ASTER ENVIRONMENTAL CONSULTANTS LTD

Mornington Dunes Co Meath,

Visitor Access and Conservation Management Plan

Draft for consultation 08/11/23

An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

comhairle chontae na mí
meath county council

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Public Consultation

We invite the public to actively participate in a crucial phase of the planning process as we share this draft restoration plan for Mornington's dunes agreed by NPWS and Meath Co Council. However, it's essential to emphasize that this is a draft plan. Your input and perspectives during this public consultation phase will play a pivotal role in shaping the final plan.

The plan outlines a series of targeted actions aimed at restoring and preserving this unique natural habitat. These actions include relocating car parks to protect the dunes, constructing accessible boardwalks for visitors, planting marram grass to stabilize the dunes, fencing to protect the dunes and implementing horse tracks for equestrian access.

We encourage you to carefully review the plan, share your thoughts, and actively participate in this process. Together, we can work towards a sustainable future for Mornington's dunes, safeguarding their natural beauty, ecological diversity, and cultural importance for generations to come. Your engagement is a vital step in ensuring the success of this restoration initiative.

Contents

1.0 Introduction

Mornington Strand and Dunes, located in County Meath, are not only important locally as a beautiful place for swimming, horse riding, and walking, but also internationally significant for its coastal habitats, particularly the sand dunes.

Mornington Dunes are a part of the Boyne Coast and Estuary Special Area as well as part of Boyne Estuary Special Protection Area Conservation in County Meath, Ireland. A wall at the Boyne Estuary mouth has contributed to the development of dunes on the northern part of the area, while a golf course occupies the dunes to the south. The dunes are in different stages of development, including embryonic dunes, marram dunes, and fixed dunes. During assessments, the dunes were found to have an unfavourable conservation status with recreational use identified as the most significant pressure.

To address this issue, the NPWS and Meath County Council as well as other local interested parties initiated a plan to manage recreation and restore the sand dunes to a more favourable conservation status. This plan involves identifying and addressing major factors causing degradation and undertaking restoration measures to ensure a successful outcome.

Overarching Aims

- Improving the conservation status of the Designated Annex I habitats in the area covered by the plan in particular Dunes (embryonic dunes, fixed Dunes, Embryonic dunes,marram dunes)
- Continue to facilitate access to the beach for recreation

Management Plan Objectives are as follows

- Documentation of the site's description, ownership, and usage, and other pertinent information, to provide context for the proposed plan.
- A comprehensive plan for works to protect the dune system that are compatible with the Conservation Objectives of the International Conservation designations (SAC and SPA).
- Specifications and estimated costs associated with these actions
- Consulting with Meath Co Council, NPWS, landowners, leaseholders, local representatives, and site users to ensure that the plan aligns with their needs and expectations.

Please Note: The report is written in plain English to facilitate public engagement

Stage 1: Draft Plan for NPWS comment

Stage 2 Draft Plan Meath County Council for comment

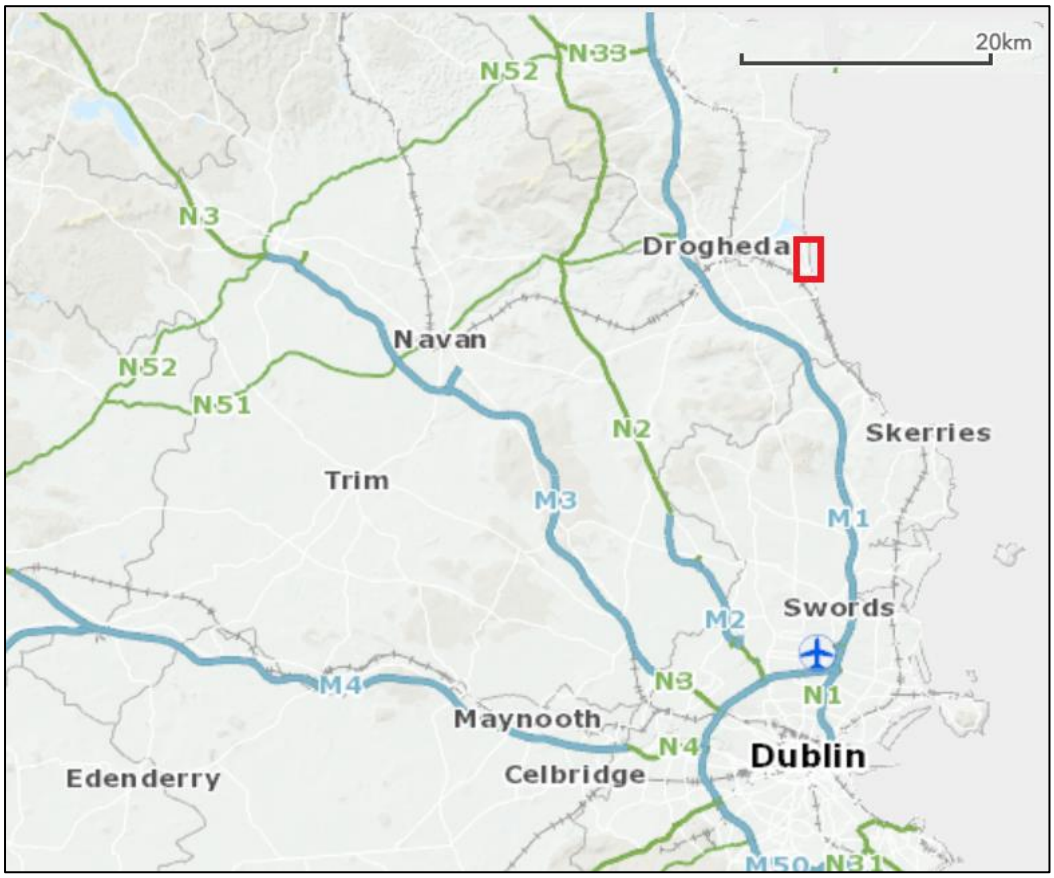
Stage 3: Presentation of Draft plan to landowners/leaseholders for comment and invite changes as required

Stage 4: Agreed Draft plan for consultation with community

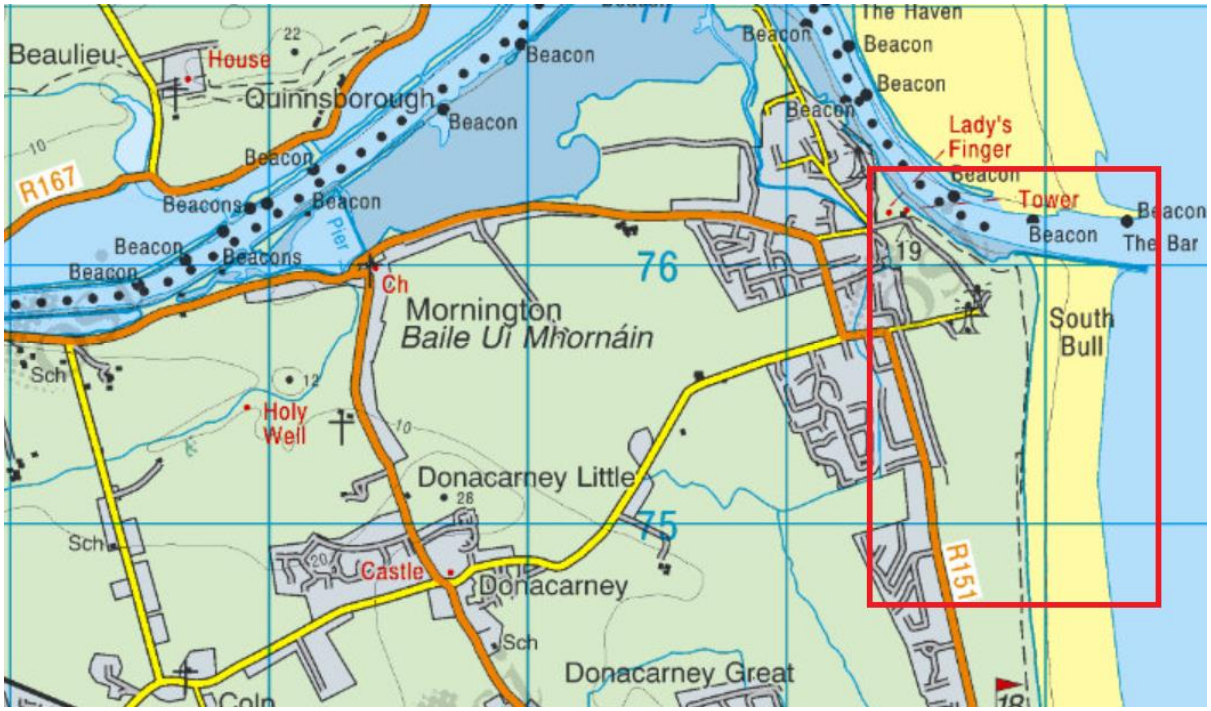
2.0 Site description (location, legal status, ownership)

2.1 Site Description

Mornington Sand Dunes are located in Co Meath, 6.9km due east of Drogheda



Map 1: Site Location Map



Map 2: Site Location map showing Mornington (Reproduced under OSI Licence number EN 0070910) Scale (1km grid)

2.2 Ownership

The success of this project relies heavily on the cooperation of the private landowners who own the site and a single leaseholder. Their agreement is crucial to the successful implementation of the plan.

2.3 Legal Status Designations of the Site

The site has 3 designations (or proposed designations)

- pNHA
- SAC
- SPA

pNHA Designation (proposed)

Mornington dunes are proposed as a Natural Heritage Area (pNHA) which is a national Irish designation.. A proposed Natural Heritage Area (pNHA) refers to a site that is being considered for designation as an NHA in the future. These areas are identified based on their ecological importance and potential to contribute to the conservation and protection of Ireland's natural heritage. The pNHA is larger than the SAC extending both to the east and west (see map 3) and the reasons for its selection will be considered during the assessment phase of this plan.

Prior to statutory designation, pNHAs are subject to limited protection, for example recognition of the ecological value of pNHAs by Planning and Licencing Authorities.

Under the Wildlife Amendment Act (2000) , NHAs are legally protected from damage from the date they are formally proposed for designation.

Special Area of Conservation

Mornington Dunes are designated as of international conservation importance under the EU Habitats Directive. Boyne Coast and Estuary SAC (site code 1957) A Special Area of Conservation (SAC) is a designation under the European Union's Habitats Directive. It identifies a site of significant ecological importance that is home to rare or threatened habitats and species. SACs are established to ensure the conservation and protection of these valuable natural resources. Mornington is specifically included in this international conservation site for the presence of sand dunes and associated habitats which are rare and threatened in a European context. These are listed as

Boyne Coast and Estuary SAC (site code: 1957) is designated for a range of coastal habitats including saltmarshes and sand dunes. The following six coastal habitats are included in the qualifying interests for the site (* denotes a priority habitat):

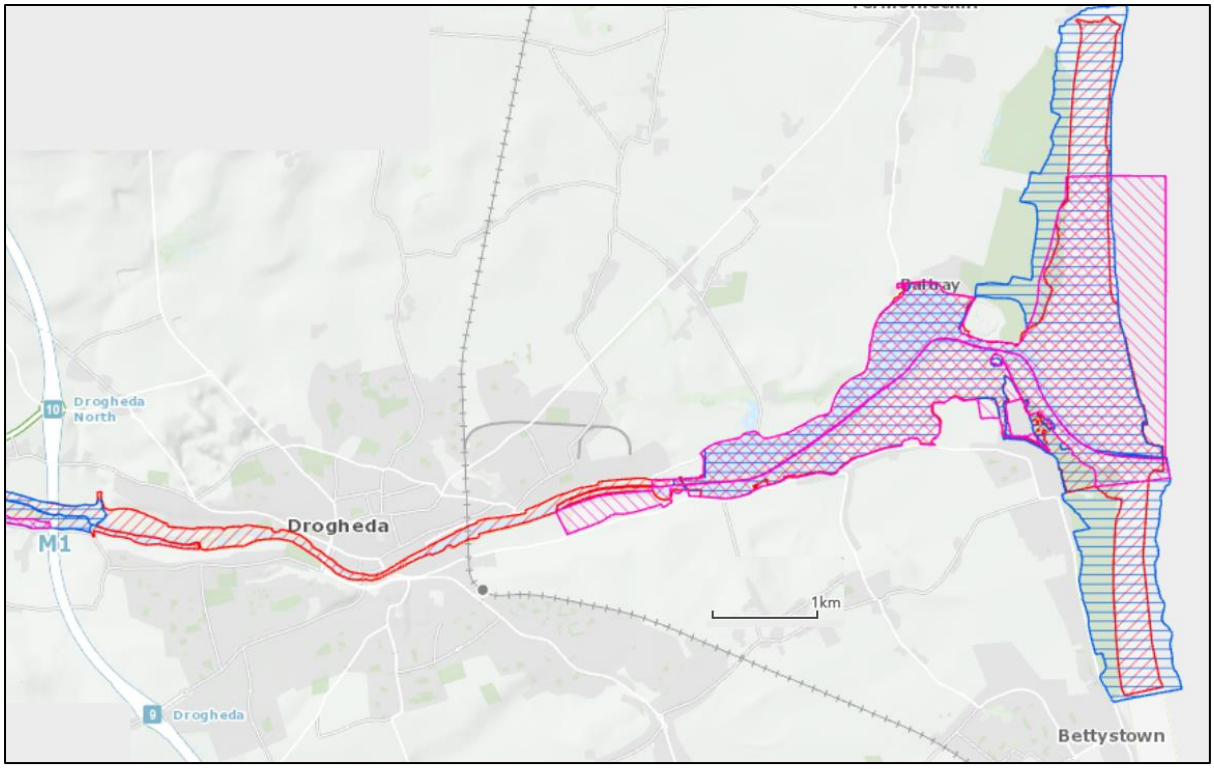
- Salicornia and other annuals colonising mud and sand (1310)
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (ASM) (1330)
- Mediterranean salt meadows (Juncetaliea maritimi) (MSM) (1410)
- Embryonic shifting dunes (2110)
- Shifting dunes along the shoreline with Ammophila arenaria (white dunes) (2120)
- Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130)*

The latter three habitats are found within the study area and specifically relate to this plan. The site synopsis is in Appendix I

Special Protection Area

A portion of Mornington Dunes are designated as part of the Boyne Estuary Special Protection Area (site code 004080), for Wetland and Water-birds and also species including Golden Plover, Knot, Black-tailed Godwit and Little Tern.

A Special Protection Area (SPA) is a designation under the European Union's Birds Directive(2009/147/EC). It identifies a site that is crucial for the conservation and protection of rare or vulnerable bird species and their habitats. SPAs aim to safeguard important bird populations and their nesting, feeding, and roosting sites by implementing appropriate conservation measures (see appendix II)



Map 3: Designated area Map Red (SAC), Pink (SPA) and Blue (pNHA)

However the most relevant map in respect of this project is the SAC as it is the designation protecting Sand Dunes of European importance

Map 4: Special Area of Conservation Boyne Estuary SAC Mornington Section

2.4 Public authorities

Meath County Council

Under Regulation 27 of the European Communities (Birds and Natural Habitats) Regulations 2011 all public authorities have a responsibility to avoid the deterioration of natural habitats and species protected under the Birds and Habitats Directives, and must exercise their functions and statutory powers in compliance with the Directives' requirements.

The following Meath County Council Bye Laws Governing Beaches Foreshore Estuaries and Harbours 2010 as amended in 2019. are relevant to this plan

Number 4: No person shall wilfully, carelessly or negligently do or permit any of the following acts to be done in or on the Foreshore. The expression "The Foreshore" means the bed and shore below the line of high water of ordinary or medium tides of the sea, extending for a distance of 200 meters seaward from the low water mark and of every tidal river and tidal estuary and of every channel, creek and bay of the sea or of any such river or estuary and so much of the adjoining sea shore and dunes as are under the control and management of the Council.

4.6. Light a fire or barbeque or do anything likely to cause a fire.

4.14. Bring or allow horses on to the Foreshore outside the hours of 5:00am to 11:00am.

4.17. Bring or allow horses to enter upon any part of the sand dunes within the Boyne Coast and Estuary SAC.

4.29. Enter upon the dunes save for the purpose of access and egress to the Foreshore and then only by dedicated walkways, boardwalks or pathways.

4.30. Cause damage to the ecology of the Foreshore or cause damage to items of dunes stabilisation such as sandtrap fencing or other techniques that may be used.

Enforcement of bye-laws

7.1. It shall be lawful for a member of the Garda Siochana or an Authorised Person to enforce these bye-laws and to exclude or remove from any part of the beach any person committing any breach of the above bye-laws and to take such other steps as authorised by law.

National Parks & Wildlife Service

The National Parks & Wildlife Service (NPWS) is responsible for the designation of conservation sites in Ireland. The NPWS works with farmers, other landowners and users, and national and

local authorities, trying to achieve the best balance possible between land use, and requirements for conserving nature in these selected areas.

Drogheda Port Authority

Drogheda Port is Ireland's premier north east port serving both the region and the greater Dublin area. Over 1.5 million tonne of bulk, breakbulk and specialist cargo transits the port annually, to and from Europe, Scandinavia and UK.

The southern training wall was built in the 1960s and this action contributed to the accretion of sand and to the formation of the dune system. According to the authority the training wall is under pressure from sand build up with a risk of wall collapse with negative impacts on the dune system. Proposals to remedy this will require planning and a conservation assessment.

2.5 Other Interested Parties

Mornington dunes is an important and popular destination for a wide range of recreational activities. including horse riding, dog walking, running and picnicking. These people are all stakeholders in this plan and their view will be sought during consultation.

3.0 Mornington Sand Dunes features of interest

3.1 History

Mornington sand dunes are part of the Boyne Coast and Estuary SAC. They lie south of the mouth of the Boyne Estuary on the east coast of Ireland. The building of the training wall at the mouth of the Boyne estuary by Drogheda Port in the 1960s contributed to an accumulation of sand and enhanced the development of dunes at the northern part of the site next to the town of Mornington. Here, there is a wide and accreting area with embryonic, mobile and fixed dunes present. The aerial photographs from 1995 to 2013 show an increase, within the designated area, from 18.3ha of dune in 1995 to 21 ha in 2013.

3.2 Uniqueness

The dune system is highly calcareous and the high calcium content of the dune system is considered unusual especially on the east coast. It is also, the most northerly site for the nationally rare plant species Wild Clary as well as the locally rare plants Viper's bugloss, Variegated Horsetail and Adder's tongue. These are considered indicators of local distinctiveness (NPWS, 2012)

3.3 Habitat Description

Mornington Dunes, are important for three types of dunes; Embryonic dunes (young dunes), mobile dunes and older fixed dunes (NPWS, 2012). Note list of species with latin in appendix III.

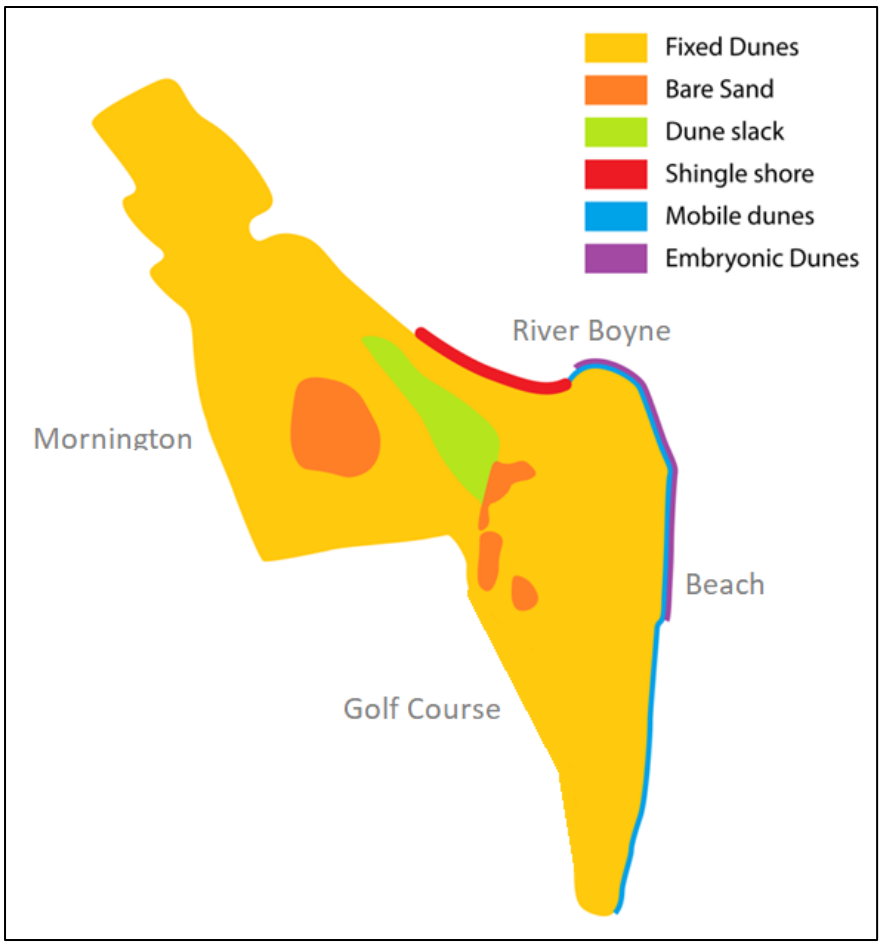
The following is the NPWS site synopsis describing the ecological importance of the area classification generally follows Fossitt (2000) with bare sand listed separately here for management purposes.

Fixed Dune

The fixed dune is an important habitat covering 21 hectares of the sand dune area at Mornington. There is a good variety of typical fixed dune species, including plants like kidney vetch, false oat-grass, sand sedge, common centaury, and many others. There are also typical moss species and lichen found in the fixed dunes. Marram grass occurs throughout the fixed dunes due to undergrazing.

Bare Sand (sub habitat of Fixed dunes)

There are two large blowouts covering 1.4 hectares in the part of the site and tracks covering about 1 hectare. A sand dune blowout is an erosion feature where vegetation is removed from the dune. The sand beneath blows away creating a depression or opening. This includes the car park, heavy used areas to the south west of the current car park and a large area to the centre of the north western section of the dunes. The latter area is estimated as 50% bare sand whereas the other sections are entirely denuded of vegetation.



Map 5: Indicative Habitat Map

Dune Slack

The dune slack area is noted for Viper's bugloss, Variegated Horsetail and Adder's tongue. These are locally rare plants in Ireland and are considered indicators of local distinctiveness at this site. The slack is susceptible to disturbance due to recreational activities, it is assessed by Ryle et al (2009) of poor quality and is drying out. The area of dune slack is just under 1 ha.

Photo 1: Viper's bugloss, Centaury, Wild Clary all known from Mornington dunes

Mobile /Marram Dunes

The wall built at the mouth of the Boyne estuary contributed to sand accumulation and the development of mobile dunes at the northern end of Mornington. As a consequence, erosion occurred towards the southern end. The mobile dune area covers 1.7 hectares and is dominated by Marram grass, with occasional Lyme grass. Other plants found in the area include Red fescue, Wild carrot, Cat's ear, and Lesser hawkbit.

Embryonic Dunes
The embryonic dunes (or newly forming dunes) are located in the accreting northern tip of the site and total just over 0.7 ha in area. The typical species present are Lyme grass and Sand couch grass, with the latter dominating. embryonic dunes naturally contain a lot of bare ground and so the impacts from recreational activities are not always obvious. However, given the heavy recreational use of the site impacts from pedestrian traffic are probable.

Shingle shore
This habitat covers an area of 0.6 ha. The typical species recorded in this survey include Spearleaved Orache, Sea beet and Scentless mayweed. A small pocket of this type of vegetation lies behind the training wall where tidal debris has gathered in the northern end of the site.

	EU Conservation Status Assessment		
Habitat	**Favourable**	**Unfavorable Inadequate**	**Unfavorable Bad**
Fixed Dunes		X	
Dune Slack		X	
Mobile Dunes		X	
Embyronic Dunes		X	

Table 1 : Conservation Assessment (adapted from Ryle et al, 2009)

During the two Coastal Monitoring Projects (Ryle et al, 2009) and (Delaney et al., 2013) the Conservation Status of these habitats were assessed and were found to be in an unfavourable condition. Recreational use is the main issue in respect of dune recovery.

4.0 Current factors impacting on dunes

The dune system is under pressure from various recreational activities. These activities have the potential to cause significant damage to the dune ecosystem, which is already under threat from climate change and other environmental factors.

4.1 Driving
The dunes are also used for recreational driving and there are multiple tracks throughout as a result of this activity. Driving compacts the sand and can like the other activities cause damage through the loss of vegetation and subsequent erosion.

4.2 Walking
Walking, running and dog walking in the dunes are popular activities. However, this has resulted in many braided tracks throughout the dune system resulting in the loss of vegetation and habitat in these areas.

4.3 Picnicking, Camping and Camp Fires

There is evidence of camping, picnicking and lighting of fires in the dunes. This can result in loss of vegetation, littering and damage to dune habitats.

4.4 Horse Riding

Horse riding on Mornington Strand is a popular activity. Horses access the beach between 5am and 11am according to by laws. Generally this appears to be adhered to however, there was a report to the author of horse activity on the dunes in May this year outside designated hours.

4.5 Sports Clubs

Anecdotal information would suggest that sports clubs have in the past trained on the dunes. This has stopped to large extent in recent years following communication from Meath County Council and NPWS in respect of enforcement of the Bylaws 4.29. However, there is one section of the dunes which is still heavily used and poses a threat to dune conservation.

4.6 Grazing

The absence of grazers has resulted in a rank sward in the fixed dunes. Many of our rare plants require grazing as they have coevolved with grazing animals.

4.7 Coastal Processes

The mobile and embryonic dunes are experiencing natural erosion in the southern part of the site and accretion in the north, which in part due to the construction of a training wall at the mouth of the Boyne estuary coupled with long shore drift.

4.8 Climate Change

Climate change is a significant factor in dune erosion on the east coast of Ireland. As sea levels continue to rise, the risk of erosion and coastal flooding will increase, putting many communities at risk. According to a report by the Irish Climate Analysis and Research Units, sea levels could rise by up to 1 meter by the end of the century, threatening low-lying areas and increasing the risk of erosion and coastal flooding. It is crucial for Ireland to take action to mitigate the impacts of climate change and protect vulnerable areas from these risks. (Reference: ICARUS, 2021)

5.0 Restoration Management Plan – Conservation Measures

The dunes at Mornington are a unique and valuable ecosystem that requires urgent conservation efforts. These dunes provide a habitat for a variety of plant and animal species, some of which are rare and endangered. They are also of landscape, geological and historic value. However, the heavy recreational use of the area has led to significant damage and erosion of the dune system. Without intervention, these precious habitats could be lost forever. It is crucial that we take action now to protect and restore the dunes at Mornington for future generations to enjoy and appreciate. By implementing appropriate management strategies as detailed below and engaging with the local community, we can ensure the long-term sustainability of this ecosystem.

Overall Targets

Target 1 Restoration of Dune Habitats

To reduce the access points and number of trackways within the dune system in order to allow these areas to recover.

Target 2 Increase Vegetation Cover

The goal of 70% of vegetation cover on the bare sand sections by 2028 is achievable using a combination of management strategies such as recreation management coupled with actions to trap sand and plant marram grass.

Target 3 Improve Conservation assessment of the site

The actions above will help to restore the dunes to Favourable conservation status. Consideration will be given to conservation grazing once dunes are restored.

Target 4 Improve access

Provision of boardwalks will help to facilitate mobility impaired people and people with young children in buggies accessing the beach.

Target 5 facilitate Parking

By making dedicated parking areas for beach access with sufficient overflow for high summer traffic volumes this will facilitate parking for visitors.

5.1 Conservation Measure: Car parking management

At present, although under bylaw 4.29. forbidden to "*Enter upon the dunes save for the purpose of access and egress to the Foreshore and then only by dedicated walkways, boardwalks or pathways*" the access to the dunes and parking is currently unmanaged. The proposed plan is to an overspill carpark located in close proximity to the beach, in order to promote dune recovery and facilitate access to the beach and recreational activities.

5.1.1 Close Current Car park

We have identified the current parking area as an area of concern. It is located on an unsurfaced dune that has eroded down to its base but given the fact that it is within the Special Area of Conservation and it has never been surfaced there is an excellent possibility for a good recovery of the dunes this area. This area has been designated as of international importance for dunes.

To address this issue, we have developed a management plan that involves relocating the parking area outside of the designated SAC area. A proportion of the car parking close to the beach will be reserved for mobility impaired people and parents with small children. To mitigate inconvenience to visitors, we propose the creation of additional parking areas with accessible boardwalks to enable easy access to the beach. The current carparking space will be replaced by an access board walked area fenced on both side which will facilitate beach access and allow the adjacent dunes recover. These measures will not only provide convenient access for visitors, but will also help to protect the sensitive dune environment.

5.1.2 Develop Replacement Car Parking

We propose to develop parallel parking along the existing access road to the beach and provide an overspill car park located within walking distance. The objective of this proposal is to optimize the available space and increase the number of vehicles that can be parked in these areas, especially during peak periods. This proposal will also ensure the safety of drivers and pedestrians in the area.

Map 6 Proposed New parallel parking and turning area (35 parking spaces, 3 disabled bays and a hammer head turning area)

The new parking will be outside the designated area and will be located on the roadside. The habitats impacted on are sand dune in nature but compromised due to existing road surfaces and sea buckthorn. Locating car parking here will require removal of sea buckthorn and bramble. This would facilitate parking whilst enabling dune recovery within the Special Area of Conservation.

Note: Provision of an overspill car-park would be subject to an agreement to acquire nearby lands which would be subject to the outcome of technical/environmental assessment(s) and securing necessary consents. The proposed parallel parking (Map 6) will be for approximately 35 cars and three disabled bays accommodated largely within the existing road width with a hammer head turning area. The parking surfacing would be porous material so to avoid any positive drainage and possible impact on protected areas.

5.1.3 Manage Access To The Dunes

Our aim is to preserve the natural beauty of the area and maintain a healthy environment for local flora and fauna. To this end we are proposing to close down access points for cars and thus preventing parking on the dune areas in order to protect the fragile dune ecosystem from damage caused by vehicular traffic and parking.

We understand the importance of access to the beach area for visitors and locals. As such, we propose to make parking available in close proximity to the site and there are no plans to restrict the number of people accessing the beach area. Our proposal seeks to promote sustainable use of the area, safeguard the environment, and enhance the overall visitor experience.

5.2 Conservation Measure: Planned Walking Routes

Managing access for walkers to the dunes is a positive step towards conservation efforts. By implementing these measures, we can ensure that this environment is preserved for future generations to enjoy. By respecting the fragility of the dunes and minimizing human traffic, we can also protect the delicate ecosystems that rely on these environments. Ideally moving towards sustainable access management, reducing the impact of foot traffic on dune vegetation and wildlife. This is a necessary step towards balancing conservation and recreation for a healthier environment. It is important to recognise the importance of this area for recreation so in order to balance both conservation and recreation. To achieve this boardwalks will be built to facilitate ease of access to the beach and three potential walks are proposed to ensure that the public still have substantial areas for recreation at Mornington.

5.2.1 Provision of Boardwalks

We propose the construction of a boardwalk on the main route north-south from Mornington to Bettystown to enhance accessibility while reducing the negative impact on the sand dune system. This plan only covers the first 700m of boardwalk including beach access points. Boardwalks have many advantages when used on sand dune systems, including the preservation of natural habitats, reduction of erosion caused by foot traffic, and protection of the fragile ecosystem from being damaged by visitors. Additionally, boardwalks provide a safe and accessible surface for people with disabilities

Raised Boardwalk

An elevated walkway built above sand dunes, which provides a stable and safe pathway for people to traverse on while protecting the fragile dune ecosystem is proposed from the car park out to the beach and southward towards Bettystown. All boardwalks will be raised to protect the fragile sand dunes. Raised boardwalks offer several advantages over walking directly on sand dunes, such as minimizing erosion, preserving natural vegetation, and reducing the amount of sand displacement caused by human traffic. This is proposed as mapped with a number of spurs off to the beach. The Boardwalk is proposed initially at a width

of 1.5 m but with a view to extending to 4 metres that will accommodate both pedestrians and cyclists

In addition this raised boardwalk could be widened in sections to provide for viewing sections or picnic areas for people such as wheelchair users who can't access the beach area.

This boardwalk will be designed by NPWS in consultation with Meath County Council.

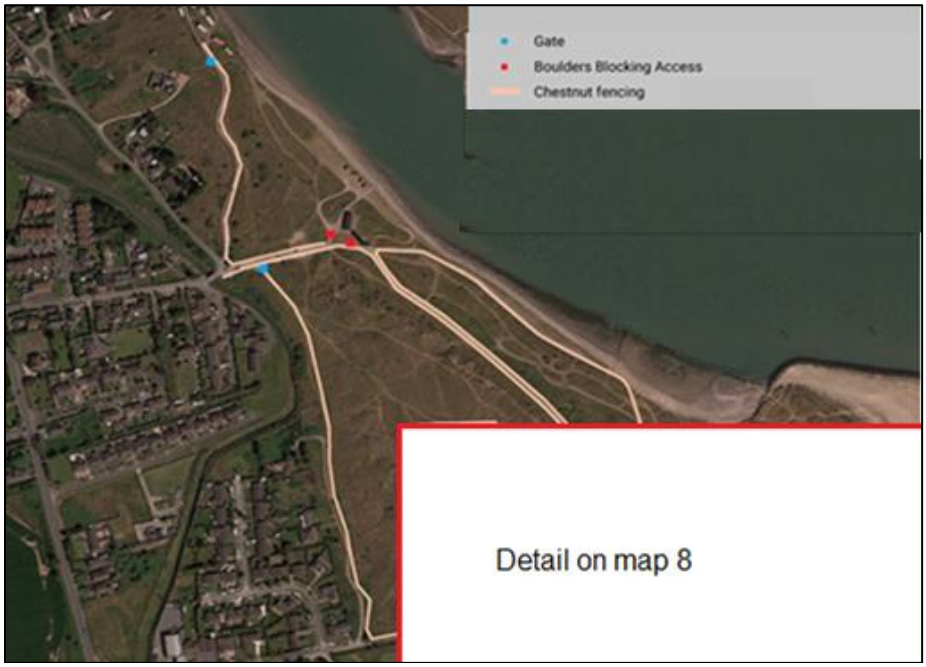
Photo 2: An example of a raised Boardwalk (Credit Sharon Tolan)

Replace Existing Boardwalk

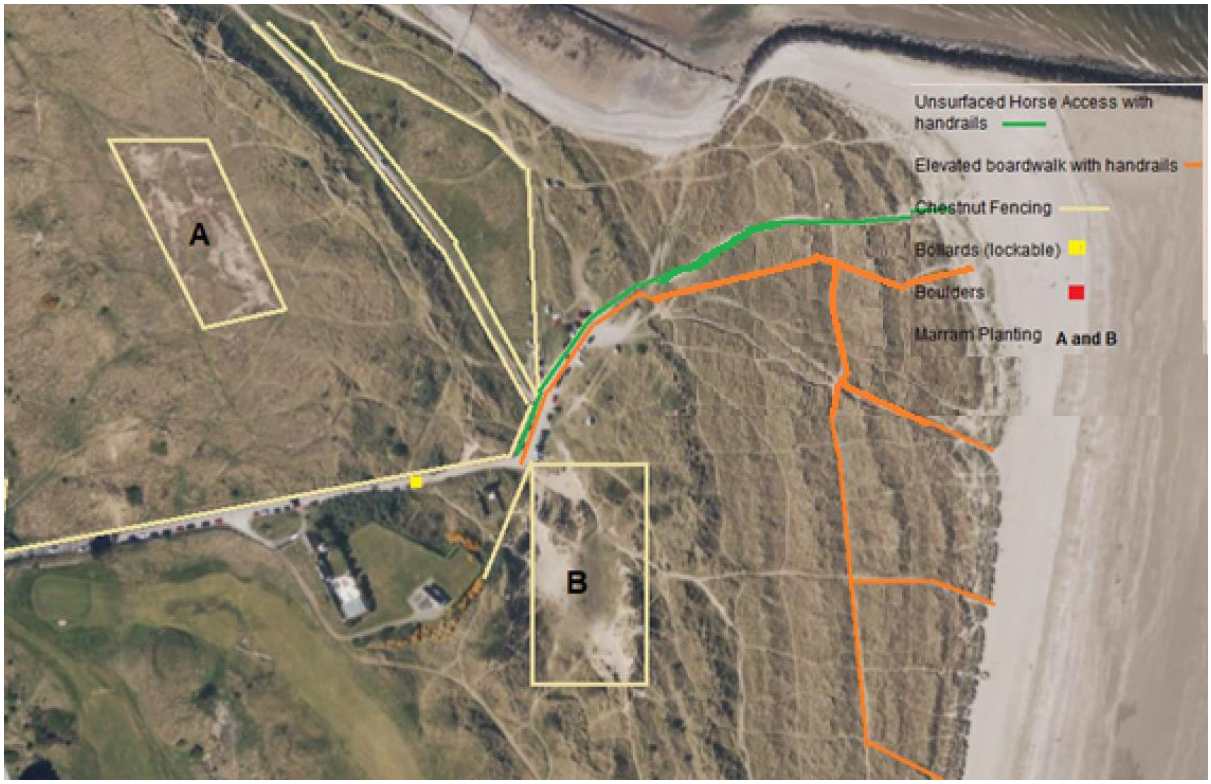
The existing boardwalk is proposed to be removed and replaced by an unsurfaced horse track

Towards the beach the chestnut fencing will be replaced by wooden hand rails to soft the visual impact of multiple fences.

Photo 3 Existing Boardwalk at Mornington (no fencing)



Map 7: Proposed Fencing to the north and west



Map 8: Detail in relation to Marram planting, Boardwalk and Horse track

5.2.2 Potential Walking Trails

Although by laws state that it is not permitted under 4.29. to "Enter upon the dunes save for the purpose of access and egress to the Foreshore and then only by dedicated walkways, boardwalks or pathways". To date there has been no enforced limit on dune access and many of the pathways have emerged through usage.

In order to ensure that the recreation value of the site is maintained three trails are proposed as well as extensive boardwalks. The blue trail to the north is 650m, the green trail is 1350 and the red trail is 1285m. These are mapped below.

Map 9. Potential Walks

Note The ecological impact of the walks, will be addressed in the Appropriate Assessment Screening and final route may change.

5.3 Conservation Measure: Horse Access

5.3.1 Byelaws

According to the bylaws section 4.14. “it is not permitted to Bring or allow horses on to the Foreshore outside the hours of 5:00am to 11:00am.” This appears to be adhered to and this plan also includes access specifically to the beach for horses.

A separate track 3m wide (ungated) will be provided for horse access to the beach. This will be unsurfaced and will run to the north of the existing car park. Bollards which are lockable / removable are proposed at 1.5m spacing to prevent access by vehicles.. Fencing will be with hand rails either side of this horse track.

5.3.2 Closing Down of Braided Routes

There are multiple routes through the sand dunes two major North south routes and many small exits on to the beach. These will be closed by fencing to prevent access to them and they will be planted with marram grass as detailed below. Signage is important in communicating the rationale to the public and other stakeholders.

5.4 Conservation Measure 4: Fencing for Conservation

5.4.1 Erect Chestnut Fencing

To protect sensitive areas of the sand dune system from car parking and walkers, it is crucial to erect fencing. The proposed chestnut fencing (see photo 3) will provide a durable barrier that blends in with the natural surroundings. Chestnut fencing is also specifically used for sand trapping and is used as a dune builder. By restricting access to vulnerable areas, we can minimize human impacts on the dunes and protect the fragile ecosystem from further damage. Fencing is an essential step towards restoring the unique dune system at Mornington.

The advantage of using chestnut fencing is that they look aesthetically pleasing and help build the dunes, however they also are likely to accumulate sand around them and may have to be moved after a number of years.

Photo 4. Chestnut fencing at Mornington showing habitat created through Marram planting

Chestnut fencing will have to be put in place using standard stakes every 2m as in the photograph above.

5.4.2 Maintenance Plan

A maintenance plan with NPWS and Meath Co council regarding boardwalks and fencing will be drawn up and agreed.

5.5 Conservation Measure: Marram Planting

The areas to be planted will be fenced with chestnut fencing. Marram planting is a vital step in the restoration and preservation of sand dunes. Marram grass has an extensive root system that stabilizes the dunes and prevents erosion caused by wind and water. The grass traps sand and other debris, helping to build up the dune structure over time. Additionally, marram grass provides a habitat for a variety of plant and animal species. Planting marram grass in degraded fixed dune areas can improve the health of the dune ecosystem, enhance its resilience to environmental pressures and contribute to the long-term protection of the coastline.

5.5.1 Exposed Bare Sand

Marram planting is proposed in areas where a change in activity is to be facilitated by fencing and signage. Method will follow the An Taisce Clean Coast guide to Marram planting. Marram for planting will be sourced from the Mornington dune system from undamaged areas outside the designated area and will be harvested at no more than 5% in any $m^{2.}$

5.5.2 Pathways to be closed

Marram will be planted where paths are being closed. Signage will be used to reinforce the conservation message.

Photo 7: Marram planted at the Magherees Co Kerry

5.6 Conservation Measure: Signage

Conservation measures can be reinforced with signage. Signs can help to explain the management goals for the site and incorporate existing by laws. Signage is recommended to be upbeat and positive in nature encourage people to become part of this conservation project.

Examples of positive signage is

- Protect our dunes and they'll protect us
- Small steps make a big impact - stay on the path!
- Baby dunes nursery area – please use the path
- Dune protection starts with you

In addition signage will be required to inform people that local housing estates are residents only parking areas.

The beach is designated to protect wintering birds and signage will reflect this.

5.7 Conservation Measure: Active Conservation Management and Education

A team of beach wardens could be trained to take on various roles such as litter picking, parking management, fence fixing, marram planting, and leading educational walks through the dunes. This will be by collaborative effort from NPWS, Meath Coco and landowners. The wardens could educate visitors about the importance of preserving the dunes and their ecosystems, as well as inform them about the negative impacts of their actions. By instilling a sense of responsibility in visitors, the wardens could help reduce littering, trampling, and other destructive behaviours. Additionally, the wardens could monitor the condition of the dunes, identify areas that require attention, and take necessary measures to maintain their natural diversity. The possibility of having year round and weekend wardens is to be investigated.

5.8 Conservation Measure: Control Invasive Species –

Sea buckthorn (*Hippophae rhamnoides*) is an invasive species that can have negative impacts on sand dune ecosystems. It is a deciduous shrub that can grow up to 6 meters tall and has bright orange berries. Sea buckthorn can outcompete native dune vegetation and reduce plant diversity, as it fixes nitrogen in the soil and grows rapidly.

This has been mapped on site by Meath County Council with the mapped funded by NPWS. Effective management strategies will be required to remove existing plants and to control the spread of sea buckthorn and prevent its negative impacts on sand dune ecosystems.

5.9 Conservation Measure: Monitoring

NPWS will design a monitoring programme for the site and this plan will be revised in 2028 using data gathered.

5.10 Conservation Measure: Appropriate Assessment Screening

Although this project is for the conservation benefit of the sand dunes, the various elements, fencing etc will have to be assessed in respect of the conservation objectives of the SAC and SPA. This may result in alterations to this plan.

6.0 References

An Taisce (undated) Practical Guide to Marram Grass Planting: A Natural Coastal Defence

Delaney, A. (2013). Monitoring survey of Annex I sand dune habitats in Ireland. National Parks andWildlife Service, Department of Arts, Heritage and the Gaeltacht.

Eichmanns, C., Lechthaler, S, Zander, W., Pérez M., Blum H., Thorenz, F., and H. Schüttrumpf 2021. Sand Trapping Fences as a Nature-Based Solution for Coastal Protection: An International Review Environments 2021, 8(12),

Government, Dublin.

Fossit J, Guide ti Habitats in Ireland. Heritage Council

https://coastal-management.eu/dune-fencing.html

https://inrbs.ie/conservation-grazing-stocking-rates-and-timing/

https://www.epa.ie/environment-and-you/climate-change/what-impact-will-climate-change-have-for-ireland/

Irish Climate Analysis and Research Units. (2021). Climate Change and Coastal Flooding: Impacts and Adaptation Options for Ireland. Retrieved from https://www.climateireland.ie/media/Climate_Impacts_Coastal_Flooding.pdf

IUCN, 2012 Ecological Restoration for protected areas. Principle Guidelines and Best Practice. Prepared by IUCN WCPA ecological restoration task force.

NPWS (2012) Boyne Coast and Estuary SAC (site code 1957) Conservation objectives supporting document -coastal habitats NPWS Version 1 August 2012

Ryle, T., Murray, A., Connolly, K., & Swann, M. (2009). Coastal Monitoring Project. Unpublished survey for the National Parks & Wildlife Service, Department of Environment, Heritage and Local

Appendix 1 Site Synopsis Boyne Coast and Estuary SAC

001957 Boyne Coast and Estuary SAC is a coastal site which includes most of the tidal sections of the River Boyne, intertidal sand- and mudflats, saltmarshes, marginal grassland, and the stretch of coast from Bettystown to Termonfeckin that includes the Mornington and Baltray sand dune systems. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1130] Estuaries

[1140] Tidal Mudflats and Sandflats

[1210] Annual vegetation of drift lines

[1310] Salicornia Mud

[1330] Atlantic Salt Meadows

[2110] Embryonic Shifting Dunes

[2120] Marram Dunes (White Dunes)

[2130] Fixed Dunes (Grey Dunes)*

]The Boyne River channel, which is navigable and dredged, is defined by training walls, these being breached in places. Intertidal flats occur on the sides of the channelled river. The sediments vary from fine muds in the sheltered areas to sandy muds or sands towards the river mouth. The linear stretches of intertidal flats to the north and south of the river mouth are mainly composed of sand. One or more species of eelgrass (Zostera spp.) occur in the estuary. Parts of the intertidal areas are fringed by saltmarshes, most of which are of the Atlantic type, and dominated by Sea-purslane (Halimione portulacoides). Other species present include Common Saltmarsh-grass (Puccinellia maritima), Sea Plantain (Plantago maritima), Lax-flowered Sea-lavender (Limonium humile) and glassworts (Salicornia spp.). Common Cord-grass (Spartina anglica) occurs frequently on the flats and saltmarshes. The two sand dune systems in the site, at Baltray and Mornington, are of conservation value, despite the restricted distribution of the intact areas and the high recreational pressure to which they are subjected. A gradient from embryonic dunes to Marram (Ammophila arenaria) dunes and then fixed dunes is shown at both systems. Version date: 9.2.2016 2 of 3 001957_Rev16.Docx The largest area of annual vegetation of drift lines within this SAC is located at Baltray, north of the estuary. The vegetation is highly representative of the habitat type, which is limited to a small number of highly specialised species that are capable of coping with harsh environmental conditions including high salinity, wind exposure, and unstable substrate and lack of soil moisture. Species present include oraches (Atriplex spp.), Sea Rocket (Cakile maritima), Prickly Saltwort (Salsola kali) and Sea Sandwort (Honkenya peploides). Embryonic dunes are particularly well-developed at Baltray where there is active accretion. Species present include Sand Couch (Elymus farctus), Lyme-grass (Leymus arenarius), Marram, Sea Sandwort and Prickly Saltwort. The embryonic dunes grade into a narrow band of shifting Marram dunes. Marram is dominant, though there are also such species as Cat's-ear (Hypochoeris radicata), Mouse-ear Hawkweed (Hieracium pilosella) and Dandelion (Taraxacum agg.). The areas of fixed dunes on the site have a typical diversity of species, including Marram, Red Fescue (Festuca rubra), Wild Carrot (Daucus carota), Common Bird'sfoot-trefoil (Lotus corniculatus), Common Restharrow (Ononis repens), Wild Thyme (Thymus praecox), Lady's Bedstraw (Galium verum) and Wild Pansy (Viola tricolor). Vegetation dominated by bryophytes and lichens is limited, though such species as

Brachythecium albicans, Hypnum cupressiforme, Peltigera canina and Cladonia spp. occur. Some dune slacks may still occur at the site. A number of scarce plants such as Viper's-bugloss (Echium vulgare), Adder's-tongue (Ophioglossum vulgatum), Variegated Horsetail (Equisetum variegatum) and Wild Clary/Sage (Salvia verbenaca) have been recorded from the site in the past. The last-named species is of particular note as it is a Red Data Book species at its most northerly known Irish station. The Boyne is the second most important estuary for wintering birds on the LouthMeath coastline. From a recent wetland survey carried out over 4 seasons (1994/95- 97/98), it is known that this site supports nationally important numbers of Shelduck (176 individuals), Golden Plover (5,338), Lapwing (4,755), Knot (1,559), Black-tailed Godwit (414), Redshank (539), Turnstone (104), Oystercatcher (922), Grey Plover (112) and Sanderling (93). Other species of regional or local importance include Brent Goose (142), Wigeon (485), Teal (185), Mallard (160), Dunlin (627), Curlew (352) and Ringed Plover (approx. 100). An area of shingle at Baltray Dunes is also an important breeding site for Little Tern, with 14 pairs recorded in 1995. Little Tern is the rarest Irish tern species, and is listed on Annex I of the E.U. Birds Directive. Part of the estuary is a Wildfowl Sanctuary and has been designated a Special Protection Area under the E.U. Birds Directive. This site has been somewhat modified by human activities. The river is regularly dredged to accommodate cargo ships, which causes disturbance to the bird, fish and invertebrate communities in the estuary. Several factories operate upstream from the estuary and pollution and disturbance associated with them has had an impact on the ecology of the area. There is a proposal to create a deep water facility at the north end of Mornington Dunes on the mouth of the Boyne estuary. Version date: 9.2.2016 3 of 3 001957_Rev16.Docx The site is of considerable conservation interest as a coastal complex that supports good examples of eight habitats that are listed on Annex I of the E.U. Habitats Directive, including one which is listed with priority status, and for the important bird populations that it supports.

Appendix II Site Synopsis

SITE NAME: BOYNE ESTUARY SPA

SITE CODE: 004080 This moderately-sized coastal site is situated west of Drogheda on the border of Counties Louth and Meath. The site comprises most of the estuary of the Boyne River, a substantial river which drains a large catchment. Apart from one section which is over 1 km wide, its width is mostly less than 500 m. The river channel, which is navigable and dredged, is defined by training walls, these being breached in places. Intertidal flats occur along the sides of the channelled river. The sediments vary from fine muds in the sheltered areas to sandy muds or sands towards the river mouth. The linear stretches of intertidal flats to the north and south of the river mouth are mainly composed of sand. One or more species of Eelgrass (Zostera spp.) occur in the estuary. Parts of the intertidal areas are fringed by salt marshes, most of which are of the Atlantic type, and dominated by Sea-purslane (Halimione portulacoides). Other species present include Common Saltmarsh-grass (Puccinellia maritima), Sea Plantain (Plantago maritima), Lax-flowered Sea-lavender (Limonium humile) and Glasswort (Salicornia spp.). Common Cord-grass (Spartina anglica) occurs frequently on the flats and salt marshes. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Shelduck, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Knot, Sanderling, Black-tailed Godwit, Redshank, Turnstone and Little Tern. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds. The Boyne Estuary is the second most important estuary for wintering birds on the Louth-Meath coastline. Black-tailed Godwit occurs here in internationally important numbers (471). A further nine species of wintering waterbirds have populations of national importance, i.e. Shelduck (218), Oystercatcher (1,179), Golden Plover (6,070), Grey Plover (146), Lapwing (4,771), Knot (1,944), Sanderling (81), Redshank (583) and Turnstone (221) - all figures are mean peaks for the 5 year period 1995/96-1999/2000. Of particular note is that the site supports 6.8% of the all-Ireland population of Knot and almost 3% of the total for Golden Plover. Other species which occur include Bar-tailed Godwit (86), Cormorant (97), Brent Goose (172), Wigeon (454), Teal (230), Dunlin (498), Curlew (395), Mallard (197), Red-breasted Merganser (14), Greenshank (6), Ringed Plover (80) and Mute Swan (13). The site provides both feeding and high-tide roost areas for the birds. The estuary also attracts large numbers of gulls in winter, including Black-headed Gull (593), Common Gull (145), Herring Gull (403) and Great Black-backed Gull (160). Little Tern have bred here since at least 1984 and a nationally important population was recorded in 1995 (14 pairs). In the intervening years breeding numbers and fledgling success has varied significantly. In 1996 approximately 20 pairs fledged 15 - 20 chicks but in 1998 and 1999 part of the shingle bank where the birds nested was washed away by storms. In 2008 35 pairs of Little Tern were recorded. The site is of considerable ornithological importance for wintering waterfowl, with Black-tailed Godwit occurring in internationally important numbers and nine other species having populations of national importance. Of particular significance is that three species that regularly occur, Golden Plover, Bar-tailed Godwit and Little Tern are listed on Annex I of the E.U. Birds Directive. Part of the Boyne Estuary SPA is a Wildfowl Sanctuary.

Appendix III

Species at Mornington

- Kidney vetch (Anthyllis vulneraria)
- False oat-grass (Arrhenatherum elatius)
- Sand sedge (Carex arenaria)
- Common centaury (Centaurium erythraea)
- Common mouse-ear (Cerastium fontanum)
- Wild carrot (Daucus carota)
- Eyebright (Euphrasia officinalis agg.)
- Red fescue (Festuca rubra)
- Lady's bedstraw (Galium verum)
- Cat's ear (Hypochaeris radicata)
- Fairy flax (Linum catharticum)
- Bird's-foot trefoil (Lotus corniculatus)
- Red bartsia (Odontites vernus)
- Common restharrow (Ononis repens)
- Mouse-ear hawkweed (Pilosella officinarum)
- Ribwort plantain (Plantago lanceolata)
- Yellow-rattle (Rhinanthus minor)
- Dandelion (Taraxacum agg.)
- White clover (Trifolium repens)
- Wild pansy (Viola tricolor subsp. curtisii)
- Rhytidiadelphus squarrosus (typical moss species)
- Tortula ruraliformis (typical moss species)
- Peltigera spp. (lichen)
- Creeping thistle (Cirsium arvense)
- Ragwort (Senecio jacobaea)
- Common nettle (Urtica dioica)
- Viper's bugloss (Echium vulgare)
- Variegated horsetail (Equisetum variegatum)
- Adder's tongue (Ophioglossum vulgatum)
- Yorkshire fog (Holcus lanatus)
- Lyme grass (Leymus arenarius)
- Common ragwort (Senecio jacobaea)
- Lesser hawkbit (Leontodon saxatilis)
- Spear-leaved orache (Atriplex prostrata)
- Sea beet (Beta vulgaris ssp. maritima)
- Scentless mayweed (Tripleurospermum maritimum)