Case study 60. South Milton Sands

Author: Robert Harvey

Main driver: Defence improvement, habitat creation and recreation

Project stage: Constructed (2009), modified (2014), future plan needed

Photo 1: South Milton Sands, looking south (source: Robert Harvey)

Project summary:

Between 2003 and 2009, the National Trust restored South Milton Sands in Devon (Photo 1 and Map 1), a heavily used 4ha sand dune site with a small beach, a café and extensive car parking. The wooden piling defences constructed in 1990 were at the end of their lifespan and thought unsustainable given the erosion at the site. The designed scheme removed the failing defences and reprofiled the dunes, which allowed the dunes to erode and build according to natural processes. Once groundwork was completed, local people helped plant the marram grass on the dunes. Following consultation, the National Trust agreed to maintain a small area of defence to an existing slipway for a 10-year period. The project was viewed as a success.

A storm on 14 February 2014 eroded about 15m of the sand dunes and lowered beach levels by some 2m. The southern end of the access track and the slipway were undermined. Boardwalks to access the beach were broken. The dune ridge was overtopped but did not breach. However the loss of two-thirds of the dune ridge (including the area reinstated and revegetated in 2009) made the frontage highly vulnerable to breach in a future storm.

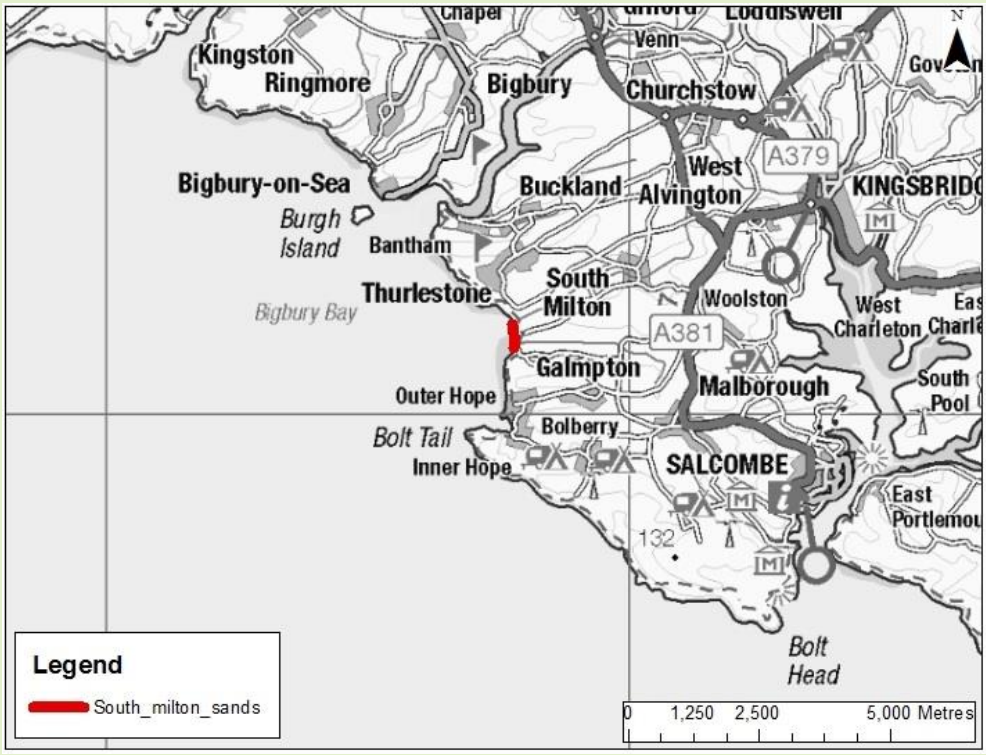
The National Trust has reinstated the access road and slipway, but the dunes cannot be sustained in their current location. The 20-year erosion line in the Shoreline Management Plan passes through the car park and close to the café. Sea level rise and increased storminess will make the existing defence line unsustainable.

National Trust wants a way forward that is sustainable and works with natural processes in accordance with its Shifting Shores policy. The current car park and access road are unsustainable in the long term and alternatives will be investigated. These need to be the subject of public engagement and the National Trust intends to consider the options.

The dunes might be sustainable in a more landward location. The future of the wetland and associated outfall also needs to be considered. If the outfall is removed, water levels will likely increase and water will find its own route to the beach, either by percolation or a (seasonal) surface channel through (rolled back) dunes. This approach could create a mosaic of dune and wetland habitat.

Key facts:

It is possible to manage dunes for flood defence, conservation and recreation while engaging local communities in doing so. However, long-term sustainability requires sufficient space to accommodate naturally occurring coastal realignment and will entail cycles of dune erosion and accretion over extended time periods.



Map 1: Location of South Milton Sands

1. Contact details

Contact details	
Names:	Richard Snow, Emma Reece, Tony Flux
Lead organisation:	National Trust
Partners:	South Hams District Council, Plymouth University, Plymouth Coastal Observatory
e-mail address:	Richard.Snow@nationaltrust.org.uk

2. Location and coastal/estuarine water body description

Coastal/estuarine water body summary	
National Grid Reference:	SX677413 to SX677417
Town, County, Country:	South Milton, Devon, UK
Regional Flood and Coastal	South West

Committee (RFCC) region:	
Transitional and coastal water body and location:	Not available
Water Framework Directive water body reference:	Not available
Land use, geology, substrate, tidal range:	Recreational beach, car park, nature reserve Tidal range: 5.7m

3. Background summary of the coastal/estuarine water body

Socioeconomic/historic context

South Milton Sands is a heavily used 4ha sandy beach with extensive car parking, donated to National Trust in around 1980. The National Trust records 80,000 visitors per year. The main car park can accommodate 120 vehicles; there is also room for 400+ vehicles in a field used at peak periods for overflow parking. South Milton Sands is popular for beach enjoyment and swimming. There is a beach café landward of the northern end of the frontage, owned by the National Trust but independently tenanted, which is very popular with visitors. Public toilets near the café are operated by South Hams District Council but with funding from the café in winter months.

There is a small concrete slipway owned by the National Trust at the southern end of the frontage. An unpaved road runs the length of the frontage, which is owned by the National Trust. This track connects the public, paved roads providing access to the northern and southern ends of the frontage, which are otherwise only connected by means of a 6-mile drive inland. The unpaved track is heavily used by local people including tenant farmers who have land on both sides of valley, by visitors to access the car park, beach and café, and as a through route between South Milton and South Huish.

The natural backshore at South Milton Sands is sand dunes. However, these had been heavily degraded during the 20th century and used for car parking. Landward of the dunes is a freshwater wetland owned by the National Trust but leased to the Devon Bird Watching and Preservation Society. This drains to the sea by means of a culvert under the access track, dunes and beach to a concrete outfall on the beach. Three privately owned residential properties overlook the wetland.

In 2002, wooden piling defences constructed in 1990 were deemed at the end of their lifespan, not working properly and thought to be unsustainable in the longer term in the context of sea level rise.

Flood and coastal erosion risk management problem(s)

- Erosion of dunes and slipway
- Potential loss of access track and car park
- Potential loss of café (close to Shoreline Management Plan 20-year erosion line) and septic tanks serving public toilets
- Potential erosion/collapse of outfall serving wetland leading to increase in water levels landward of beach
- Saline flooding of freshwater wetland
- Three residential properties overlooking wetland at flood risk
- Rock House apartments (adjacent to southern end of frontage) at erosion risk

Other environmental problems

- Potential loss of public access and recreational amenity
- Loss of dune habitat to erosion, coastal squeeze and trampling by visitors

4. Defining the problem(s) and developing the solution

What evidence is there to define the flood and coastal erosion risk management problem(s) and solution(s)

The National Trust wants to:

- keep the beach and dunes for recreational use (rather than as a car park)
- work with natural processes
- engage the local community

The public is concerned about the loss of car parking and erosion of the access track.

The Shoreline Management Plan policy for this frontage in the short, medium and long term is:

'Continue to allow existing localised defences to be maintained or replaced, either along existing or realigned positions, if alternative funding is available to reduce the risk of flooding and erosion and maintain visitor access. If alternative funds are not available, then allow natural coastal evolution to continue through No Active Intervention'.

What was the design rationale?

2009

Following options appraisal and extensive consultation, the wooden piling defences were removed (including rotten timber piling and many tonnes of rubble) and the dunes were reprofiled and reinstated using sand from the beach. Once groundwork was complete, local people helped plant marram grass on the dunes (see Photos 2 and 3).

It was agreed that a short area of timber palisade would be retained for 10 years at the most vulnerable southern end of the frontage, covering the slipway area. This gave people time to accept that change will occur over time during the transition from defended to natural dunes. The car park was retained onsite and access to the beach was improved with board walks. The project took 6 years to complete, mainly because of the stakeholder engagement process. People need time to understand and come to terms with change. Engaging the community in practical tasks of dune restoration generated positive publicity and helped the project being viewed as a success.

Around the same time, the owners of Rock House apartments south of the National Trust frontage installed a rock revetment immediately adjacent to the National Trust slipway to protect their property.

2014

A storm on 14 February 2014 eroded about 15m of the sand dunes and lowered beach levels by some 2m. The southern end of the access track and the slipway were undermined. Boardwalks to access the beach were broken. The dune ridge was overtopped at the southern end but did not fully breach. However, the loss of much of the dune ridge (including the area reinstated and revegetated in 2009) made the frontage highly vulnerable to breach in a future storm.

The National Trust decided that reinstating the dunes in their previous location was not practicable or sustainable. Landward migration of the dunes is constrained by the access track and car park. The dunes and beach were therefore left as they were. The access track was diverted landward at the southern end to reinstate it. The slipway was reinstated using boulders. Broken boardwalks were removed and pedestrian access routes to the beach were reinstated. Towards the northern end, the access track is vulnerable to erosion but minor realignment inland is not possible as it is constrained by the septic tanks owned by South Hams District Council.

Public access to the eroded dune face was found to be exacerbating erosion and hazardous to public safety. The National Trust therefore put up a wire fence and warning signs. As these have not proved entirely effective, it is now proposed to install a chestnut paling fence to deter access to the eroding dune face.

Photo 2: Slipway (National Trust) and rock revetment (not National Trust) (source: Robert Harvey)

Photo 3: Eroded dunes and new embryo dune formation (source: Robert Harvey)

Future

Beach levels have recovered since February 2014 and embryo dunes have re-formed at the base of eroded dunes towards the northern end of the frontage.

The 20-year erosion line in the Shoreline Management Plan passes through the car park and close to the café (Photo 4). Sea level rise and increased storminess will make the existing defence line unsustainable.

The National Trust seeks a way forward that is sustainable and works with natural processes in accordance with its Shifting Shores policy. The current car park and access road are unsustainable in the long term and alternatives will be sought. These need to be the subject of public engagement and the National Trust intends to consider the options. Small incremental changes to these facilities would not be cost-effective.

The dunes might be sustainable in a more landward location. The future of the wetland and associated outfall also needs to be considered. If the outfall is removed, water levels will likely increase and water will find its own route to the beach, either by percolation or a (seasonal) surface channel through (rolled back) dunes. This approach could create a mosaic of dune and wetland habitat.

While allowing the dune frontage to roll back over time complies with the Shifting Shores policy, the rate and volume of material available will depend on continued offshore and longshore feed, which requires extended periods of slow accretion. The losses incurred between the December 2013 and February 2014 events represent a 1 in 50 year incident (the most energetic 3-month incoming system since 1948) and so should not be taken as 'typical'. Therefore timescales regarding encroachment over the access track and, subsequently, the car park are difficult to estimate but a repeat event of this magnitude would almost certainly breach. Hence the desirability to implement relocation of facilities before that happens.

Photo 4: Beach House Café and access road (source: Robert Harvey)

Project summary	
Area of transitional and coastal water body or length benefiting from project:	Frontage length ~400m
Types of measures/interventions used (Working with Natural Processes and traditional):	Dune reinstatement and planting (WWNP) Timber palisade (traditional)
Numbers of measures/interventions used (Working with Natural Processes and traditional):	2
Standard of protection for project as a whole:	Not defined 2014 storm, which severely damaged but did not breach

	dune defences, was classed as 1 in 250 years
Estimated number of properties protected:	3 residential properties 1 café

How effective has the project been?

The project implemented in 2009 was seen as a success, in large part because of community engagement with the project (Photo 5). The project demonstrated that it is possible to implement a scheme that addresses flood and coastal risk management (FCRM), nature conservation and public recreation in a heavily used area.

Photo 5: Reinstated pedestrian access to beach (source: Robert Harvey)

However, following the severe winter storm in February 2014, it is not clear that long-term FCRM benefits could be achieved with this approach. While the frontal dunes acted as a reasonable sea defence, there were no secondary dunes behind to take their place when the frontage was washed out. Rebuilding the dunes in their previous location is not considered sustainable and installing artificial defences is considered inappropriate to this location. The National Trust was able to roll back the unpaved access road relatively easily at the southern end. Should the remainder of the frontal dunes be removed in a future storm (which is a very high probability), options for rolling back the service road a second time are more constrained owing to the car park, septic tanks and café. The experience gained in public engagement with the 2009 measures will be valuable in charting a future way forward.

5. Project construction

How were individual measures constructed?

2009

- Construction of slipway, boardwalks, palisade and pedestrian access tracks by traditional methods
- Dunes reinstated by bulldozing and profiling sand from beach

- Marram planting by local community

20142014

- Slipway reinstated with boulders
- Access track realigned inland
- Pedestrian access tracks reinstated and fenced

How long were measures designed to last?

To be advised – the timescale of recent works is commensurate with Shoreline Management Plan predictions for shoreline retreat.

Were there any landowner or legal requirements which needed consideration?

The National Trust has leased South Huish wetland to the Devon Bird Watching and Preservation Society on a 10-year lease. There are several tenanted farms on National Trust landholdings, one of which is a 3 generation tenancy (though up to 10% of land can be removed from tenancy during lease). These leases and tenancies complicate negotiations to relocate facilities at risk of flooding or erosion.

6. Funding

Funding summary for Working with Natural Processes (WWNP)/Natural Flood Management (NFM) measures	
Year project was undertaken/completed:	2009, modified 2014
How was the project funded:	National Trust Flood Defence Grant in Aid was not sought.
Total cash cost of project (£):	2014: <£10,000
Overall cost and cost breakdown for WWNP/NFM measures (£):	In 2009 and 2014, most expenditure related to WWNP methods but detailed breakdown is not available.
WWNP/NFM costs as a % of overall project costs:	In 2009 and 2014, most expenditure related to WWNP methods but detailed breakdown is not available.
Unit breakdown of costs for WWNP/NFM measures:	In 2009 and 2014, most expenditure related to WWNP methods but detailed breakdown is not available.
Cost–benefit ratio (and timescale in years over which it has been estimated):	Not assessed

7. Wider benefits

What wider benefits has the project achieved?

- Community engagement
- Maintenance of key infrastructure including unpaved access road
- Viability of car park and café secured for short to medium term

How much habitat has been created, improved or restored?

- 2009 works reinstated ~400m length of dunes to a width of about 50m
- 2014 storm reduced width to ~20m

8. Maintenance, monitoring and adaptive management

Are maintenance activities planned?

The National Trust maintains the boardwalks, fencing, signage, trackway dressing and ditch sumps .

Is the project being monitored?

The National Trust monitors frontage visually/anecdotally weekly.

Beach levels are monitored by Plymouth Coastal Observatory every few years.

Erosion of the beach revealed 3,000 year old tree trumps from the forest bed, which were investigated by archaeologists and palaeoclimatologists.

Has adaptive management been needed?

The 2009 works had to be adapted in 2014 due to storm damage.

9. Lessons learnt

What was learnt and how could it be applied elsewhere?

- Major erosion can occur very quickly in a single storm.
- Community engagement is important as is the use of suitable methods to achieve this.
- Need to manage public expectations and shock at sudden changes.
- Need to remind people what has been discussed and agreed. Record meetings.
- Professional advice was taken on dune alignment in 2009 and followed, but resulting works were only sustained for 5 years.
- There is a need for a future management plan and for stakeholders to sign up to it.

10. Bibliography

None provided

Project background

This case study relates to project SC150005 'Working with Natural Flood Management: Evidence Directory'. It was commissioned by Defra and the Environment Agency's Joint Flood and Coastal Erosion Risk Management Research and Development Programme.