

## Coastal Management

Author: Dominic Shaw

### Introduction

Climate Change will have profound effects on coastal communities around the globe. For example, higher sea-levels and more frequent, more intense weather events will increase the risk and impacts of flooding. In response, national authorities will need to adapt their coastal management strategies to cope with this new context. As one example, National Resources Wales (NRW) is introducing new adaptation strategies to their choice of policies. This study focuses on the case of Fairbourne in Gwynedd, Wales, and the threats that it faces from climate change.

### Background

Shoreline Management Plans (SMPs) split the coast into sections and outline where public funding for management strategies can be allocated. There are 4 management options: Advance the Line (ATL), Hold the Line (HTL), Managed Realignment (MR) and No Active Intervention (NAI). The West of Wales SMP2 (2012) is the first to stop funding protection of a substantial settlement in the UK (GCC, 2016). As a result, Fairbourne, Gwynedd will eventually be decommissioned and its residents will have to leave.

### Why not improve existing defences?

Fairbourne is situated on a drained saltmarsh, which would, before engineering, flood regularly at spring tide. A seawall was constructed in the 1860s to make the land economically viable for development. However, the seawall rooted the shingle bank to its base, disrupted the flow of beach material in the sediment cell and starved the bank, making it less effective as a flood defence. During a storm event, sediment is now carried off-shore, and the bank requires continual replenishment.

Following a cost-benefit analysis, NRW decided that in the new context of climate change, this is no longer a sustainable solution. Furthermore, as Fairbourne is very close to sea-level and has a very flat topography, if a higher sea-wall was built and failed, more water would be trapped in Fairbourne, causing a

greater risk to life similar to the breaching of the levees in New Orleans following Hurricane Katrina (2005).

### The Fairbourne Question

The question of 'how to respond when coastal defences are no longer sustainable' will not be one faced by Fairbourne alone. Even in Wales, another 40-50 coastal settlements are at high risk of flooding and coastal erosion due to climate change (GCC, 2019). Geographers, policy makers, politicians, development planners and coastal residents are all interested in Fairbourne to learn lessons for how best to tackle this issue in the future.

### Findings

#### An Uncertain Future

Assuming the defences hold until an evacuation estimated to be in 2054, it can be estimated that a large proportion of the current residency are likely to have died. A MCMC simulation of population using ONS death tables for England and Wales found it is virtually certain only 38.6-43.5% of current residents would live until a 2054 evacuation (Shaw, 2022). It is expected that there will be an influx from births, however there is also an expected out-migration with some relocating due to old age (e.g. for care provision) or change in circumstance (e.g. marriage, university). One unexpected population fluctuation comes from an influx of second-home owners, most of whom are using the properties as a cost-effective holiday home. With high season for tourism, including from second-home owners, during summer months (i.e. outside of the winter storm season), this is expected to reduce overall risk as they would not be present during a flood event.

#### Un-Fairbourne?

As this context is so new, many complex issues arise through this case study. Some are related to governance, for example: as there are few clear principles established for decision-making, what should be the criteria for protecting, or decommissioning a settlement? Which agencies

should make a decision, and which stakeholders should be involved in giving their point of view?

How would you feel if your community was going to be decommissioned? What consequences might this have for your sense of place, community, and identity?

More broadly, should all settlements be invested in, despite the economic cost and likely unsustainability of coastal defences (for example)? Should some be protected, and if so, which ones? Why?

If communities are going to be decommissioned, where should they be moved to? Who should pay for the loss of property and business? What consequence may there be for the destinations which are going to receive new inhabitants? What is 'fair' in this context?

In the case of Fairbourne, residents remain in shock at the news that their coastal defences will no longer be effective, and their settlement will slowly be decommissioned. Can you think of a better solution to this situation?

As enhanced greenhouse gases results in more energy in the ocean-atmosphere system, this means that intensive storm events are more likely to increase. Coastal settlements are therefore more vulnerable to storm surges and flooding, and local solutions will need to be found to safeguard life and property.

## References

Alexander, M., McKinley, E. and Ballinger, R., 2019.

Aligning Flood & Coastal Erosion Risk Management and Well-being in Wales: An analysis and evaluation of FCERM governance

Gwynedd County Council, 2019. West of Wales SMP2 Frequently Asked Questions. Bangor.

Shaw, D., 2022. The Fairbourne Question: A Case Study Approach to Understanding FCERM Adaptation Planning Challenges in Wales. Undergraduate. Cardiff University.

Thomas, A., 2020. Arthog Community Council Meeting Minutes 8th January.

Ymgynghoriaeth Gwynedd Consultancy, 2016. FAQ Fairbourne Moving Forward v9. Caernarfon.

## Suggestions for Further Work

Download the Shoreline Management Plan for your nearest coastal area. Which policies are being applied along the coastline? How will these policies shape communities and the environment?

## Questions

Can you think of physical or socio-economic hazards associated with the following situations?

- The failure of coastal defences
- Inability or unwillingness to invest in Fairbourne
- Residents leaving Fairbourne

Do you think the politics of these issues will play out differently in coastal and non-coastal communities?

What might be good methods to find out what the broader population think of how to manage coastlines in the context of climate change?