

Restoration of dune habitats along the Danish west coast - DK

1. Policy Objective & Theme

- SUSTAINABLE USE OF RESOURCES: Preserving coastal environment (its functioning and integrity) to share space

2. Key Approaches

- Participation
- Socio-economic
- Technical

3. Experiences that can be exchanged

Different measures of restoration for improving the conservation status of dunes. The methods used can be applied in similar dune systems elsewhere.

4. Overview of the case

Restoration actions were conducted on 5675 ha. of coastal dunes which were in a poor conservation status.

5. Context and Objectives

a) Context

In Denmark and in the rest of Europe, dunes and coastal dune heathlands are considered to be threatened and vulnerable habitats. The Danish coastline bordering the North Sea is famed for its long stretches of white sandy beaches and extensive dunes. Substantial tracts are also of high international conservation importance. However, these dune systems have suffered from an array of problems over the years, associated with inappropriate land use and over-stabilisation. A national survey in the late 1990s concluded that significant areas were in a poor conservation state. The most serious threat came from the large-scale invasion of non-native species such as *Pinus mugo* and *Pinus contorta*. This was further exacerbated by the inability of the dunes to function as natural dynamic systems and of the vegetation to cope with increasingly large amounts of ammonium deposition.

b) Objectives

The aim was to regain a more favourable conservation status of Danish dune habitats. It was also designed to secure viable populations of *Bufo calamita* and *Rana arvalis* along the Danish west coast in the area containing decalcified fixed dunes with a mosaic of humid dune slacks. Additionally, it aimed to produce a guidance document on the best practice management of these fragile habitats.

6. Implementation of the ICZM Approach (i.e. management, tools, resources)

a) Management

The Danish Forest and Nature Agency, under the Danish Ministry of Environment and Energy, was responsible for the work.

b) ICZM tools

Monitoring of Danish coastal priority habitats had showed that their conservation status was not favourable. Restoration actions were, therefore, planned on a total net area of 5,675 ha - covering 65% of the total sand dune resource in the country. It was proposed to use different techniques on areas suffering different levels of overgrowth to restore dune heath habitats, including the priority habitat types: fixed coastal dunes with herbaceous vegetation ('grey dunes') and decalcified fixed dunes with *Empetrum nigrum*. Three general threats were identified:

1. Invasion of non-native species, especially *Pinus mugo* and *Pinus contorta*.
2. Lack of natural dynamic processes (over-stabilisation of dunes).
3. Ammonium deposition / eutrophication.

Tree growth had changed the dune heathland ecosystem completely, due to the shadowing effect of the canopy and forest-induced changes of nutrient circulation and micro-climate. Further site specific threats concerning drainage, pressure from tourism, and barriers to habitat management due to land ownership had also been identified. Invasive vegetation and non-indigenous trees were cleared to encourage the restoration of dune heath habitats. In general, 388 ha. of plantations, 516 ha. of dense overgrowth and 4972 ha. of tree encroachment were cleared. Grazing, burning and cutting was carried out on 2909 ha. A broad range of sustainable management methods were used, i.e. clearing of tree growth using both manpower and machinery, mosaic burning, mosaic cutting and removal of material, and establishment of different grazing regimes. Sustainable techniques imply no use of herbicides and great effort was made to avoid damage to dune topography. Specifically:

- Restoration of 264 ha of dune heath habitats, i.e. conversion (clearing) of non-indigenous conifer forest to priority habitat types fixed coastal dunes with herbaceous vegetation ('grey dunes') and decalcified fixed dunes with *Empetrum nigrum*.
- Clearing of 542 ha with dense overgrowth.
- Removal of tree encroachment on 3452 ha.
- Management activities on more than 2800 ha to deal with threats of nutrient enrichment and lack of natural dynamic processes.
- Restoration of natural hydrology at three sites.
- Performing land swaps in order to remove barriers to habitat management due to land ownership on Rømø.
- Improved living conditions of herpetofauna at 30 breeding localities.

Drainage trenches were closed in three project sites to retain surface water in the area for longer in the summer and restore the natural hydrology. The raised water table also contributes to keeping the area clear of invading trees, maintaining the natural dynamics and diversifying the dune heath habitat niches.

A monitoring programme executed by the National Environmental Research Institute (NERI) and the University of Copenhagen (KU) was set up. Follow-up actions are likely to be needed to maintain the conservation status of the sites and the positive effects of the actions conducted between 2001 - 2005. This will be done through future revisions of management plans within the framework of the Nature Conservation Strategy of the Danish Forest and Nature Agency (1999).

7. Cost and resources

The total Budget was €4,675,796.00 of which there was a Life Contribution of €2,805,478.00

8. Effectiveness (i.e. were the foreseen goals/objectives of the work reached?)

This large-scale work succeeded in improving the conservation status of the dune heath areas involved including the breeding sites for herpetofauna, primarily *Bufo calamita* and *Rana arvalis*. The methodologies applied and the best practice identified led to the production of extensive and intensive monitoring reports and Best Management Practice Guidelines. These have already been used in other dune heath areas, private as well as state owned, inside as well as outside Natura 2000 areas.

9. Success and Fail factors

37.78 ha of key land was purchased from private land owners. The public awareness and understanding of the current nature conservation issues, habitats of EU importance and the Natura 2000 network was increased through a website, video and booklet made available in Danish and English. Close co-operation between landowners, conservation authorities, scientists and practitioners were necessary in order to counter any negative developments.

10. Unforeseen outcomes

It was found that efforts to use grazing as a management tool in marginal areas such as these were faced with financial constraints resulting from the Common Agricultural Policy, since farmers were unwilling to enter into grazing agreements without accompanying subsidies. The methodologies of clearing plantations and mosaic burning attracted international interest amongst relevant authorities and co-operation and exchange has been established with Dutch and Swedish entities.

11. Prepared by

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12. Verified by

It has not been possible to verify this case.

13. Sources

- Dune Heath Management Best Practices Manual (undated) Danish Forest and Nature Agency
- Restoration of Dune Habitats along the Danish West Coast (undated) Danish Forest and Nature Agency
- LIFE02 NAT DK 008584 Final Technical Report
- www.sns.dk



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