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The challenges of protecting rural coastal communities from climate change and human impacts

A Case Study: Maharees Conservation Association CLG

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Overview. The Maharees tombolo separates Brandon Bay and Tralee Bay and connects the two villages of Fahamore and Kilshanning to the mainland (total population 293). Natural hazards and human activities are adversely impacting the long term health of the dune ecosystems and the preservation of the tombolo structure. Socio-economic forces have resulted in a transition away from primary modes of production (farming and fishing) the last two decades to tertiary goods and services focussed on tourism and visitors to the area. The lack of an integrated, fit-for-purpose plan to manage human activity (pedestrian paths and horse trails to access beach and related activities of parking, camping, unregulated access, dune scrambling, and fires) has led to destabilization of the fragile dune system. The foredunes are also suffering chronic erosion from Atlantic storms.

The local community mobilised to form the Maharees Conservation Association (MCA) CLG in February 2016 to design short- and long-term coastal management solutions. The MCA has successfully engaged with all the relevant stakeholders to conduct coastal protection activities (beach cleans, dune vegetation planting, signage and access fencing, straw bales, dune fencing, cultural & heritage walks, public & committee meetings, fundraising events, media, and partnerships & outreach). In March 2018 the OPW announced they would be funding (€150,000) a 'Coastal Erosion & Flood Risk Management Study' for the Brandon Bay-Maharees 'priority cell'. This is a major step to implement long term measures to mitigate coastal hazards. This study will be supported by researchers in NUIG Geography from an OPW funded project (2015-2017).

There is a growing policy shift internationally away from the sectoral management of coastal and marine resources to a more integrated ecosystem approach that recognises interdependencies between the multiple activities that compete for limited space along the land-sea margin. We advocate that both market and non-market Ecosystem Goods and Services (EGS) in rural coastal communities should be determined to estimate the full value of their functional systems to partially remediate existing bias in cost benefit analyses (CBA) that, hitherto, handicap rural communities in funding competitions allocating resources for coastal protection compared with more urbanized coastlines. Full value auditing will justify, at least fiscally, investment in preserving biodiversity and EGS and promote their conservation and sustainable use. This research will be conducted by teams in NUIG and IT Tralee. The benefits of empowering coastal communities and involving them in decision making (bottom-up) results in policy and binding legislation that is more likely to be acceptable to these rural communities. Likewise, the survival of rural coastal communities depends on empowering people to make change locally and providing them with tools to adapt to climate change impacts.

EPA Climate Change Report 2017

- Sea level rise by 2100: 55–60 cm 2100 (best case scenario).
- Sea level rise will amplify the impacts of storm surges and wave erosion in coastal areas.
- Extreme events: fewer but more intense storms.
- Increased winter flooding.

List of MCA activities Feb 2016 - March 2018

Legend to Activities	# occurrences
1 Beach clean	16
2 Dune vegetation planting	9
3 Signage and access fencing	2
4 Straw bales	4
5 Dune fencing	4
6 Cultural & heritage walks	2
7 Public & Committee meetings	10
8 Fundraising event	8
9 Media: TV, Radio, Newspapers, Magazines	22
10 Partnerships & Outreach	27
11 Other	15
Total	119

LEGEND

1 Challenge 1

Challenge 1 & 2: Dune and Cliff Erosion from Storm Waves

Photographs 1 & 2. Examples of dune erosion after Storm Eleanor (January 2018). Scarping of dune toe leads to undercutting and increase in face steepness, leads to state of tension in upper part of dune with visible tension cracks parallel to the face (Photograph 2); mass failure of upper dune to dune toe via dune slumping processes; if wave attack continues sand is removed; if wave attack ceases slumped material provides temporary protection to dune toe.

Challenge 3: Flooding

Photograph 5. Kerry County Council carry out regular maintenance at the Trench Bridge area of Lough Gill in order to keep the stream outlet from blocking up and flooding this low lying area (private properties and public road). The ongoing management of this area is an area of concern, particularly in relation to Climate Change predicted sea level.

MCA TIMELINE

2016 FEBRUARY
Maharees Conservation Association CLG is formed following public lecture (Dr Eugene Farrell, NUIG)

2016 MARCH
Beach clean
Dune vegetation planting
Signage and access fencing
Straw bales
Fundraising event
Online funding
Kerry's Eye

2016 APRIL
Beach clean (Ghoulane)
Straw Bales
2 committee meetings

2016 MAY
Dune vegetation planting
School visit with Clean Coasts
2 committee meetings
Kerry's Eye

2016 JUNE
Fundraising event
Kerry Radio
Kerry's Eye
Site visits by TDs & OPW

2016 JULY
3 public lectures

2016 SEPTEMBER
2 beach cleans
2016 OCTOBER
Dune vegetation planting
Dune vegetation planting
Site visit by NUIG, NPWS, KCC

2016 DECEMBER
Nominated for Clean Coasts
Ocean Hero Award
Radio Kerry

2016 NOVEMBER
Straw bales Scraggane Bay
Straw bales Brandon Bay

2017 MARCH
Dune vegetation planting

2017 APRIL
Chestnut fencing on dunes
Beach clean
MCA AGM
Beach clean

2017 MAY
Dune vegetation planting
School visit with Clean Coast
NUIG GSTA experiment
Chestnut fencing on dunes
Dune vegetation planting
Radio Kerry
Cultural heritage Walk
Radio Kerry

2017 JUNE
NUIG Nortec AWAC deployment
3 beach cleans
Conference "Sea, Land, & Spirit"
Dune vegetation planting
Radio 1 Drivetime
Irish Times

2017 JULY
Support NUIG AWAC deployment
Beach clean
School visit with Clean Coasts

2017 AUGUST
Guided walk
Beach clean
Fundraising quiz

2017 SEPTEMBER
The Kerryman
Online fundraising
Clean Coasts 'Big Beach Clean'
etc.....

Challenge 4: Invasive species

Sea Buckthorn (*Hippophae Rhamnoides*) is dark greens/brown colour surrounded by dune marram grasses

Photograph 4. Anecdotal evidence from local farmers and NPWS staff suggests that *Hippophae rhamnoides* was planted some time in the 1970s. The Coastal Monitoring Project 2004-2006 survey states that it was planted by Kerry County Council to combat dune erosion (Ryle et al 2009). The plantations have been expanding ever since are impacting adjacent native flora. A recent study by Grobler (2017) showed that the total coverage of 13.56 hectares has been increasing at an average rate of 27% or 0.39ha per year since 1995.

Challenge 5: Sand deposition

Photographs 6 & 7. The Maharees has one access road. This road is frequently impassable due to sand deposition. This has important implications for health and safety of residents. The location by The Mahareg Cut (Photographs 6 and 7) was cleared 17 times by Kerry County Council (KCC) in winter 2016. Sand fencing installed by the MCA has fixed this problem (see below). The road north of the Grotto was cleared by KCC 12 times in 2017 and 3 times in 2018. Dune fencing was installed by the MCA in February 2018 to reduce this risk.

Challenge 6: Human Impacts

Photograph 3. The extent of fixed dunes is rated as unfavourable-inadequate for the most recent EU Conservation Status Assessment. The decline in fixed dune area as a result of erosion is largely caused by human recreational activities and also by overstocking of cattle that graze the dunes. Land tenure is an important constraint in managing (NPWS 2013). Other human impacts; pedestrian paths and horse trails to access beach + related activities (parking, camping, unregulated access, use of ATVs, dune scrambling, and fires on dune and beach (Note: too many locations to label on map)

Challenge 7: SAC/SPA/NHA Status (not mapped)

Stakeholders from NUIG, MCA, KCC, and NPWS discuss short- and long-term management options onsite (October 2016)

Photograph 8. Coastal protection designations (e.g., EU instruments like 2002 Integrated Coastal Zone Management and/or 2008 Marine Strategy Framework Directive) can prevent local communities mobilizing (or feeling empowered) to carry out intervention at the local scale. The MCA has built a very strong relationship with NPWS.

Challenge 8: Valuing Ecosystem Goods and Services in CBA (not mapped)

EGS include the economic value of fisheries or agriculture, storm protection and erosion control, and non-extractive uses like tourism. Yet many other values are not easily estimated. For EGS that are produced outside of an economic CBA market, economic assessments are lacking or purposefully minimised as market externalities (MEA, 2005). It is critical, however, to include both market and non-market EGS to determine the full value of a functional system, often termed "ecosystem services" to its users (Gomez-Baggethun et al., 2010).

The Maharees Conservation Association CLG: examples of direct and indirect impacts

March 2016

September 2017

Dune restoration has occurred within 12 months of soft interventions (restrict access and parking, bales, planting, education boards, warning signs).

3 dune fences installed in April 2017 have protected road from sand deposition.

The one access road in/out Maharees has not been blocked since the fences were installed in April 2017. New fencing was installed February 2018 north of grotto. This road has been cleaned by KCC 12 times in 2017 and 3 times in 2018.

Beach plastic

€5

The Fishies Project: Transition year students from Mean Scoil nua an Leith Triuigh Castlegregory are making and selling keyrings made from beach plastics collected in Brandon Bay; all proceeds are being donated to directly support the activities of the Maharees Conservation Association. In December 2017 art masks made by the students from beach plastics were displayed at Clean Coasts & on the front page of the Irish Examiner.

November 2017: The MCA wins the Clean Coasts Ocean Hero Award Group of the Year.

PROJECT BRIEF June 2017

In December 2017 Kerry County Council announced a **Coastal Erosion & Flood Risk Management Study** application has been submitted to the OPW for the 'Brandon Bay Maharees Coastal Cell'. In March 2018 it was announced the application was successful. The study will be 90% OPW funding and is estimated to cost €150,000. **OPW requires that proposals and funding applications for structural measures to prevent or mitigate erosion should be done in conjunction with an appropriate coastal erosion risk management study which fully investigates, substantiates and demonstrates the merits of any measures being proposed. This is a major step to a long term solution!**

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