

RESTORATION OF DUNE HABITATS ALONG THE DANISH WEST COAST

INTERNATIONAL WORKSHOP



VIGSØ BUGT KURSUSCENTER

SEPTEMBER 8-11 2003

REPORT



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**LIFE Project: Restoration of Dune Habitats along the Danish West Coast
(LIFE02/NAT/DK/8584)**

International workshop September 2003

Workshop programme

Monday, 8. September 2003

Evening Arrival of participants to Vigsø Feriecenter.

Tuesday, 9. September 2003

09:00 – 10:00 Arrival of the last participants to Vigsø Feriecenter

10:00 – 10:15: Welcome address by Chief Forester of Thy Forest District, Ditte Svendsen

10:15 – 11:15 “Danish dune heaths – why are they so outstanding in a national as well as an international perspective?” by professor Ib Johnsen, University of Copenhagen

11:15 – 12:00 Overview of the project “Restoration of Dune Habitats along the Danish West Coast”, by former project manager Søren Korsholm and present project manager Hanne Stadsgaard Jensen, Danish Forest and Nature Agency

12:00 – 13:00 Lunch

13:00 – 14:00 Rehabilitation plans for amphibians in Danish dune heath habitats (Lars Briggs, Amphi Consult)

14:00 – 15:00 The use of prescribed fire in restoration and maintenance of protected Atlantic heather vegetation in dune ecosystems of the North Frisian islands and other protected areas on Schleswig-Holstein mainland (Alexander Held and Marco Hille, Fire Ecology Research Group, University of Freiburg, and Georg Hoffmann, Untere Naturschutzbehörde, Nordfriesland)

15:00 – 15:30 Coffee break

15:30 – 17:00 Monitoring programmes in the Danish Dune Heath Habitat project

- a. Intensive (professor Ib Johnsen, University of Copenhagen)
- b. Extensive (researcher Knud Erik Nielsen, Danish Environmental Research Institute)

17:00 – 18:30 Excursion to amphibian habitat at Lild Strand

19:00 – 20:00 Dinner, followed by coffee

Evening Free/project group meeting

Wednesday, 10. September 2003

08: 00 – 09:00 Breakfast

09:00 – 09:30 Searching for key factors to restore characteristic flora and fauna communities in coastal dunes. By Hans Esselink, University of Nijmegen.

09:30 – 11:30 Short presentations of other LIFE Nature projects

1. A Conservation Strategy for the sand dunes of the Sefton Coast, Northwest England (Paul Rooney, Liverpool Hope University)
2. Conservation and re-establishment of of Southern Atlantic Wet Heaths with *Erica ciliaris* and *Erica tetralix* and dry coastal heaths with *Erica vagans* and *Ulex maritimus* (Victoria Whitehouse, Cornwall Wildlife Trust)
3. Protection and Management of Coastal Habitats in Latvia (Vija Znotina, University of Latvia)
4. Protection of grey dunes and other habitats at Hulsig Heath, Northern Jutland (Lone Godske, Nordjylland County)

11:30 –12:00 Group discussions of best practices

- a. Public versus private ownership of land – how to handle it
- b. Management and rehabilitation practices, including long-term impacts
- c. Monitoring and follow-up
- d. Public participation and information

12:00 – 13:00 Lunch

13:00 – 15:00 Group discussions continued

15:00 – 15:30 Coffee break

15:30 – 17:00 Plenary, presentation of group discussions and conclusions

17:00 – 17:30 The conservation of sand dunes in the Atlantic Biogeographical Region: the contribution of the LIFE programme. By John Houston, Ecosystems Ltd

17:30 – 18:00	Introduction to fieldtrip
19:00 – 20:00	Dinner, followed by coffee
Evening	If the weather permits, trip to Hanstholm Wildlife Reserve

Thursday, 11. September 2003

07:00 – 08:15 Breakfast and vacation of rooms

08:30 – 15:00 Field trip.

1. Store Tyvbak. View over area cleared of trees, and mosaic burnings. Active clearing may be taking place on the day of our visit.
2. Ålvand Klithede. Burnings of different ages. View over a large area of continuous dune heath.
3. Lunch at Cafe Conrad, Klitmøller
4. Bulbjerg. Grazing and clearings. A controlled fire may be ongoing on the day of our visit.

On the way, several other stops may be made to show various aspects of dune heath management, including public information displays, and the Hanstholm reserve.

15:00 Return to Vigsø

Key points and main conclusions from the workshop

1. When removing trees and other vegetation (encroached or deliberately planted) from dune heaths, evidence suggests that it is important to minimise the level of nutrients left behind by the removed vegetation. The vegetation should preferably be removed from the site as soon as possible after the felling/cutting. If this is not possible, the vegetation should be collected in piles, in order to minimise the fertilisation effect of dead leaves and needles.
2. Burning the dune heath is an efficient management tool, when used properly. Care should be taken to optimise the burning methods to match the desired output. Small scale burnings can be used to test the best way to achieve the optimal temperature etc. Monitoring of the results of the burnings should ideally be systematic in order to make maximum use of the lessons learned.
3. Eutrophication, desiccation and acidification are some of the major threats to dune and dune heath ecosystems. Removal of the causes is generally seen as too expensive and time consuming, therefore nature management is usually the tool used for countering the degradation, even though we often know very little about the long-term effects of the management measures implemented. Comparative studies of intact, degraded and rehabilitated ecosystems are therefore of vital importance. The dune systems are particularly suited for studies of nutrient dynamics and nutrient limitation factors.
4. A major challenge in Danish habitat management during the coming years will be how to get from the defined conservation criteria (which will be published this autumn) to the desired conservation status.
5. Rehabilitation of dune heaths is much easier from pine plantations than from agricultural land, as the original seed bank remains partly intact for many years in the plantations, while it soon disappears under agricultural cultivation.

ABSTRACT

Rehabilitation plans for amphibians in Danish dune heath habitats

By Lars Christian Adrados, Amphi Consult

INTRODUCTION

Due to the invasion of non-native tree species, over-stabilisation of sand dunes, and eutrophication, the value of the project areas as breeding and foraging sites for a number of stenotopic amphibian species have declined for many decades. The objective of the amphibian part of this project is to secure viable populations of primarily Natterjack toad *Bufo calamita* and Moor frog *Rana arvalis - striata* in the dune habitat mosaic along the Danish North Sea coast. The field reconnaissance in the first project years has documented that the population status of *B. calamita* is much worse than the initial mapping and interim assessment of preservation status reported to the EU commission in 2000 showed, - and that it is vital to target rehabilitation plans towards the demands of *R. arvalis*, too. Appropriate management measures include shrub removal, bank cutting, scraping, pond digging, grazing, and burning.

STATUS OF THE AMPHIBIAN SPECIES

Bufo calamita is on the EU-Habitat Directive Annex IV and on the Danish yellow-list as species requiring special attention. Prior to the project, the estimated population of *B. calamita* along the Danish North Sea coast was app. 20.000 individuals¹. After field reconnaissance within this project and additional monitoring performed by Amphi Consult (partly for Ribe County) it is now clear that the estimated population reaches a maximum of no more than 10.000 individuals. Only on 4 sites along the Danish North Sea coast has *B. calamita* been found in bigger populations:

- One is located in the military training area of Oxbøl, where the tank-driving keeps breeding and foraging habitats open.
- The two southernmost localities are on the other hand natural dynamic landscapes on the islands Fanø and Rømø, where the wind-induced sand drift maintains open and stressed, wet as well as dry habitats.
- The northernmost locality is a natural dynamic landscape near the dynamic parabolic dune Råbjerg Mile, where the wind-induced sand drift creates open and stressed wet as dry habitats, which are perfect as breeding and foraging habitats for *B. calamita*.

In the three former areas, appropriate management is considered a precondition to the long-term viability of populations. In the last area, the population is considered to be viable on long term naturally. In all other areas within the project, the natural dynamic and/or the anthropogenic pressure is not longer sufficient to maintain the required habitats for *B. calamita*, thus management is necessary.

Rana arvalis is on the EU-Habitat Directive Annex IV and on the Danish yellow-list as species requiring special attention. *Rana arvalis - striata*, which is less dependent on a dynamic landscape than *B. calamita*, was sparsely found along the whole Danish North Sea coast. The total population of *Rana arvalis* was estimated to app. 4 mill. individuals¹. The amount of the population in the LIFE project areas is unknown. In general the species will benefit of management activities undertaken for *B. calamita*, but in many areas there is a need of management activities focused specially on the breeding and foraging habitats of this species.

Pelobates fuscus is on the Danish red-list as vulnerable, and on the EU-Habitat Directive Annex IV.

A former information about the existence of Common spadefoot toad *Pelobates fuscus* in Bunken Klitplantage could be verified. In addition it's found at the nearby located Råbjerg Mile. This makes the localities to the northernmost in Western Europe with brood of *P. fuscus*. The surroundings of the first

¹ Phil, S. Ejrnæs, R., Søgaard, B., Aude, E., Nielsen, K.E., Dahl, K. & Laursen, J.S. (2000): Naturtyper og arter omfattet af EU-Habitatdirektivet. Indledende kortlægning og foreløbig vurdering af bevaringsstatus. - Danmarks Miljøundersøgelser. 219 s. - Faglig rapport fra DMU, nr. 322. (Nature types and species included in the Habitat Directive. Initial mapping and interim assessment of preservation status. - National Environmental Research Institute. 219 p. - Report from NERI, no. 322.)

habitat are however not suitable for the foraging activity of the species, which makes management activities needed. Because of the species hidden habits¹, there are no estimations of the Danish population size.

REHABILITATION STRATEGIES

Due to the varying population structures and sizes of the different amphibian species along the North Sea coast, it was necessary to formulate species-related rehabilitation strategies. These strategies can cover the whole Danish North Sea coast and not only areas targeted by the LIFE project.

The strategy concerning *B. calamita* must focus on two priorities:

1. To secure populations considered to be viable on long term with appropriate management.
2. To optimise the conditions for populations considered to be viable on short term with appropriate management.

The managing activities for *B. calamita* must secure continuous breeding possibilities, which means that the breeding habitats (along the North Sea coast: humid dune slacks - habitat type 2190) must be kept open. *B. calamita* is an indicator of the intensity of stress level of the habitat. If the humid dune slacks are managed the right way by vegetation cutting and/or grazing, there will be microhabitats with the right height of vegetation and the right microclimate. Further, breeding waterbodies must be temporary, very shallow and fully exposed to the sun. *B. calamita* breeds only in very warm and shallow waters, which optimally dry up in July-August to avoid competition from other amphibian species and to avoid predation from fish and insect larvae. Further, the environment in the breeding waters must to some degree be turbulent. The tadpoles of *B. calamita* feed on algae growing on grains of sand and clay. The turbulence of grazing cattle or sheep stepping in the breeding water will keep vegetation absent and keep a high concentration of algae on sediment particles securing a high growth rate of tadpoles. An open terrestrial habitat (along the North Sea coast: decalcified fixed dunes with *Empetrum nigrum* - habitat type 2140 - and their mosaic of Northern Atlantic wet heaths with *Erica tetralix* - habitat type 4010) is necessary for *B. calamita* in order to forage and sandy areas are preferred by the species to dig in and hide easily during daytime and hibernation.

The strategy concerning *Rana arvalis - striata* has to be more general, as the knowledge about the species distribution and population sizes along the North Sea coast still is limited. Therefore the succession status of potential breeding and foraging habitats in combination with the occurrence of breeding success within approx. 1 kilometre distance are the key elements in the strategy. The priority is to optimise the conditions for local breeding populations by managing the breeding and foraging habitats. *Rana arvalis* requires breeding ponds with low nutrient level and rather open foraging areas in dunes, heathlands, and heath-bugs.

The strategy concerning *Pelobates fuscus* must focus on appropriate breeding and foraging possibilities at any place where the species is found, as the number of findings of this species along the North Sea coast is very limited.

MANAGEMENT MEASURES

Within the project areas, six measures have been recommended:

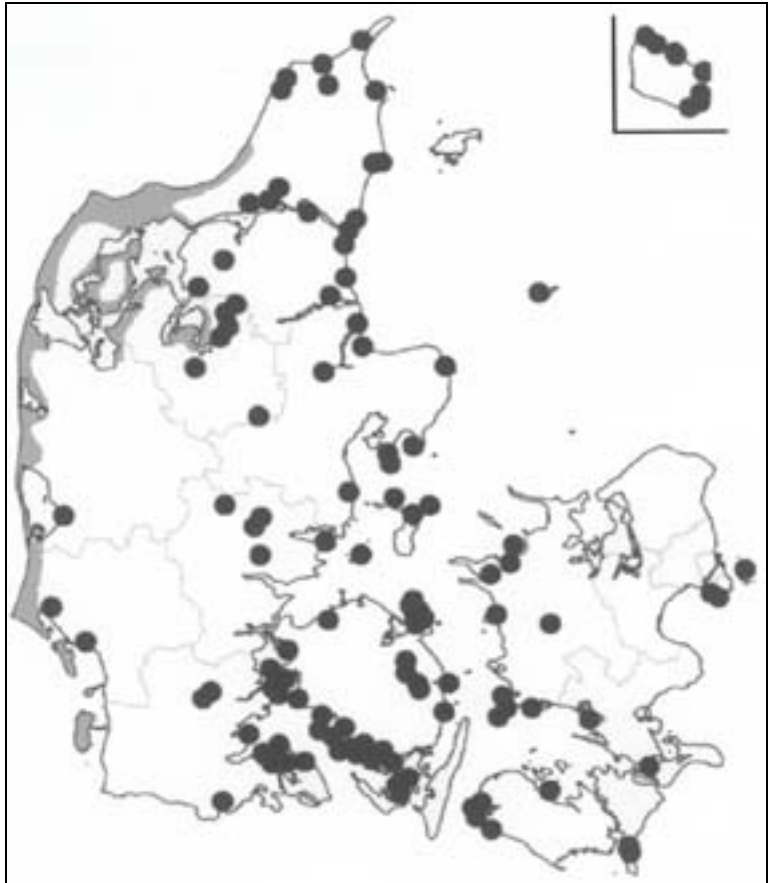
- Pond digging, where it is considered to be vital for securing the breeding conditions for *P. fuscus* and *B. calamita*. The measure will in addition improve the breeding conditions for *R. arvalis*.
- Scraping, where it is considered to be vital for securing the breeding conditions for *B. calamita*. The measure will in addition improve the breeding conditions for *R. arvalis*.
- Shrub removal, where it is considered to be vital for the foraging conditions for *P. fuscus*. The measure will in addition improve the foraging conditions for *R. arvalis*.
- Bank cutting, where it is considered to improve the breeding and foraging conditions for *R. arvalis*.
- Grazing, where it is considered to be vital for securing the foraging and breeding conditions for *B. calamita* and considered to improve the breeding and foraging conditions for *R. arvalis*.

- Burning in areas, where the measure is considered to improve the foraging conditions for *R. arvalis*.

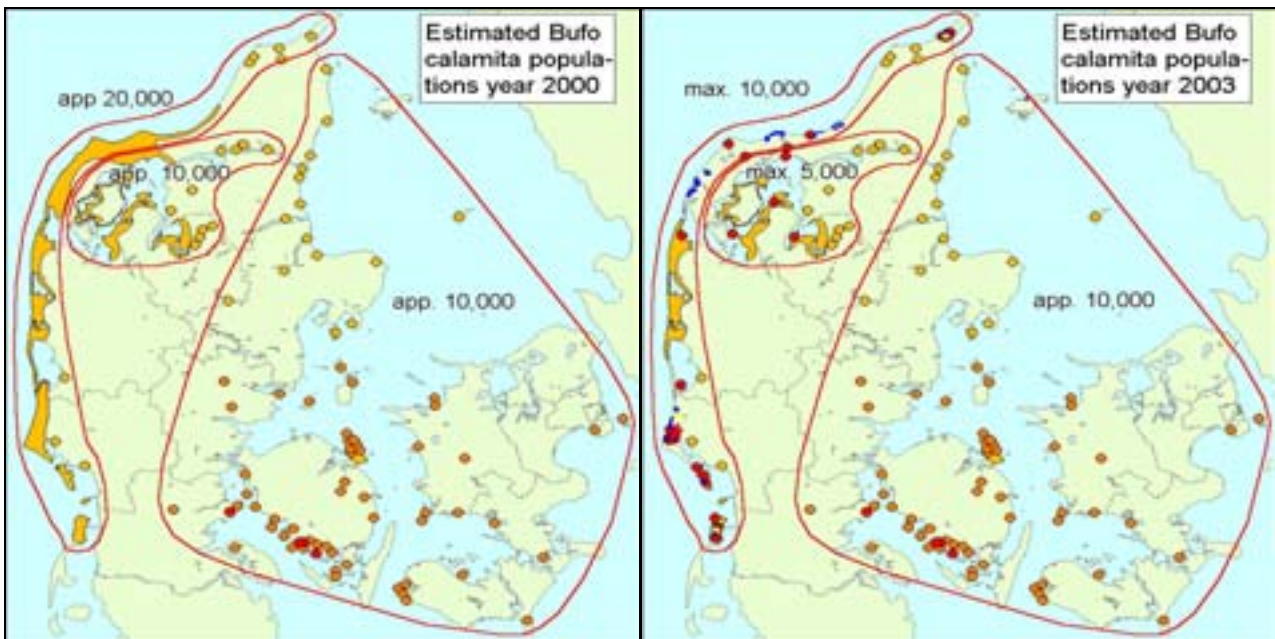
EVALUATION OF MANAGEMENT MEASURES AND LONG TERM REHABILITATION STRATEGY

In 2005 the effect of the performed management measures will be evaluated by intensive field monitoring of amphibian breeding success. The evaluation will serve as baseline for the elaboration of rehabilitation strategies and instructions for future management to secure viable populations of primarily *Bufo calamita* and *Rana arvalis* in the Habitat sites along the Danish North Sea coast.

ANNEX I: OCCURRENCE OF *BUFO CALAMITA* IN DENMARK:



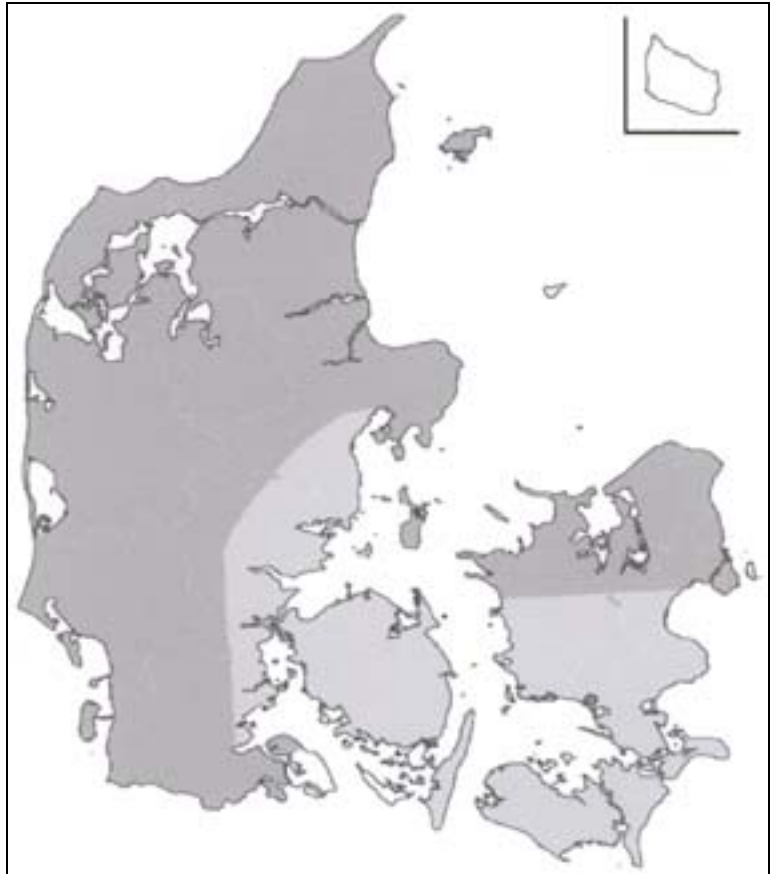
Occurrence of *B. calamita* in Denmark after 1990. In accordance to "Nature types and species included in the Habitat Directive - Initial mapping and interim assessment of preservation status" by National Environmental Research Institute.



Estimated populations of *Bufo calamita* when the LIFE project started in year 2000 - estimation by National Environmental Research Institute and Amphi Consult

Estimated populations of *Bufo calamita* after monitoring counties with LIFE project areas in 2001 to 2003 - estimation by Amphi Consult

ANNEX II: OCCURRENCE OF *RANA ARVALIS* IN DENMARK:



Occurrence of *R. arvalis* in Denmark after 1990. In accordance to "Nature types and species included in the Habitat Directive - Initial mapping and interim assessment of preservation status" by National Environmental Research Institute.

ANNEX III: OCCURRENCE OF *PELOBATES FUSCUS* IN DENMARK:



Occurrence of *P. fuscus* in Denmark after 1990. In accordance to "Nature types and species included in the Habitat Directive - Initial mapping and interim assessment of preservation status" by National Environmental Research Institute.

The use of prescribed fire in restoration and maintenance of protected Atlantic heather vegetation in dune ecosystems of the North Frisian islands and other protected areas on Schleswig Holstein mainland

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Abstract

The project aims to investigate the effects and test operational procedures of prescribed burning in the maintenance of diverse heather species associations and succession stages in Atlantic heathlands of Northern Germany. The project was initiated in 2002 and will continue from 2003 onwards on a regular basis

The use of prescribed fire in diverse heather species associations and succession stages in the nature conservation areas of Northern Frisia (Nordfriesland), Schleswig-Holstein State, Germany, aims to substitute cost-intensive mechanical treatments and to restore historic burning practices

Since 1984 a variety of tools for heathland management have been used large-scale in the management of old, matured and grass-dominated stands of *Calluna vulgaris*, e.g., by mowing, mulching, grazing and swiping. The aim of these methods is to preserve different succession stages. In some of the nature conservation areas these practices produced a mosaic of different development stages of the heather vegetation. For technical, financial and nature conservation reasons it is now aimed to combine the above-mentioned management tools with prescribed fire.

The use of heavy machinery is limited due to the vulnerable features of the terrain: The impact of heavy equipment would destroy microclimatic structures which are vital for a number of species.

The first prescribed burns took place in late summer of 2002 in different types and degradation stages of heathlands. It was important to gain local experience as the fire characteristics are completely different, due to other climatic conditions, from heathland-fires in other regions of Germany.

At this stage there are no results yet to be published. After this first steps it is planned to establish prescribed burning as a heathland management tool in winter 02/03 and summer 2003 on a regular basis. Technical and scientific implementation of the project is in the responsibility of the Fire Ecology Research Group / Global Fire Monitoring Center (GFMC), Max Planck Institute for Chemistry, Freiburg, Germany.

Monitoring programmes - intensive

Professor Ib Johnsen, University of Copenhagen

University of Copenhagen is involved in studies aiming at disclosing advantages and disadvantages of the methods applied to re-establish and maintain the coastal heath in Denmark. The focus has been on the above ground vegetation and its resilience to recover from a number of adverse developments and effects.

The presentation includes some preliminary results of the ongoing and previous studies (Hulsig Heath, Anholt) and gives an outline of the type of conclusions to be expected with regard to ideal management practices. Pictures of the plant communities and flora descriptions shall be provided to describe the wanted and unwanted outcome, respectively.

The methodological challenges for the ecologist to characterize the highly composite and complex coastal heath ecosystem are discussed. Some of the questions to be addressed are the need for managers and researchers to communicate and exchange experience and ideas, as well as to collaborate in conveying information to the public on the relevance and importance of this LIFE project and the unique quality of coastal heath nature in general.

Abstract

Searching for key-factors to restore characteristic flora and fauna communities in coastal dunes

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Dunes are highly dynamic and diverse environments. The combination of dry and moist spots, north and south exposed slopes, open and dense vegetation provide a mosaic of different biotopes. Due to succession and succession reset by sand movement or by local disturbances many plants and animals co-occur, each characteristic for a certain successional stage or a combination of stages.

In the Netherlands and other parts of NW-Europe, acidification and eutrophication (due to increased nitrogen deposition), drainage and changes in land use cause accelerated vegetation succession in coastal dunes. This results in encroachment by tall grasses and bushes. Open and species rich vegetation stages are hardly found. The lack of variety has negative consequences for the resident fauna. Many insect species, especially larger ones, decrease in numbers. As a consequence bird species that depend on these insects as a food source - such as European Nightjar, Montagu's Harrier and Red-backed Shrike - have disappeared from the Dutch coastal dunes.

Restoration measures which are taken in the Dutch coastal dunes are mainly focussed on the characteristic dune vegetation. References for authentic vegetation and knowledge of individual plant species requirements are available. Taken measures to restore the vegetation are therefore quite successful. However, only little knowledge is available for fauna species and a reference (including complex ecological relations and interactions) is missing. The success of taken measures on fauna communities in coastal dunes is hardly studied, but is expected to be limited.

In former research it was found that breeding success of Red-backed Shrikes (*Lanius collurio*) depends on a high availability of larger insects and small vertebrates. This makes the Red-backed Shrike a good indicator of faunal diversity. A comparison was made between the diet of the last breeding Red-backed Shrikes in the Dutch coastal dunes (1997-1998) with that of a vital shrike population in the dunes near Skagen, Denmark (2002-2003). Studying the ecology of important prey species of the Red-backed Shrikes helps to understand the key-factors for restoring characteristic flora and fauna communities of coastal dunes.

The Sefton Coast LIFE Project:

A conservation strategy for the sand dunes of the Sefton coast, north west England

Paul Rooney

Senior Lecturer, Liverpool Hope University College
(Project Officer, Sefton Coast Life Project 1996 – 1999, Sefton Council 1987 - 1996)

Introduction

The total area of dunes in Great Britain, not including blown sand deposits already lost to development, is about 56,000 hectares. The total dune area in England is estimated at 12,000 ha. (Doody, 1991).

The Sefton coast lies between the Mersey and Ribble estuaries in north west England. Despite loss to development it is still the largest area of open dune landscape in England, and one of only six sites in Great Britain with more than 1000 ha. of dune habitat (Doody, 1991). The main dune system is c.17 km long and up to 5 km wide, comprising a total area of approximately 2000 ha. High rolling dunes near the coast are backed by sandy plains and heathland and low-lying agricultural land overlying earlier deposits of sand.

Much of the remaining area of the Sefton dune coast is now a candidate Special Area of Conservation (cSAC). The designation brings with it particular obligations for the conservation of important habitats and species. Two of the dune habitats present are listed as ‘priority’ in the EU Habitats and Species Directive 92/43/EEC. These are fixed (grey) dunes (Corine Code 16.221 to 16.227 Fixed dunes with herbaceous vegetation) and dune heath (Corine Code 16.23 Eu-Atlantic fixed dunes, *Calluno – Ulicetea*). Species occurring on the Sefton Coast and listed in either Annex II or IV of the EU Habitats and Species Directive include petalwort *Petalophyllum ralfsii* (a bryophyte), great crested newt *Triturus cristatus*, natterjack toad *Bufo calamita* and sand lizard *Lacerta agilis*.

Threats to the dunes and the need for management

The dunes of the Sefton coast have suffered similar problems to many other dune sites across Europe. Until recently the dune area covered more than 3000 ha., but residential development, afforestation, industry, military sites, roads, golf courses and holiday parks have considerably reduced this. Pressures from housing development and uncontrolled recreational access led to widespread environmental degradation during the 1960's and 1970's. In 1978 the Sefton Coast Management Scheme was established (Houston and Jones, 1987) to tackle the problems resulting from uncontrolled human use of the dunes.

The Sefton Coast Management Scheme was a working, voluntary partnership of land managers co-ordinating their actions and agreeing objectives for the whole coastal area. It was successful in tackling years of neglect, in repairing recreational damage, establishing nature reserves and developing skills in habitat management. Initial efforts were targeted on sites designated for nature conservation. The Sefton Coast Management Scheme re-birthed itself as the Sefton Coast Partnership in 2000. This development resulted in changed relationships between the original core partners and a concerted attempt to increase the active partnership membership.

The Sefton dune coast today is managed mainly for nature conservation, coastal defence, sport and amenity. Sefton Council (local government) is the largest single land owner, with English Nature (statutory agency), the National Trust (non-governmental organisation) and the Territorial Army responsible for other substantial areas. Golf, with seven individual courses, is a significant land use within the dune area. Land ownership and land uses create a variety of habitats and a range of intensity of use often benefiting nature conservation, but also present a challenge for the integrated management of the whole dune system.

The Sefton Coast Life Project

By the early 1990's the Coast Management Scheme partners realised that it was important to look beyond the safeguarded sites to the whole dune coast and coastal resource. The recognition of the urgent need for additional nature management led to an application by core partners in the Coast Management Scheme to the Life-Nature Fund, and funding was secured to assist conservation efforts on the dune coast and in particular the preparation of a conservation strategy for the sand dunes of the Sefton coast. The bid was approved in July 1995. The Sefton Coast Life Project was operational between September 1995 and June 1999, with an active project team between February

1996 and March 1999. The project operated with a total budget of over 1 million Euros, and was co-financed by the Life-Nature Fund.

The main aim of the Project was to develop a strategic plan to manage the whole of the Sefton Coast c.SAC by consolidating management planning, improving conditions for key species and carrying out management actions to protect duneland habitats whilst also raising awareness and support amongst visitors and locals. In particular, the project was expected to

- support the purchase of key sections of the coastal dunes and heaths
- establish nature reserves over the most sensitive locations
- develop educational and information trails at appropriate sites
- develop nature conservation management plans in co-operation with golf course managers and other landowners
- undertake habitat restoration and species recovery actions
- organise workshops and a symposium to share the experiences of this programme with managers of similar dune SAC's across Europe.

The aims of the Sefton Coast Life Project may be summarised as follows:

- to prepare a nature conservation strategy for the sand dunes of the Sefton Coast
- to undertake emergency actions, purchase land at risk and carry out practical management work
- to achieve sustainable habitat management through conservation management plans, species and habitat strategies and the development and dissemination of best practice in dune management.

Project Achievements

During the operational period of the Life Project the aims and all specific actions required were met in the areas of strategy preparation, land purchase, practical action for habitats and species, management planning, dissemination, information and monitoring.

Notably, the project team experienced unexpectedly high levels of success and support when working with golf course and military land managers. A European Symposium was held during

September 1998 and the proceedings published. The Symposium and proceedings provided a substantial contribution to European coastal dune management practice.

The Project received a special award from the EU during Life week in 1999 for 'Projects Demonstrating Best Practice in Dissemination'.

Remaining challenges

Following the successful implementation of the Sefton Coast Life Project, concerns still remain for the quality and use of the sand dunes of the Sefton coast and the sustained success of the Sefton Coast Partnership.

In terms of habitat quality, the lack of extensive grazing over most of the dune system accelerates the rates of seral succession, producing increased vegetation cover with a trend towards scrub and woodland especially on the fixed dunes. With this change there is evidence of decreased species diversity (Edmondson et al., 1993) and changes in soil type and structure (James, 1993). Without management intervention this process will increasingly threaten the EU priority habitat types of fixed dunes and dune heath causing them to be squeezed out completely.

The effects of conifer plantations and coastal erosion may further reduce dune processes, and enhance the fragmentation of habitats and the loss of species at some sites. Small fragmented areas are more difficult to conserve than large complete areas.

The trend of increasing recreational use on the dune coast has the potential to put severe pressure on recreation management infrastructure, operation of natural processes, and the sustained survival of habitats and species.

Public understanding of dune processes, coastal change and the need for management is still generally poor. As emergency habitat restoration schemes often necessitate a dramatic landscape change and sometimes the use of large and heavy machines, they are a source of conflict between members of local communities and the dune managers. Conflict resolution diverts scarce resources away from conservation management.

Perhaps the most substantial challenge is for the re-birthing Sefton Coast Partnership to sustain the success and achievements of the Sefton Coast Management Scheme and the Life Project, whilst also meeting new challenges as they arise.

Conclusions

The Life Project built upon the established success of the Sefton Coast Management Scheme. It achieved its targets and made lasting contributions to coastal dune conservation, particularly in disseminating best practice, securing threatened land and engaging golf and military landowners in action for nature conservation. The Project assisted a broad range of landowners to move towards the achievement of favourable conservation status for the features of international conservation value on the Sefton coast. The process of achieving this movement was a valuable as the movement itself.

However, significant challenges remain for the quality and management of dune habitats and species. The Life Project primarily worked towards the improvement of conditions on the Sefton coast, but was at the same time firmly European in outlook, action and product. As the Project was time limited, it is now for the Sefton Coast Partnership to take forward the experience and outcomes of the Sefton Coast Life Project and to sustain action contributing to the delivery of favourable conservation status.

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Conservation and re-establishment of southern Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix* and dry coastal heaths with *Erica vagans* and *Ulex maritimus* in south west England and north west France

A project supported by the LIFE programme of the European Union. Contract No: B4-3200/95/857 (1995 - 1998)

Victoria Whitehouse, Conservation Manager, Liverpool Hope University

Project Delivered by:

RSPB - Royal Society for the Protection of Birds

CWT - Cornwall Wildlife Trust

SEPNB - Société pour L'Étude et la Protection de la Nature en Bretagne

Objectives:

The three main objectives of the project are:

- To produce sustainable heathland by increasing its area and reducing fragmentation, by practical measure and advisory work.
- To acquire former heathland for re-establishment of heathland habitats and to retain such areas in nature conservation ownership and management.
- To provide an interchange of information on heathland management and re-establishment techniques between SEPNB (France), RSPB and CWT (UK) and the wider conservation community.

CWT Abstract: Heathland re-creation and management: the farming response in Cornwall

Agriculture in the United Kingdom is within a period of economic decline. The strong pound, BSE regulations, Over Thirty Month Scheme (OTMS) and falling milk prices continue to exert significant financial pressure on the Cornish farmer. Of the heathland sites identified by the Southern Atlantic Wet Heath Project, 81% are owned by farmers. The decision whether to enter land into a heathland management or heathland re-creation programme is ultimately theirs, being based upon managerial, sociological and economic factors. It was within this complex situation of pressures that the heathland project was established. This paper discusses the agricultural situation in Cornwall and the response of farmers and landowners to the Southern Atlantic Wet Heath Project. Success or failure as measured by adoption of heathland management/re-creation is dependent upon the landowners' perception of the heathland resource and the economic viability of its management.

Two zones were identified within Cornwall for heathland management and re-creation: the Carrick heaths and the Lizard heaths. A proactive approach was adopted, identifying and targeting owners of lowland heath sites. Such areas were surveyed and assessed for management and re-creation potential. Advice was provided to landowners and assistance offered in securing Agri-environment funding through the Countryside Stewardship Scheme (EC Agri-environment measure 2078/92 and 746/96 as amended) to support heathland management and other landscape and conservation works. Where schemes were adopted, management plans were produced.

The success of the proactive approach and adoption of heathland management by the landowner was found to be dependent upon the economic position of the farm. In Cornwall, agricultural

viability is closely related to geophysical and climatological conditions which restrict the range of agricultural enterprises possible, limiting economic potential of the farm. Proposals on mediating the economic requirements of modern agriculture with heathland management and heathland re-creation are explored within this paper.

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Protection and management of coastal habitats in Latvia

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LIFE-Nature project "Protection and management of coastal habitats in Latvia" is managed by Faculty of Biology, University of Latvia. Project duration: 2002 - 2005. Project area is the Baltic Sea coast in Latvia - an approximately 300 m wide coastal belt beginning from the waterline in the terrestrial direction. The sea coast in Latvia extends over 490 km.

The sea coast in Latvia holds great biodiversity. A threatened habitat can be found in almost every part of the sea coast of Latvia. Project aims at direct conservation measures for 23 habitat types listed in Habitats Directive, and 9 habitat types according to the Bern Convention. The most endangered habitats are: sandy beaches, embryonic, white and grey dunes, coastal grasslands and boreal forests. Most of the habitats are particularly sensitive and attractive for recreation. Areas of grasslands and grey dunes are decreasing due to overgrowing and tree planting. The greater part of the coastal protection belt likely will become NATURA 2000 sites by accession of Latvia in European Union.

Main activities of the project include mapping and evaluation of habitats; various restoration and management measures of endangered habitats; management plans for protected nature areas; public education.

Problem that threatens the conservation of coastal habitats in Latvia is a low level of information on the locality, value and necessary protection of these habitats. Even municipalities don't know which habitats are valuable and which are not. Often, houses, car parking places, camping sites are being built in areas of endangered habitats. Less valuable habitats could be chosen for building, leaving the endangered habitats untouched.

Therefore, the key activity of the project is the mapping and evaluation of habitats. Habitat map shows: habitat types; area of each habitat; value (which habitats are more valuable and which are less valuable); disturbances (invasive species, wastes etc.); necessity for the restoration and/or management; status of protection (is this habitat protected and are there protected species?).

Habitat maps are elaborated on background of orthophoto maps with 1 m and 0.25 m spatial resolution. Potential habitat borders are digitised. Experts visit every site, check and evaluate each habitat and its borders. Then, the checked habitat borders are edited in computer and attribute database with habitat parameters is created.

After the habitat mapping, functional zoning is being elaborated. Functional zoning is a map which shows appropriate regime of protection: which actions are necessary, allowed and forbidden in every single site. Examples of functional zones: zone for recreation; zone for landscape protection; strictly protected nature reserves etc.

Functional zoning is the background for sustainable development of the coastal protection belt. According to functional zoning, municipalities can use the less vulnerable areas for commercial activities. At the same time, the network of protected nature areas can be developed and endangered habitats and species can be conserved and maintained.

More information about the project: <http://piekraste.daba.lv/>

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The conservation of sand dunes in the Atlantic Biogeographical Region: the contribution of the LIFE programme

John Houston, Ecosystems Ltd

Abstract

Coastal sand dunes in Europe cover perhaps 1% of the total land area with a total of c.500,000 ha¹. They are areas of high biodiversity but only a few areas are strict nature reserves; most dune systems serve multiple functions and several threats remain, including total loss through development pressures. In terms of management the debate over the past two decades has been to introduce the 'dynamic approach' to dune management at various levels; understanding and working with natural processes for the benefit of nature and society. A series of LIFE projects have helped to address many of the current issues affecting dune systems throughout Europe and develop best practice in habitat management and through networks such as EUCC the dissemination of this experience has reached the dune management community. The next step may be to use the completion of the Natura 2000 lists as a catalyst for encouraging a more co-ordinated approach to networking and for raising the key issues affecting dune systems at the pan-European level.

¹ Van der Meulen, F: 1997. Management and dynamics of coastal dunes in Europe and France. In: Biodiversité et protection dunaire. Proceedings of LIFE-Environment conference in Bordeaux 17-19 April 1996.

Group discussion conclusions

Group A: Public vs. private ownership of land

Main points:

1. Running costs are a problem on both types – conservation orders and subsidy schemes need to be long-term in order to allow sufficient time to get properly started
2. The convincing power of the authorities towards the private owners is crucial to a successful protection
3. It is important to get things started and show results quickly
4. Information about the possibilities for management and subsidies should be carefully timed
5. Promotion of issues attracting several segments of landowners is often helpful
6. Voluntary agreements should generally be preferred to orders
7. Regular information to landowners about news and developments in protected areas can be very useful
8. Land redistribution is an option to be used when the public organisation has some other land of no protection value in the area

Group B: Management and rehabilitation practices, including long-term impacts

Introduction

An overview was made of management topics that needed discussion in the opinion of the participants in this session. The few hours available for discussion was too short to tackle all topics on the list. Therefore, the removal of top soil (sod-cutting), restoration of hydrology and the use of heavy machinery were hardly discussed. In this summary, all topics will be described shortly. At the end some general remarks are given.

Topics

1) Dealing with invasive plant species / cutting of conifers and firs

Invasive plant species are – planned or by accident - introduced by man, after which they are able to colonise a larger area. Main discussion items were the planting of coniferous trees, especially Mountain Fir (*Pinus mugo*) and Japanese Rugosa Rose (*Rosa rugosa*). Also the vigorously growing moss species *Campylopus introflexus* (originally from South-America) is a big issue, at least in The Netherlands and Germany, as this moss species has a southern distribution and has only recently reached Denmark.

The main question is in which stage to act in dealing with invasive species. To destroy invasive species from the start (on and on again) is time consuming and expensive. When the invasive species becomes more dominant there is however a chance that changes to the system are irreversible, but experience or knowledge about this subject is scarce. When the goal of the measurements is to restore the ecosystem, all organic material built up by the invasive species should be removed together with the plants or moss.

Also native species (like Birches (*Betula* sp) or Purple Moor-grass (*Molinia caerulea*) in dunes, heathland or peatmoor) can become a threat for the ‘original’ biotope, especially under influence of

nitrogen deposition. The question to which densities native plant species may encroach (as ‘natural’ process) before taking measures is delicate and there was no consensus about this.

2) Use of prescribed fire

Fire can be a cheap and efficient tool to put back vegetation succession, though not under all circumstances. The composition, height and density of the vegetation, time of year and weather conditions before and during burning are all important factors. Since burning as a management tool has been out of the picture in NW-Europe for several decades, it is necessary to build up experience and knowledge again. When experienced, one can use fire as a subtle tool, by changing the intensity of fire and burn in mosaics. In this way it is possible to create heterogeneity on a small scale, and important plant and fauna species will survive the measure. Fire is successful in removing trees and shrubs, but only when enough undergrowth is present which can act as running fuel for the fire. When vegetation is too dense (e.g. with tall grasses) fire is not an option. In this case a ‘slash and burn’ technique may be useful. Also very important: burning is not a 9 to 5 job! To reach the expected results it is necessary to give the fire enough time to do its work, even when it takes a few days.

3) Grazing

Time was too short to discuss the pro’s and con’s of grazing in detail. Like with fire the results of grazing depend on many factors like grazing pressure, type of grazer (cattle, horse, sheep, etc.), period (summer, winter, all year), frequency, etc., but also on vegetation type and nutrient status of the area.

Grazing has a long tradition in dunes and other (semi) natural habitats and is seen as one of the most promising management tools to remove biomass and create a heterogeneous vegetation. However, the use of grazing as a tool for nature management needs a different approach compared to grazing in the past. Grazing used to be carried out in flocks at daytime, while the animals stayed inside the stable at night. In this format, a shepherd could regulate the flock where to graze and many nutrients were removed from the area as the faeces were dropped in the stables. Nowadays, cattle is often placed night and day inside a fenced area, without regulation and with less removal of nutrients as result. Although the effects of grazing might be more ‘natural’ compared to grazing with a shepherd, it is questionable if the goals of nature management can be reached in this way. Although effects on vegetation are well known and in many cases positive, only little is known about the effects of grazing on fauna species.

4) Improving dynamics vs. coastal defence

All participants agreed that lack of dynamics is one of the most serious threats for coastal dune systems. However, coastal dunes often act as a defence system against the sea, which makes the discussion about dynamic management of coastal dunes difficult. Therefore, contact with (local) people about possibilities and threats is a very important item in planning restoration of dynamic processes. Unfortunately, available time was too short to discuss this topic in more detail.

5) Removal of top soil (sod-cutting) and restoration of hydrology

Sod-cutting is a very efficient way of removing nutrients from the system and put back vegetation succession. Especially in moist or wet parts of dune areas, sod-cutting can be very successful since most characteristic flora and fauna species of these sites are capable of recolonisation. Intact or restored hydrology of the area is a constraint for success. Restoration can take place by taking away all drainage systems, or by stopping (natural) leaches to other areas. Effects on flora and fauna seem to be best when water tables are increased slowly in the course of several years, but evidence is scarce. When removing the top soil-layer, effects on fauna seem to be best when the measure is

carried out in a ‘messy’ way (small patches, variation in deep and shallow parts) which creates a mosaic of vegetation coverage and ground relief.

6) Use of heavy machinery

This topic was not discussed due to lack of time.

General discussion

When discussing the possibilities and problems of the management topics described above, one major problem came to light. In many cases of nature management (in and outside dune areas) there is no clear diagnosis of the exact problem, nor of the exact goal to reach. The following general questions rose more than once during the session:

- Is it clear which processes lie underneath the (unwanted) changes, which are visible in the area?
- Is the goal of the project to conserve present natural values or to restore values, which are (almost) lost?
- Is the goal of the project to give the landscape a ‘facelift’ or to restore natural processes (e.g. with the removal of shrubs or trees: in the case of restoration more should be done than just remove the plants)
- Is it known which important nature values (e.g. populations of characteristic or endangered plant and animal species, but also hydrological or geomorphological processes) are present in the area that will be affected by management?

All participants agreed that a good analysis of the present situation of an area is necessary to develop an adequate management plan. In some cases a single management tool will be sufficient, in many cases a blend of (less intensive) tools can perhaps be more effective. In some cases it may even turn out that – under present circumstances of environmental pressure - ‘doing nothing’ is a better alternative than taking measures.

It also turned out that there are as many points of view about nature management as the number of experts that are involved in the process. Especially for managers who are responsible for the measures in the field it is impossible to combine the knowledge of all these experts. Therefore it is the task of experts of all different disciplines to come to a balanced advice for a management plan

Group C: Monitoring and follow-up

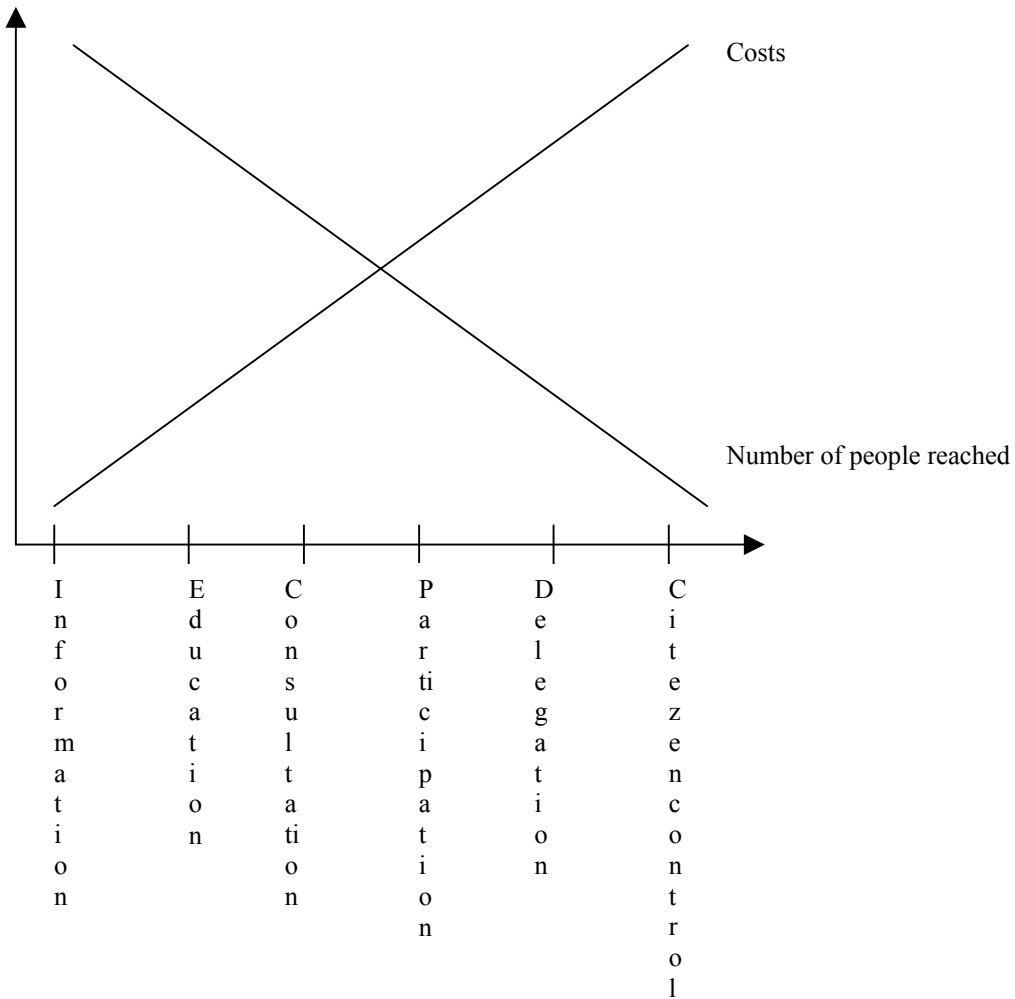
Main points:

1. Monitoring and follow-up should be an integral part of projects
2. It is important to initiate the process with experts, managers and politicians
3. A starting point (baseline) knowledge is necessary, also for early warning
4. Guidelines should be formulated for:
 - a. management practices
 - b. ecosystem structure, etc
5. Monitoring should go hand-in-hand with research on:
 - a. Cause-effect
 - b. Accumulation effects
 - c. Indicators
6. Environmental factors should be included (e. g. N, P, climate)
7. Data should be made broadly available
8. Monitoring should take place at different levels:

- a. mapping of stages occurring
 - b. scale dependency
 - c. time dependency
 - d. species – to ecosystems level
9. collation of common experiences is important; → feedback loops; EU transects, etc.

Group D: Public participation and information

A simple diagram summarises the discussions of this group:



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