A Practical Guide to Marram Grass Planting:

A Natural Coastal Defence




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1. Background & Context

Coastal erosion is the process of wearing away material from the coastal profile due to an imbalance in the supply and export of material from a certain section of coastline. Coastal erosion takes place mainly during strong winds, high waves, high tides and storm surge conditions which can lead to coastline retreat. Solutions to mitigate this process such as the construction of hard structures have sometimes aggravated erosion in areas requiring protection and have altered neighbouring shorelines (ANCORIM). These solutions are used less and less frequently with a growing preference for soft solutions which are more favourable to the environment and work with the natural dynamics of the coastline. Hard structures are usually very costly and can be unsustainable.

The preservation and strengthening of soft structures by the coast, such as sand dune systems, plays an important role in increasing and preserving biodiversity which also contributes to coastal protection as these systems can act as natural coastal defence barriers. Coastal erosion can have a dramatic effect on the environment and on human activity, such as damaged infrastructure and property lost to the sea etc. This process can also threaten important habitats of wildlife, the safety of people at the coast, and economic activities such as tourism.

We must remember however, that coastal erosion is very much a natural process which has given us the beaches and the coastline that we currently have. However in recent years it is thought that humans have had an impact in increasing the incidences and extent of erosion (ANCORIM).

Over 50% of the Irish population currently live within 10km of the coastline (The Heritage Council, 2006), increasing pressure on the coastline with development. The popularity of the coastline for tourism has also increased pressure in popular areas and can sometimes add to the pressure on a section of coastline.

There are economic, social and ecological considerations at play by the coastline and a coastal sustainable development plan should include the need to protect people, property and activities while also protecting natural environments and their functioning in the coastal ecosystem.





2. Dune Formation & Destruction

There are 3 types of coast on the European Atlantic: the sandy coast, the rocky coast and tidal marshes (wetlands including estuaries and lagoons). For the purpose of this guide, we will focus on sandy coasts and what we can do to mitigate coastal erosion on beaches backed by sand dune systems.

Beaches (when backed by a dune system) constantly exchange sediments with dunes: the beach feeds into the dune and the dune acts as a sand reserve necessary for maintaining the beaches balance. Dunes are created from beaches, with the assistance of wind and vegetation such as marram grass, lyme grass etc. These grasses slow sand movement and allow dunes to form, fig. 1. Dunes require an available source of sediments and a specific type vegetation to exist. Vegetation that is adapted to coastal environments and has extensive root networks which bind the sand dune systems together giving shape and stability to the structure. Dunes constitute reserves of sand for the beach should a storm event affect the beach area (ANCORIM).

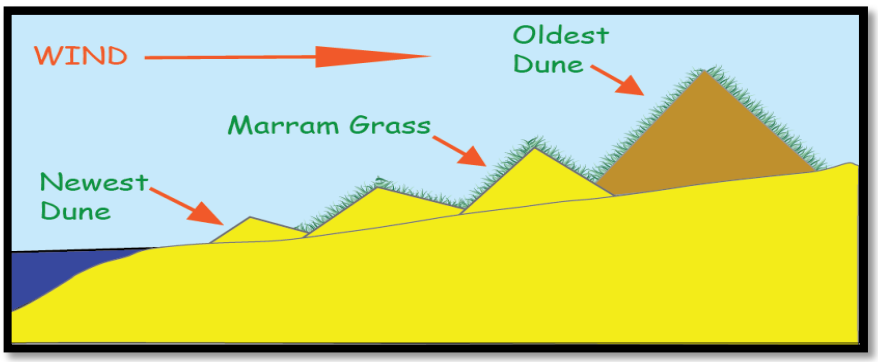


Fig.1. How dunes are formed

3. Coastal Dune Erosion Influences

1. Environmental influences

- Type of coastline – whether soft or hard coastline
- Rising sea levels, more frequent storms and flooding incidents have worsened the problem
- Near shore currents
- Diminishing offshore sediment banks
- Slope of the land

2. Human influences

- Population impacts - extensive trampling through the dunes can cause dune grasses to become exposed/ uprooted leaving sand dunes exposed to strong winds
- Quad biking, horse riding, bbq's and camp fires etc. can be harmful to dune systems
- Coastal squeeze - where coastal lands are reclaimed for different uses – marsh/ wetlands are left without room to expand naturally resulting in minimised wave energy absorption and the ability to reduce wave surge impacts
- Intensive development and use of sand for construction purposes
- Vegetation clearing and water extraction
- River basin regulation works, this can affect sediment that comes from a catchment area

Coastal erosion is usually due to a combination of factors both natural and human factors. (Devoy 2008; ECOPRO 1996; ANCORIM)

4. Destruction of vegetation

Dunes can show signs of blow outs where weaknesses in vegetation cover have been exploited by wind and waves, fig. 2. This can result in sand dune blow-outs which may gradually become more extensive creating an issue for the dune stability and its function as a coastal defence barrier against storms, flooding and inundation from the sea.

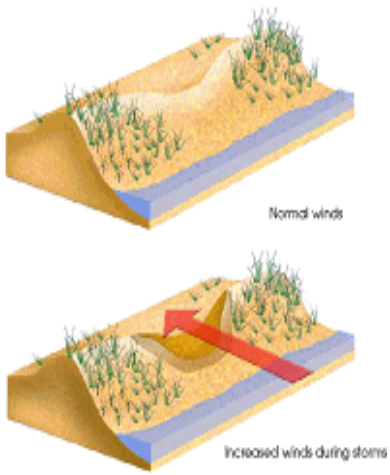
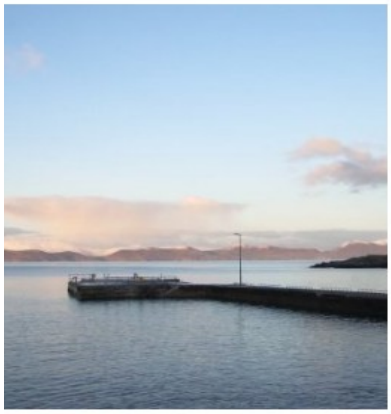


Fig. 2 Formation of a dune blowout

5. How do we work to prevent coastal erosion?

Hard engineering works fix the shoreline with groins, breakwaters, buttresses etc. although these can sometimes aggravate a problem and can be very costly.



Soft/ flexible engineering works attempt to sync with nature and the natural dynamics of the coastline and the mobility of the shoreline e.g. sand replenishment, planting, sand trapping, fencing etc.

Both hard and soft works can sometimes be complimentary. There are a number of advantages and disadvantages to both types of works. However, anticipation and prevention of a need for works is the preferred option. This can mostly be achieved by environmental planning and control techniques or in some cases through carefully reviewing the causes of erosion and the removal of these causes e.g. recreational use of sand dunes (ECOPRO 1996).

Dune stabilisation may be needed to:

- Maintain dune ridges which act as coastal protection for low-lying hinterland.
- Prevent the loss or deterioration of valuable natural habitats.

6. Marram Grass Planting – Getting Started

1. Contacting interested parties
2. Time of year and site restrictions
3. Impact on the environment
4. Health and safety
5. Step by step photographic guide to planting marram grass
6. Useful resources

6.1 Contacting interested parties:

Local Authority:

It is good practice to liaise with your local authority prior to the commencement of your marram grass planting project.

This is necessary for a number of reasons:

- Your Local Authority may already have a management plan in place for the dunes.
- There may be special restrictions on the dune area, e.g. it may be a Special Area of Conservation (SAC).
- They may be able to assist you in terms of expertise, labour and tools.

Local stakeholders and other governing bodies:

Before planting commences all stakeholders should be made aware of the project, such as, land owners, recreational users, fishermen groups, community groups and organisations such as the NPWS (National Parks and Wildlife Services) etc. You may find that some of these stakeholders will want to become involved with your project.

6.2 Time of year and site restrictions

Marram grass may be planted at any time of year, but preferably September to April with March being the most favourable planting month, as there are less environmental impacts to contend with such as storms, frost and sea swells.

Marram grass should be planted above the high tide mark as it can withstand salt spray but not a total saltwater submersion. Lyme grass on the other hand can withstand the occasional covering and can be planted nearer to the front of the dunes, if appropriate to the area.

6.3 Impact on the Environment

Participants should be made aware of the fragile nature of dune systems and the wildlife that inhabit them. Efforts should be made to find out if an area is a protected site, such as a Special Areas of Protection (SPA) or a Special Areas of Conservation (SACs). This information can be found on the National Parks and Wildlife Services (NPWS) website: http://www.npws.ie.

Furthermore group members should be made aware of any plants, breeding birds and invertebrates that may be sensitive to works being carried out. Access to the dune area will also have to be taken into consideration in order to minimise environmental damage caused by trampling. Temporary paths may be laid down in order to minimise impact and protect areas sensitive to blowouts.

To heighten public awareness regarding dune sensitivity and your restoration project, it is advised that information signage should be erected in a location that is in close proximity to the newly planted area and visible to the public. This signage may also be used to deter trampling if fencing off the dune is not an option.

6.4 Health & safety

A Health and Safety assessment should be carried out before the project commences. The following items should be taken into consideration:

Risks

The following risks are applicable to anyone taking part in this activity.

- Hazardous waste/ broken glass / syringes.
- Drowning or being swept out to sea, immersion.
- Hypothermia, heat exhaustion, heat stroke and sun burn.

- Injuries caused by the coastal environment, e.g. collapsing dunes, stings from coastal wildlife.
- Unsafe access onto dunes.
- Outflow pipes.

Control Measures

Hazardous Waste/ broken glass/syringes:

- Ensure appropriate clothing and footwear is worn by all participants.
- A sharps box should be on site to dispose of syringes or any other hazardous material.

Drowning or being swept out to sea, immersion:

- All participants must follow group leader's instructions.
- A check in sheet should be signed by all participants.
- Weather conditions must be taken into account along with tide and wave height.
- None of the participants should enter the sea.
- It is recommended that the group leader should have a whistle for an alert signal.
- The group leader should conduct frequent head counts.
- The group leader should wear luminous clothing for quick and easy location.
- The group leader should carry a mobile phone for emergency calls.

Hypothermia, heat exhaustion, heat stroke and sunburn:

- Appropriate clothing and sun protection to be worn by group.

Injuries caused by the coastal environment:

- Issues such as unsafe access and collapsing dunes should be taken into consideration when assessing the dune area.
- A first aid kit should be on site to deal with any minor injuries such as cuts and scratches.

Outflow pipes:

- Before planting the area should be checked for sewerage outflow pipes.

7. A Step by Step Guide to Marram Grass Planting

Step 1: Dig holes roughly 30 -90cm apart, in a checkerboard pattern to ensure good coverage. If the area is eroding at a noticeable rate it is best to plant the grass closer together.

Step 2: Uproot marram grass from an area that is plentiful and close to the location of the proposed planting area. This can be done by hand or by digging.

By hand, take a small section of plant and twist it until comes out of the ground easily.

When digging out grass be careful not to leave areas exposed and vulnerable to blow outs.

The removed plant should have at least 150mm of healthy root attached.

Step 3: Divide the marram grass into small bundles for planting.

Step 4: Double over the bundle of marram grass in half. The idea of this is to trick the transplanted grass into thinking it is totally covered in soil. This encourages the plant to work harder to photosynthesis (The process by which green plants use sunlight to synthesise foods from carbon dioxide and water). This procedure should result in faster growth.

Step 5 - Planting: Take the doubled over bundle of marram grass and plant two-thirds of it under soil into the proposed area.

Step 6: Continue these steps until you fill the proposed planting area.

Step 7 - Fencing: If funding is available it is recommended that the planted area is fenced off. This deters trampling and also acts as a sand trap, which aids in the growth of the dunes.

Step 8 - **Information signage**: This can be used to promote your project, raise awareness about dune sensitivity and also discourage trampling.

Step 9 - Aftercare of site: Your project should be on –going. Care should be taken to replant areas where the plants have not grown.

Step 10:
Have fun and enjoy protecting your coastal environment.

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Useful resources

Scottish natural heritage:
http://www.snh.org.uk/publications/on-line/heritagemanagement/erosion/sitemap.shtml

Conservation Services
http://www.conservationservices.ie/web/Con%20Services/Services/Dune%20Conservation/Marram%20Grass%20Planting

Sand Dunes – A Practical Handbook - by Alan Brooks and Elizabeth Agate (2005)
ISBN 094675232X

Rural Beach Management: A Good Practice Guide - by John McKenna (2000)
ISBN: 09508407 77

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