of water tables due to increased evapotranspiration and pattern of rainfall and changes in the groundwater profile in response to shoreline retreat.

Continuation of grazing management is required, particularly where the development of scrub and rank grassland is apparent, for instance on Tywyn Aberffraw where a period of abandonment of the grazing regime may be partly responsible for an increase in scrub on the site.

New dune slacks are required to initiate early successional stages with abundant areas of bare sand for colonisation. This should ideally be attained by the restoration of erosion episodes enabling aeolian processes to scour new slacks down to the natural water table.

5.5 Status and Management Requirements of Feature 6: Natural eutrophic lakes with *Magnopotamnium* or *Hydrocharition* type vegetation

Status of Feature 6: Unfavourable Maintained (2012)

The natural eutrophic lakes with *Magnopotamnium* or *Hydrocharition* type vegetation feature within this site is considered to be in Unfavourable maintained condition due to eutrophication (nutrient enrichment), leading to insufficient characteristic species and sparse macrophyte cover in deeper areas (L Coron). (Burgess et. al. 2006)

Management Requirements of Feature 6

Although there is some indication of recovery of factors affecting this feature (as indicated by declining levels of phosphate in Llyn Coron waters) there is little indication of improvement in the feature itself at this time. However, many of the characteristic species remain and there is good prospect of recovery if the correct management is implemented. This is likely to include:

- Catchment management to reduce nutrient input via surface streams. Levels of phosphate remain stubbornly high, possibly due to re-cycling from bottom sediments, but mean that further inputs from the catchment are unacceptable. Furthermore, the high levels of P in the lake water mean that the system is particularly sensitive to nitrogen inputs, indeed is probably N-limited for much of the season. Control of nitrogen inputs is equally vital.
- Restriction of livestock access to the shore. This is to reduce direct input of animal manures and nutrients, reduce sediment disturbance and consequential muddying of the water and re-suspension of phosphorus, and enable fringing vegetation to develop which will both protect the shoreline from wave erosion and serve to buffer the lake from surface water run-off. Care must be taken that grazing of the Aberffraw dunes does not conflict with this requirement.
- Avoid the introduction of alien species. Alien aquatics, both plants and animals, can seriously disrupt aquatic ecosystems. Introduction of coarse fish should be avoided at all cost. Himalayan balsam, currently near the outfall, is being eradicated by a long-term programme of public and private partnership.
- Maintain water levels – the sluices on Llyn Coron and on Llyn Rhos Ddu should be maintained to counteract the effects of downstream river deepening.

5.6 Status and Management Requirements of Feature 7: Transition mires and Quaking Bogs

This is a minor SAC feature and no specific conservation objectives are required at this stage.

Status of Feature 7: Unknown

Management Requirements of Feature 7

5.7 Status and Management Requirements of Feature 8: Petalwort

Status of Feature 8: Unfavourable Declining (2012)

The petalwort *Petalophyllum rafsii* at Y Twyni o Abermenai i Aberffraw / Abermenai to Aberffraw Dunes SAC in 2005 is in an unfavourable declining condition. Although monitoring indicates that its status at Tywyn Aberffraw is within the limits set, its abundance and distribution on the Newborough dunes fails to achieve the target level and appears to be declining. There is some indication that this may be due to drying out and possible changes in ground chemistry (Rumsey 2005)

Management Requirements of Feature 8
At Aberffraw, the maintenance of grazing to maintain open dune conditions and low sward, preventing scrub-induced increases in evapotranspiration and consequential lowering of water tables. The presence of several drains and over-deepened river channels should be reviewed with regard to groundwater levels. The quality of groundwater must be protected from direct or indirect pollution.

At Newborough, drains within the forest (north to the Cefni) militate against the survival of this species in remnant open slacks. Consideration should be given to their infilling. Drying of the slacks elsewhere should be addressed under feature 5.

5.8 Status and Management Requirements of Feature 9: Shore dock

Status of Feature 9: Unfavourable Declining (2012)

The shore dock (*Rumex rupestris*) at Y Twyni o Abermenai i Aberffraw / Abermenai to Aberffraw Dunes SAC is in unfavourable declining condition.

Management Requirements of Feature 9
The entire feature occurs within the Newborough Forest (management unit 20). Management requirements include maintenance of open conditions, scarification or poaching of the ground to permit germination etc. This will require scrub and canopy clearance, maintenance of grazing, protection of water supply and quality, and periodic clearance of the fire pool. However, the genetic threat to the species remains, both due to possible genetic bottleneck (a low population point resulting in loss of genetic diversity) coupled with isolation from the usual mechanism of gene flow and seed dispersal in coastal waters. Stream flow has been highly modified as a result of afforestation and that re-design of the forest at Ffrydiau and Cerrig Duon is required to safeguard water supply and facilitate connectivity. Linking of shore dock populations to the sea from the present location needs consideration as well as manipulation of the gene pool and/or translocation of a population to a more appropriate location.

5.9 Status and Management Requirements of Feature 10: Great crested newt

Status of Feature 10: Unfavourable recovering (2012)

The great crested newts at Glan-traeth SAC in 2012 was in unfavourable recovering condition.

Management Requirements of Feature 10
Great crested newts appear to occur as a meta-population in several breeding pools and terrestrial habitat across Glan-traeth SAC and within Newborough Warren – Ynys Llanddwyn SSSI. The species has also been recently recorded at Tywyn Aberffraw.

Key requirements are shallow open water pools with areas of open bottom for courtship display and leafy macrophytes (e.g. *Mentha aquatica*) for egg laying in a fish-free environment. Pools which dry out at the end of the season or in drought years can ensure fish-free status. Action is required to create bare scrapes for courtship (Glan-traeth). The creation of additional shallow pools (where this does not compromise other conservation objectives) can seek to increase habitat and the bolster the resilience of the population to loss of individual pools.

5.10 Status and Management Requirements of Feature 11: Estuaries

Status of Feature 11: Unfavourable ?.

Management Requirements of Feature 11
Sea level rise and coastal squeeze of this habitat against the fixed embankments at Malltraeth and Rhyddgaer is an issue. NRW has a responsibility to find compensatory habitat to mitigate for intertidal habitat loss in SACs. The SMP2 policy is Hold the line for all 3 epochs at Malltraeth. There may be opportunity for habitat expansion at Rhyddgaer.

5.11 Status and Management Requirements of Feature 12: *Salicornia* and other annuals colonising mud and sand

Status of Feature 12: Favourable (2012)

According to Lough et al 2007 condition is “unfavourable”. This is considered to be a misinterpretation of CSM guidance in regard to presence of artificial habitat on the shore. Other monitoring targets (On Braint estuary 2 out of 3 transects require >5% of transect as Salicornia habitat and on Cefni estuary 1 out of 3 transects require >5% of the transect to be Salicornia habitat) seem to have been met.

Management Requirements of Feature 12
The development of Salicornia stands is subject to a high degree of stochastic variation as regards distribution and extent. No intervention is considered appropriate at this time.

5.12 Status and Management Requirements of Feature 13: Mudflats and sandflats not covered by seawater at low tide

Status of Feature 13:

Not known

Management Requirements of Feature 13
Not known

5.13 Status and Management Requirements of Feature 14: Atlantic salt meadows

Status of Feature 14: Unfavourable (2012)

Management Requirements of Feature 14

The ASM feature fails the condition monitoring due to the incomplete zonation present in some transects and to the presence of coastal defence or modified habitat at the terrestrial transition. This includes the causeway (Malltraeth Cob) and the presence of conifer plantation on the shoreline behind the Cefni saltmarsh, both of which truncate the full zonation from pioneer saltmarsh to freshwater and natural terrestrial habitat.

This feature is vulnerable to climate-change induced “coastal squeeze”. Action may be required to enable it to migrate inland. There is no constraint (other than Malltraeth Cob) to natural migration within the SACs but there are opportunities on adjacent areas for saltmarsh habitat migration, either through active intervention or natural development.

It is unclear whether the removal of the Malltraeth Cob is a realistic expectation – although the benefit to the ecological restoration of the Glannau Mon SAC (and restoration of natural estuarine profile) should be recognised if its removal for other objectives were ever to be considered. Current SMP2 policy is “hold the line” for the foreseeable future. However, the modification of the edges of the conifer plantation to swamp, dune and semi-natural broadleaf woodland along the saltmarsh boundary is a realistic expectation recognised under the Forest Management Plan.

Feature 15 Sea cliffs?

6. ACTION PLAN: SUMMARY

This section takes the management requirements outlined in Section 5 a stage further, assessing the specific management interventions required on each management unit. This information is presented in two parts:

- A summary of the information held in Natural Resources Wales' Actions Database for sites
- A summary of ongoing management which is not recorded in Natural Resources Wales' actions database

6.1 Actions in Natural Resources Wales' actions database

See Appendix

6.2 Ongoing management

- Appropriate grazing of sand dune habitat at Morfa Dinlle, Aberffraw and Newborough Warren and Forest and at Glantraeth
- Mowing of rides and slacks where grazing is not possible
- Scrub and conifer removal around shore dock sites and Pwll Pant Mawr (Sands of Life Project) and open areas including Cerrig Duon, Parnassus Slack and Pant y Fuches. Stump removal where appropriate.
- Scrub control and the introduction of grazing at Great Crested Newt ponds/ Ffrydiau in Newborough Forest and scrub removal at Aberffraw/ Llyn Coron by the Sands of Life Project
- Invasive species removal at Aberffraw and Newborough by the Sands of Life Project and INNS management frontal dunes/Penrhos.
- Turf, soil, needle litter and tree regen removal on the Newborough rocky ridge/ Precambrian outcrop at Aberffraw/ Llyn Coron by the Sands of Life Project
- Sand notches/ sand scrape excavation at Aberffraw and Newborough Warren to remobilise by the Sands of Life Project
- Retention of woody debris/ hibernacula piles near great crested newt ponds in Newborough Forest.

7. GLOSSARY

This glossary defines some of the terms used in this **Core Management Plan**. Some of the definitions are based on definitions contained in other documents, including legislation and other publications of Natural Resources Wales and the UK nature conservation agencies.

Action	A recognisable and individually described act, undertaking or **project** of any kind, specified in section 5 or 6 of a **Core Management Plan** or **Management Plan**, as being required for protecting, managing or enhancing one or more of the **features** for which a site is designated.
Atlantic dune woodland	This is a diverse native broadleaf woodland type thought to develop as a late successional habitat within dunes where sands have been stabilised by scrub development and salt influence is minimal. Very little of this habitat exists in the UK. Main tree species found are downy birch, willows, aspen, hawthorn, alder, elm and oak.
Attribute	A quantifiable and monitorable characteristic of a **feature** that, in combination with other such attributes, describes its **condition**.
Coastal squeeze	This is the loss of intertidal habitat where the high-water mark being fixed by a defence or hard/ immovable structure and the low water mark migrating landwards in response to sea level rise.
Common standards	See **JNCC common standards.**
Condition	A description of the state of a feature in terms of qualities or **attributes** that are relevant in a nature conservation context. For example, the condition of a habitat usually includes its extent and species composition and might also include aspects of its ecological functioning, spatial distribution and so on. The condition of a species population usually includes its total size and might also include its age structure, productivity, relationship to other populations and spatial distribution. Aspects of the habitat(s) on which a species population depends may also be considered as attributes of its condition. Condition is considered favourable

	when all the conservation objectives are being met.
Conservation management	Acts or undertaking of all kinds, including but not necessarily limited to **actions,** taken with the aim of achieving the **conservation objectives** of a site. Conservation management includes the taking of statutory and non-statutory measures, it can include the acts of any party and it may take place outside site boundaries as well as within sites. Conservation management may also be embedded within other frameworks for land/sea management carried out for purposes other than achieving the conservation objectives.
Conservation objective	The expression of the desired state of a **feature,** expressed as a composite statement defining the **condition** that we wish the feature to be in. Each feature has one conservation objective.
Core Management Plan	A Natural Resources Wales document containing the conservation objectives for a site and a summary of other information contained in a full site **Management Plan**.
Factor	Anything that has influenced, is influencing or may influence the **condition** of a **feature**. Factors can be natural processes, human activities or effects arising from natural process or human activities. They can be positive or negative in terms of their influence on features, and they can arise within a site or from outside the site. Physical, socio-economic or legal constraints on management of the site can also be considered as factors.
Favourable condition	See **condition**.
Favourable conservation status	The Habitats Directive definition of **Favourable Conservation Status** (FCS) is given in full in section 4.
Feature	The species population, habitat type or other entity for which a site is designated. The ecological or geological interest which justifies the designation of a site and which is the focus of **conservation management.**
Integrity	See **Site integrity.**

JNCC common standards	A set of principles developed jointly by the UK nature conservation agencies to help ensure a consistent approach to monitoring and reporting on the features of sites designated for nature conservation, supported by guidance on identification of attributes and monitoring methodologies.
Key Feature	The habitat or species population within a **management unit** that is the primary focus of management and **monitoring** in that unit.
Management Plan	The full expression of a designated site's legal status, **vision**, **features**, **conservation objectives**, **performance indicators** and management requirements. A complete management plan may not reside in a single document, but may be contained in a number of documents (including in particular **the Core Management Plan**) and sets of electronically stored information.
Management Unit	An area within a site, defined according to one or more of a range of criteria, such as topography, location of **features**, tenure, patterns of land/sea use. The key characteristic of management units is to reflect the spatial scale at which site management and **monitoring** can be most effectively organised. They are used as the primary basis for differentiating priorities for conservation management and monitoring in different parts of a site, and for facilitating communication with those responsible for management of different parts of a site.
Monitoring	An intermittent (regular or irregular) series of observations in time, carried out to show the extent of compliance with a formulated standard or degree of deviation from an expected norm. In monitoring of sites designated for habitat and species conservation, the formulated standard is the quantified expression of favourable **condition** based on **attributes**.
Operational limits	The levels or values within which a **factor** is considered to be acceptable in terms of its influence on a **feature**. A factor may have both upper and lower operational limits, or only an upper limit or lower limit. For some factors an upper limit may be zero.

Performance indicators	The **attributes** and factors together with their associated target values (or ranges of values) which provide the standard against which information from **monitoring** and other sources is used to determine the degree to which the **conservation objectives** for a **feature** are being met.
Plan or project	**Project:** Any form of construction work, installation, development or other intervention in the environment, the carrying out or continuance of which is subject to a decision by any public body or statutory undertaker. **Plan**: a document prepared or adopted by a public body or statutory undertaker, intended to influence decisions on the carrying out of **projects.** Decisions on plans and projects which affect Natura 2000 and Ramsar sites are subject to specific legal and policy procedures.
Site integrity	This is defined in Welsh Government policy as the coherence of a site's ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it is designated.
Site Management Statement (SMS)	The document containing Natural Resources Wales' views about the management of a site issued as part of the legal notification of an SSSI under section 28(4) of the Wildlife and Countryside Act 1981, as substituted.
Special Feature	See **feature**.
Specified limits	The levels or values for an **attribute** which define the degree to which the attribute can fluctuate without creating cause for concern about the **condition** of the **feature**. The range within the limits corresponds to favourable, the range outside the limits corresponds to unfavourable. Attributes may have lower specified limits, upper specified limits, or both.
Unit	See **management unit.**
Vision Statement	The statement conveying an impression of the whole site in the state that is intended to be the

product of its **conservation management.** A ‘pen portrait’ outlining the **conditions** that should prevail when all the **conservation objectives** are met. A description of the site as it would be when all the **features** are in **favourable condition**.

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9. APPENDIX

9.1 Performance Indicators

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These performance indicators describe the evidence, including in particular evidence to be obtained from monitoring of sites and features, that will be used to inform judgements about whether or not the conservation objectives (in section 4 of the Core management plans) are being met.

These performance indicators should NOT be used as a substitute for the conservation objectives, including in particular for the purposes of assessing plans and projects. The assessment of plans and projects should be made in view of the conservation objectives set out in section 4.

9.1 1.1 Performance indicators for Feature 1 Embryonic shifting dunes and Feature 2: Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") (EU Habitat code 2110 and 2120)

Performance indicators for feature condition		
Attribute	**Attribute rationale and other comments**	**Specified limits**
Extent	Dune habitats are dynamic and interchangeable, the relative proportions varying over time. The extent of shifting dunes varies naturally during and between years. However, an interim target of 10% shifting dunes (4.19% at time of designation) is considered desirable in view of the importance of shifting dunes in initiating the succession to other features of the site over time. Correct juxtaposition of ecological zones is a mandatory attribute of feature condition. (Derived from JNCC common standards).	The aggregate area of dune habitat is at least 675ha. No evident loss through anthropogenic causes. Minimum 67ha (10%) of shifting dunes, target 202ha (30%) and Typical zonation from beach to fixed dune should be intact over at least 95% of the coastal frontage.
Quality	Derived from JNCC common standards (JNCC 2004).	Sample target for shifting dunes: On Tywyn Aberffraw and Newborough Warren dune systems:

Performance indicators for feature condition		
		Shifting dunes are present, and ≥ 60% of shifting dune points recorded are good quality shifting dunes.
Site-specific habitat definitions		
Shifting dune typical species	Sandy hummocks typically vegetated with tussocks of *Ammophila arenaria* and often with *Leymus arenarius* and *Elytrigia juncea (Elymus farctus), Festuca rubra, Senecio jacobaea, Hypochaeris radicata, Carex arenaria, Eryngium maritimum, Euphorbia portlandica, Calystegia soldanella, Euphorbia paralias, Phleum arenarium*. Other strandline species, e.g. *Honckenya peploides* sparsely distributed.	
Good quality shifting dunes	**Good quality** shifting dunes will have the following attributes; **Within a 1m radius** of each sampling point. 1. At least one of the following species is present, *Ammophila arenaria* and/or *Leymus arenarius*. 2. *Ammophila arenaria* and / or *Leymus arenarius* are flowering and / or fruiting. **Within a 2m radius** of each sampling point. 3. The following negative indicator species are absent; *Arrhenatherum elatius*, *Cirsium arvense*, *Cirsium vulgare*, *Lolium perenne*, and *Urtica dioica*. 4. *Hippophae rhamnoides* is absent. 5. Non-native species are absent.	
Sampling approach	Mapping.	
Sampling method	Presence or absence of habitat.	
Sample point size	1m and 2m radius.	

Performance indicators for factors affecting the feature		
Factor	**Factor rationale and other comments**	**Operational Limits**
Sediment and strand line supply	Embryonic dunes depend on organic strandline material and mobile sand.	There should be no significant man-made obstruction to longshore drift nor extraction of sand from foreshore or offshore source area. No removal of natural organic debris (beach "cleaning").
Disturbance	Periodic disturbance to the vegetation such as fire, storm, trampling or grazing is required to initiate dune mobility.	>30% <90% bare sand within this habitat

9.1 1.2 Performance indicators for Feature 3: Fixed dunes with herbaceous vegetation (grey dunes) EU ref2130

Performance indicators for features' condition		
Attribute	**Attribute rationale and other comments**	**Specified limits**
Extent	The extent of fixed dunes varies naturally during and between years. Correct juxtaposition of ecological zones is a mandatory attribute of feature condition (Derived from JNCC common standards).	Zonation from beach to fixed dune should be intact over at least 95% of coastal frontage
Quality	30-70% of sward should be species rich grassland 2-10cm in height Non-native (including Hipoppae rhamnoides) species where present should be rare Scrub/ trees should be rare	Bare ground present but no more than 10% (JNCC 2004) Scrub no more than 5% (JNCC 2004)

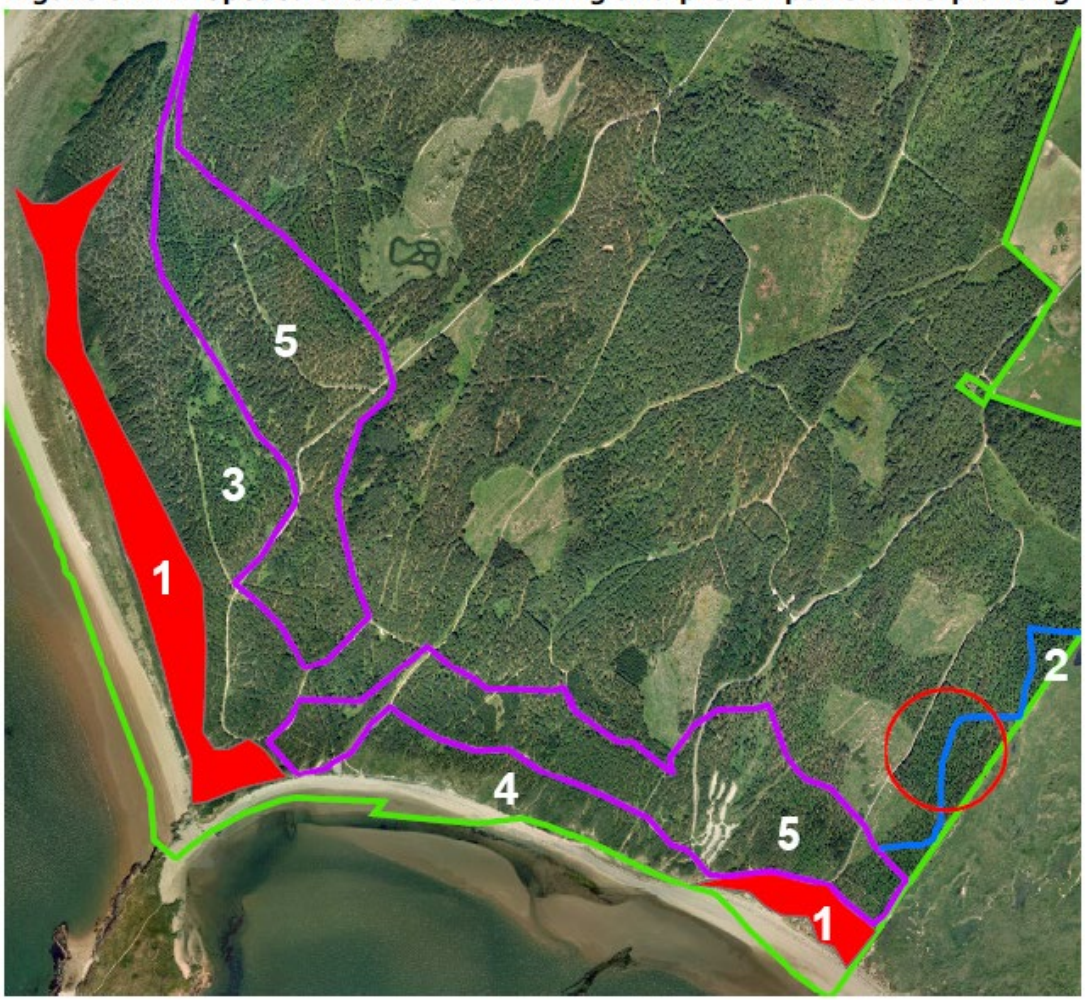
Site-specific habitat definitions	
Fixed dune typical species	
Good quality fixed dunes	**Good quality** fixed dunes will have the following attributes; *Hippophae rhamnoides* is absent. Non-native species are absent.
Sampling approach	Mapping.
Sampling method	Presence or absence of habitat.
Sample point size	1m and 2m radius.

9.3 1.3 Performance indicators for Feature 4 and 5: Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae)* and Humid dune slacks) (EU Ref 2170, 2190)

Performance indicators for features' condition		
Attribute	**Attribute rationale and other comments**	**Specified limits**
Extent		No net loss of extent
Quality	All humid slack communities should be present from embryonic dune slacks with a high percentage of bare ground to slacks with more closed vegetation and up to 33% *Salix repens* cover (JNCC 2004) Sward should be >30% forbs, < 70% grasses.	Bare ground present but no more than 5% (JNCC 2004) Tree cover (other than *Salix repens)* no more than 5% (JNCC 2004)
Site-specific habitat definitions		
Dune slack species		
Good quality slacks	**Good quality** dune slacks will have the following attributes; Non-native species are no more than rare. Other negative indicator species no more than 5% cover.	
Sampling approach	Mapping.	
Sampling method	Presence or absence of habitat.	
Sample point size	1m and 2m radius.	

Appendix 9.4 – Forest Management Plan 2010-2015 forest retreat and underplanting strategy

Figure 5.1: Proposed areas of clearfelling and pre-emptive underplanting



Key

Areas of clearfelling to restore to mobile dunes*
Realignment of forest boundary with warren* ○ = proposed area of hydrological experiment*
Pre-emptive planting of ADW species as buffer against dune incursion

Zone	Description
1*	Clearfell and partial destumping. Encourage natural processes.
2*	Realignment of forest boundary with the warren (indicative felling edge)
3*	Low-intervention. Monitor and review over the plan period
4	Natural processes to be allowed to occur. Area of limited intervention.
5	Forest protection. Underplant to create an Atlantic dune woodland (ADW).

**Subject to the conclusion of the Newborough Forest Science Review 2010*

9.5 Appendix 9.5 Soft dune frontage of Aberffraw, Newborough and Morfa Dinlle SACs

File note agreed by Emmer Litt Coastal Process Specialist NRW

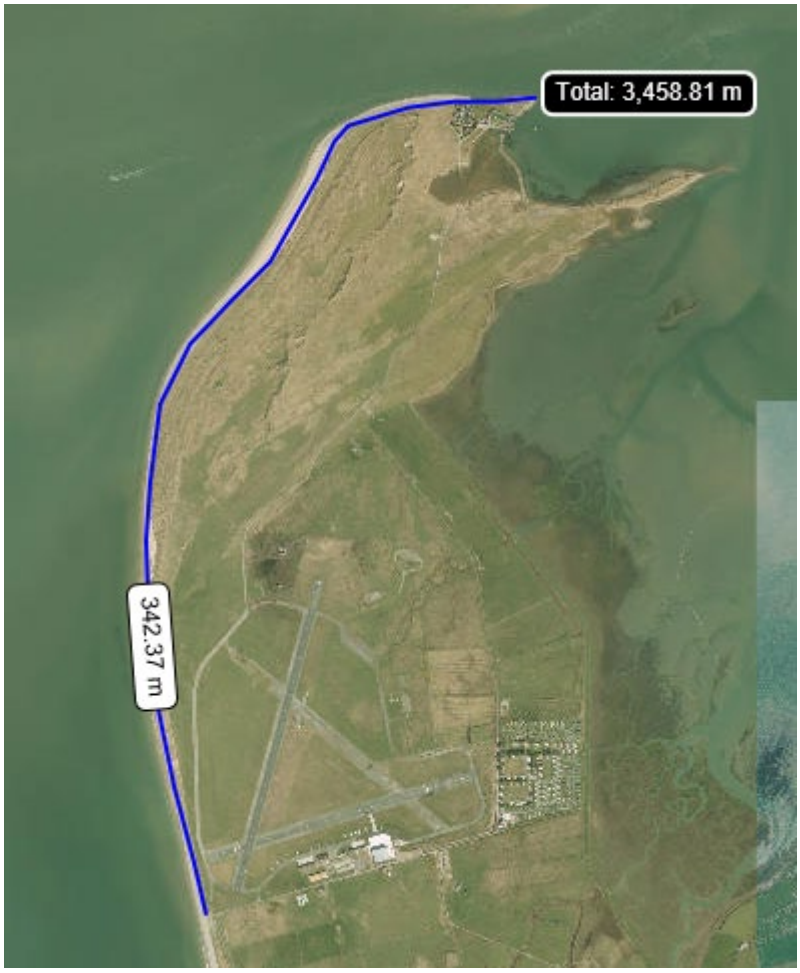
Aberffraw 1

Newborough Llanddwyn – Abermenai Point

Newborough Penrhos

Area discounted as not “frontage” i.e. open to wind and wave action from the open sea and protected by salt marsh

Morfa Dinlle frontage



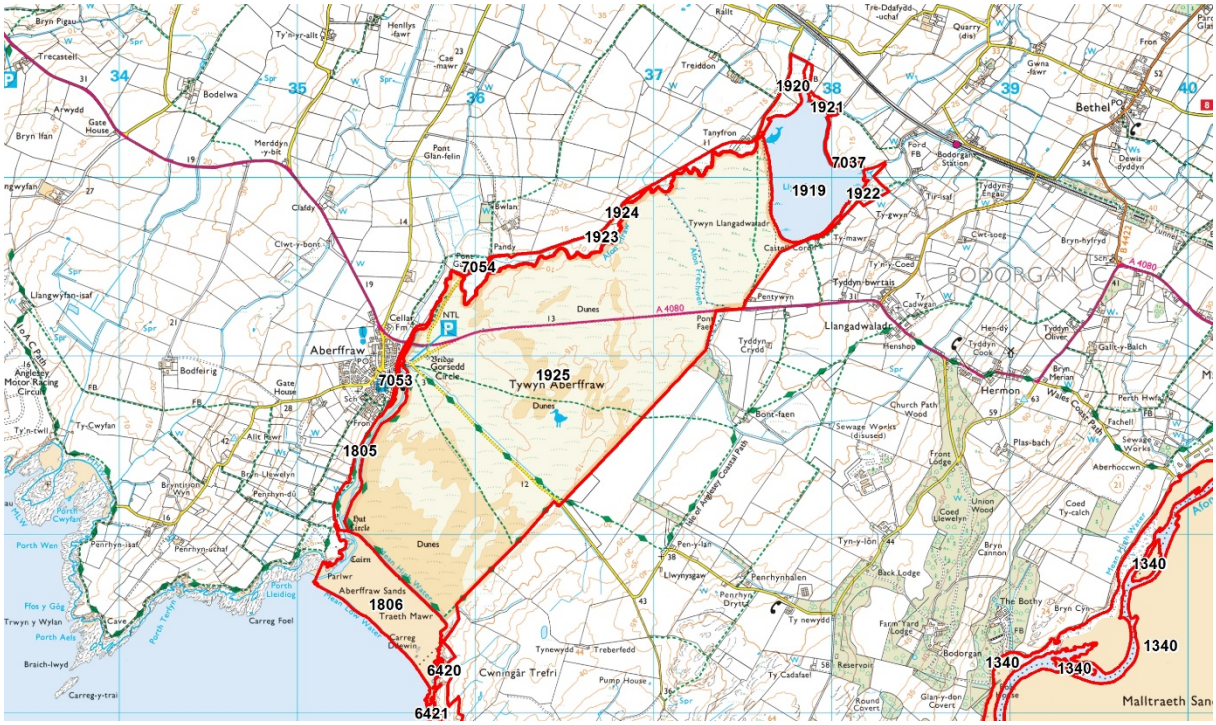
Totals

Site	Length
Aberffraw	870
Newborough Warren	5900
Newborough Penrhos	2730
Morfa Dinlle	3460
	Total length 12960m

9.6 Appendix 1.5 SAC Unit Maps

Newborough

Aberffraw



Morfa Dinlle

Appendix 9.7
Actions for Glannau Môn SAC from NRW's Actions database

Organisation	Mechanism	Action Label	Action Management Status	Notes on Management Action	Unit Reference	Name	Unit Area (Ha)	Associated Sites	Management Officer	Site Wide Management Action
Cyfoeth Naturiol Cymru / Natural Resources Wales	NRW direct management	A3 Tree planting, past and present	Underway	Remove conifers from CCW tenanted land.	1341	Saltmarsh pool	10.11	SSSI - Newborough Warren - Ynys Llanddwyn, SAC - Glannau Mon: Cors heli / Anglesey Coast: Saltmarsh	Dave Thorpe	No
Cyfoeth Naturiol Cymru / Natural Resources Wales	Targeted education, awareness raising and liaison	A1 Access for sea fisheries	Identified	Cockling, winkle picking, mussel collection and other activities on mudflats - impact on Zostera and other features and through vehicle access across saltmarsh. Requires coordination of access rights with Ynys Mon Maritime Officer.	1345	Braint Estuary/Traeth Melynog	284.36	SAC - Glannau Mon: Cors heli / Anglesey Coast: Saltmarsh, SSSI - Newborough Warren - Ynys Llanddwyn	Dave Thorpe	No
Cyngor Sir Ynys Mon / Isle of Anglesey County Council	Implementation of appropriate coastal management		Complete	Ensure Shoreline Management Plan review (SMP2) enables natural realignment of shoreline and sediment supply	1343	Penrhos Beach	99.8	SSSI - Newborough Warren - Ynys Llanddwyn, SAC - Glannau Mon: Cors heli / Anglesey Coast: Saltmarsh	Dave Thorpe	No
Cyfoeth Naturiol Cymru / Natural Resources Wales	NRW direct management	A5 Coastal flood defence and erosion	Identified	Land acquisition followed by re-engineering of flood banks.	1345	Braint Estuary/Traeth Melynog	284.36	SAC - Glannau Mon: Cors heli / Anglesey Coast: Saltmarsh, SSSI - Newborough Warren - Ynys Llanddwyn	Dave Thorpe	No
Cyfoeth Naturiol Cymru / Natural Resources Wales	Felling Licence	A4 Tree planting, past and present	Identified	Modification to canopy proposed as part of FDP discussions. Remove conifers from saltmarsh edge to restore natural transition zone from saltmarsh to dune and scrub..	1341	Saltmarsh pool	10.11	SSSI - Newborough Warren - Ynys Llanddwyn, SAC - Glannau Mon: Cors heli / Anglesey Coast: Saltmarsh	Dave Thorpe	No
Cyngor Sir Ynys Mon / Isle of Anglesey County Council	Implementation of appropriate coastal management		Complete	Ensure Shoreline management plan review enables natural shoreline realignment.	1344	Traeth Llanddwyn	173.88	SSSI - Newborough Warren - Ynys Llanddwyn, SAC - Glannau Mon: Cors heli / Anglesey Coast: Saltmarsh	Dave Thorpe	No
Cyfoeth Naturiol Cymru / Natural Resources Wales	NRW direct management	A6 Coastal flood defence and erosion	Identified	Removal of the cob (~100metres) at Rhuddgaer to allow for saltmarsh to extent inland. Include provision of access	1345	Braint Estuary/Traeth Melynog	284.36	SAC - Glannau Mon: Cors heli / Anglesey Coast: Saltmarsh, SSSI -	Dave Thorpe	No

				landward of current access track. Lead by Habitat creation scheme (NHCP).				Newborough Warren - Ynys Llanddwyn		
Cyfoeth Naturiol Cymru / Natural Resources Wales	NRW direct management	A2 Terrestrial non-native	Underway	Conifers, black cherry and white poplar on the edge of the saltmarsh should be removed and associated ditches / grips considered for blocking to permit natural expression of the saltmarsh - dune - scrub transition zone.	1340	Cefni estuary	426.55	SSSI - Newborough Warren - Ynys Llanddwyn, SAC - Glannau Mon: Cors heli / Anglesey Coast: Saltmarsh	Dave Thorpe	No
Rural Estate	Licence amendment		Identified	Decision of JTG to permit punt gunning on adjacent areas undermines conservation objectives for wildfowl. Review at 3-year break clause.	1345	Braint Estuary/Traeth Melynog	284.36	SAC - Glannau Mon: Cors heli / Anglesey Coast: Saltmarsh, SSSI - Newborough Warren - Ynys Llanddwyn	Dave Thorpe	No+A1:K10

Actions for Y Twyni o Abermenai I Abberffraw SAC from NRW's Actions database to be added

Appendix 9.8 Notes on military history of sites

Aberffraw: Luftwaffe aerial photographs of Aberffraw suggest that a number of potential trench positions (man-made) could have existed within Aberffraw. A number of WWII defensive positions were active in the immediate environment. The majority of the identified positions are located to the south east of Aberffraw, in the vicinity of RAF Bodorgan.

Newborough: A Coflein record indicates the presence of a *'Powder Magazine'* Circa 1842 located at Abermenai Point. Newborough Warren Q site control Room - Named after the Q ships of WW1, this decoy airfield was sited in the sand dunes. Operational from '41-'43, with standard Drem lights being used to mark out the dummy runway at night. An aircraft approaching at the correct angle to land would have seen a series of red lights warning him not to land. Manned by a corporal and three airmen from an enlarged Anderson shelter. Sources include: Defence of Britain Project Phillips, Alan, 2006, Military Airfields Wales, pg. 256-7 Sloan, Roy, 1991, Wings of War over Gwynedd, pg20-61 Smith, David J 1982 Action Stations 3: Military Airfields of Wales and the North West, pg. 196-200 Link

Morfa Dinlle: Llandwrog airfield was officially closed on 29th July 1945 until it re-opened for civilian use as Caernarfon Airport in 1975. However, from September 1946 until late 1955 the base housed a secretive maintenance unit, known as No.277MU. Between these years the base received 9,000 tons (71,000 bombs) of enemy chemical weapons (Sloan 1998). Under 'Operation Sandcastle', the weapons were brought from Germany to a channel port, then shipped to the docks at Newport and then driven up to Llandwrog. After some form of processing, probably carried out in the large number of now demolished hangars built on the former runway they were driven to Fort Belan along a newly constructed road, where a jetty had been built. The material was eventually loaded onto a ship and dumped in a deep part of the Atlantic Ocean. It is not known why such a complex procedure involving much loading and unloading of dangerous material was required (Evans, 2012). (Evans, R. (2012). Former Watch Office RAF Llandwrog, Caernarfon. Archaeological Building Record: Level 2. Gwynedd Archaeological Trust. Bangor.)