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Dynamic dune management in practice – remobilization of coastal dunes in the National Park Zuid-Kennemerland in the Netherlands

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Abstract

In order to achieve enduring dune dynamics, new thinking led to the notion that remobilization of entire, formerly mobile but artificially stabilized dunes, is probably the way forward. Some experiments are going on at the moment. The first results are shown here. A great effort is needed to build consensus for such controversial projects.

Keywords: Remobilization; Consensus building; Dune dynamics.

Introduction

Dutch dunes were completely stabilized in the 19th and 20th century due to stopping over-exploitation and systematic stabilization programmes. Extraction of drinking water caused the groundwater-table to drop. This resulted in desiccation of formerly wet slacks. Because of a lack of large-scale dune dynamics, existing wet dune slacks dried out and the development of new wet dune slacks stopped. Rabbit diseases (myxomatosis, RHD) and nitrogen from air pollution led to grass and scrub encroachment. Consequently, pioneer stages became very rare.

The management of the National Park stopped the policy of dune stabilization and put an end to groundwater-extraction.

However, since the mid-1990s awareness grew that this was not enough, and that the process of dune mobility had to be actively restored.
Removal of vegetation and soil from desiccated dune slacks was started in order to get closer to the groundwater-table, to restore animal and plant communities and to restore dynamics.

Fig. 1. 'Bride of Harlem', reactivated dune in February 2003.

Fig. 2. Project Wurmenveld, Zandvoort, 24-04-2002; former potato fields transformed into wet dune slack.

Ecologically the projects were successful: circumstances favorable for endangered plant communities were restored and several endangered plant species, like *Parnassia palustris*, *Epipactis palustris, Gentianella amarella* colonized these project areas, but the projects did not result in long lasting dynamic processes.

These experiences have taught us that long lasting dynamics in the Dutch dunes may only be successful if whole dunes are reactivated, and perhaps even only if these are part of a dynamic landscape. Two large-scale experiments to investigate this option are performed in the National Park.

Experiment 1: project 'Verlaten Veld' (12ha)

Winter 1998/1999 a large-scale experiment was started north of Zandvoort, about 3km from the North Sea in a calcareous dune area. Dune geomorphologists of Amsterdam University advised on the plan. A parabolic dune (width of the parabolic head 375m) with a coniferous forest (2ha, 70 years old) on top and the adjacent deflation plain were completely denuded. About 10ha dune scrub was removed. About 60cm of the topsoil (about 70,000m^3) was removed from the National Park.

The area is closed to the public. Nevertheless, a lot of people had to be convinced of the desirability of such a potentially controversial project. A Consensus Building Approach was developed. Interactive discussions and advice led to adjustment of the plan. Several categories were involved:

Professionals:
- Public servants province, state (licenses); financiers; public servants Zandvoort: excursions;
- Rangers: excursions and responsibility for supervision in the field.

Interest groups:
NGO Dutch Dune Conservation*;* earth value group; volunteers: meeting; excursions; publications.

Partner organizations inside and outside the National Park: excursions; information.

Politicians of the local community: excursions; articles in papers.

The general public: radio, newspapers, excursions.

The Consensus Building Approach continued, also after the project was completed, by way of excursions, publication of results, and a film shown in the visitor centre.

The project is monitored by the Bureau for Beach and dune Research. Some results of this project are discussed by Arens *et al.* (2005).

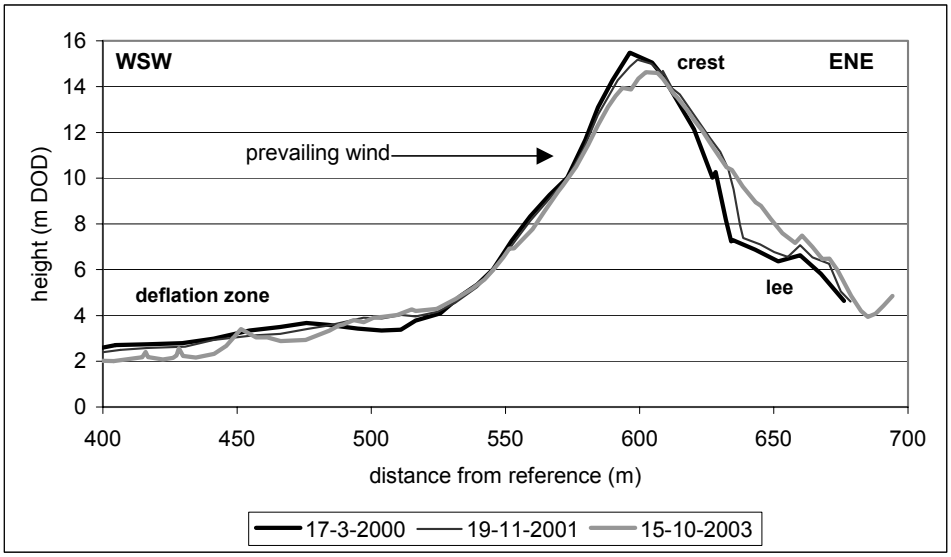

Fig. 3. Mobility of the parabolic dune, between March 2000 and October 2003. The surface of the dune slack in front of the parabolic head (left side) is dropping because of deflation. The crest of the dune is eroding and has moved about 8m downwind. Lots of sand are deposited on the lee side (right side), which has moved about 10-20m downwind.

Fig. 4. 'Verlaten Veld' in summer 2004.

The reactivated dune has remained fully mobile for six years and it looks like this will remain so for the coming years. Grazing with cattle and horses has been introduced in November 2003, grazing with European Bison is considered. This too might help keep the process going.

Experiment 2: project 'The Bride of Harlem' (8ha)

Fig. 5. Work being done in the' Bride of Harlem'.

A second parabolic dune was remobilized winter 2002/2003. This experimental area is located north of the Verlaten Veld, about 1km from the North Sea, west of Lake Vogelmeer. It was part of a larger project where topsoil was removed from 30ha dune slacks formerly used for agricultural purposes. Sand was used for landscape restoration: filling up an old water extraction canal and improving an artificial dune lake (islands, shallow parts, dune slack). To avoid causing disturbance to visitors by sand-transporting trucks, hydraulic sand transport was used.

In a densely populated country like the Netherlands again we needed to convince a lot of people of the desirability of such a potentially controversial project. The Consensus Building Approach was used again. The location of this project is situated in a dune area with many visitors. For that reason additional information was given on temporary notice boards on site. Special attention was given to a 'critical-visitor-group' (excursion).

Consensus Building Approach continued, after the project was completed, through excursions, publication of results, film shown in visitor center.

Conclusions and recommendations

Remobilization of a complete dune has been successful at least for a period of six years. A new dune slack is formed in front of the moving dune and old vegetation is covered at the back of it. Time will tell if this management will result in durable dune mobility over longer periods of time.

Potentially controversial projects could be realized thanks to the great effort put into consensus building.

In the future we hope to remobilize an entire landscape consisting of the frontal dune ridge and two series of parabolic dunes. Here we hope to achieve that landscape-forming processes remain active for a very long time (decades).

Fig. 6. Radio Noord-Holland.

Fig. 7. 'Verlaten Veld' March 2003.

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