Dynamic Dunescapes Dune Management Case Study

Notches and Scrapes, Oxwich, 2021

Sand dune system	Oxwich Burrows (in Oxwich National Nature Reserve, South Wales on South Gower Peninsula)
Case Study Subject	Notch and scrape creation to restore dynamic conditions in the stabilized dune system
The Management Intervention	

Site background information

Oxwich National Nature Reserve (NNR), is an important coastal site with a diverse mix of habitats and SSSI designations. Originally designated SSSI in the 1960's for its dune flora, and later as an NNR. The dune system itself has become more fixed, and succession through the dunes has halted, no new slacks have formed for several decades. Stabilisation and rigorous vegetation growth, including bracken spread and woodland regeneration has seen the loss of dune grassland, humid slacks, and the loss of any bare sand.

What was the issue/change you hoped to make? (Ecological, physical, user behaviour, mix)

Due to the dune system being small (less than 100 ha) and Oxwich SSSI Bay being sheltered from winds, and sediment distribution, there is very little new habitat being established, any embryonic dunes which may form on the front, will be removed by the high tides and storms usually frequent from the autumn onwards. With very little natural dynamic sand movement coupled with rapid vegetation succession the site has become over-stabilised with little to no bare sand and early successional habitat.

The overall aim of the Dynamic Dunescapes project at Oxwich is to rejuvenate the dunes by restoring natural dynamic conditions both in the frontal dunes with a frontal dune notch and in the dune slacks by scraping away the humic layer to expose bare sand. These management actions will have direct beneficial impacts on the condition of the dune habitats and the species requiring bare sand or pioneer dune habitat conditions. It is hoped that by kick-starting the geomorphological processes at Oxwich that the dunes will become more dynamic and more self-sustaining reducing the management time and costs into the future.

What was the suggested intervention?

To use mechanical processes to excavate a notch in the frontal dunes to allow more bare sand to travel through the rest of the dune system behind.

A large area of dune vegetation was scraped to the level of the winter water table to reveal bare sand behind the frontal dune notch, which will create open bare sand and conditions suitable for early successional dune slack communities and will benefit both invertebrate and bryophytes communities which rely on these early successional stages for their survival. The position of the frontal dune notch will promote sand movement and scour within the dunes.

Since the works there have been two south-easterly storms and sand is blowing into the scraped area and beyond the footprint of the scraped area into the dunes behind. This will have a positive effect on the dune vegetation rejuvenating it with calcareous sand rain.

What did you do?

First, a geomorphological appraisal was conducted to identify the best position of the intervention. The report suggested that the prevailing wind at the site comes from the south west. The dune system behind the bay is protected from this wind as it sits beyond Oxwich Point which extends to the south. Close to the point the wind blows offshore, and further into the bay the wind blows parallel to the beach, not blowing the sand directly into the dune system. The second most common direction of wind at this site was south east, which is perpendicular to the beach. This is the direction that it was identified that the notch would be most effective.

This work used records of where the existing dune slacks remained wet during the winter, the distribution of sensitive species in the dune system, and where bare sand is currently available to identify where the intervention would be best positioned, to expand an area of bare sand.

As the works required ground penetrating works and due to the sites history a UXO survey was also carried out prior to the works (See UXO Case Study Note)

How did you do it?

Areas of scrub needed to be first removed in the slack at which the work was planned. This was done outside of the bird nesting season in the winter prior to the notch and scrape creation. Contractors cut and chipped the scrub. Chipped material was removed from dune habitat.

To create the notch and dig the scrapes, contractors used a 16-ton bulldozer and two 15-ton excavators. The machinery was brought into the site once and tracked out once to minimize the movement of the heavy machinery through the reserve to reduce any damage to the habitats

By completing the dune slack scrape work in the winter, it was clear when the scrape reached the water table, confirming that the scrape was deep enough to produce wet slacks in the winter months.

The work period was 10 days. The progress of the contractors was also observed daily during the work period.

How was the site / intervention monitored?

Visual observations for comparison prior to and after the works. Before/after imagery was taken. Following the works storms with south easterly winds have identified that some sand has been blown through the notch into the slacks behind.

What modifications, if any, did you make to your initial plan and why?

Originally the plan was to create lots of smaller scrapes across the site to expose bare sand, but as the work was to be completed in the winter with heavy machinery, the plan was modified to instead create one large

scrape. This meant that the heavy machinery only had to travel into the dunes once, and not create as much damage across the site as travelling to create many slacks would have. This helped protect sensitive species.

Additionally, by exposing more bare sand behind the frontal notch and to the south east of the reserve it is likely more sand will be blown inwards to other smaller slacks and benefiting a larger area of the reserve.

Highlight any issues/obstacles & how you overcame them?

Ensuring clarity between plans and onsite work with contractors. Having a good working relationship with the contractors and spending time on first day to mark out the work areas.

How much did the intervention cost?

£9,650 for the scrub work. £8,050 for the notch and scrapes.

What size was the area of the intervention?

Approximately 0.4 ha of scrub was removed in the slack the year prior to further intervention works.

The notch in the frontal dune was approximately 20m wide at the top and 10m at the base x 35m long from the beach to the slack.

What else went well?

Pre-planning the route that the machinery would take to travel into the reserve and onto the work site minimized damage to other areas of the site.

Evaluating the progress twice daily was important, as the machinery worked quickly.

Knowing the tide timings was also important to make sure that the piles of sand that was removed from the notch were not placed in the way of beach users at high tides, and that the beach was safe to access at all times.

Engagement Measures

How were the public and others engaged?

Community engagement was an important part of this work. The site was quieter than usual due to a coronavirus lockdown, but there were still locals out walking in the vicinity.

Posters were produced and displayed on the entrance to the site to make visitors aware of what works were going ahead, and to advise them to keep their distance from the work site.

Photographs of the posters that were displayed on the site were shared by members of the public in Facebook groups supporting the dissemination of the messaging through the community.

How were communities/volunteers involved?

The local village council was contacted and updates were shared by the councilor to the residents via email and a Whatsapp Group.

How were local schools or other organisations involved?

No.

Is the intervention working?

Please describe how. What has changed?

Before and after photos shows the extent to which new areas scrub removed, notch that has been created, scrape created and the extent of new wet dune slack pools have been created.

The intervention so far shows good signs of working as sand has been mobilized and several storms with south easterly winds have blown sand further inland to other slacks in the reserve.

If the intervention has not worked, detail why not, and what could be done differently next time?

N/A – Further surveys over time will provide more evidence of the scale of success of the intervention.

Media & Reports

Photos/video clips (Before/During/After)

All:

Credit: Natural Resources Wales/Dynamic Dunescapes

Notch before

Notch after

Notch before

Notch after

Scrapes before

Scrapes after

Scrapes before

Scrapes after

Links to surveys/reports

Oxwich Burrows – A Geomorphological Appraisal

Options for Dune Rejuvenation, Kenneth Pye & Simon J. Blott