



Sand Dune and Shingle Network

Fourteenth Newsletter, April 2012

Linking science and management





Introduction

Paul Rooney

Director – Sand Dune and Shingle Network



Welcome to the 14th newsletter of the Sand Dune and Shingle Network. This edition includes our now regular European update. This year marks the 20th anniversary of the European Habitats Directive

and it is appropriate that we remind ourselves of the importance of taking a European view in nature conservation. The Directive is one of the cornerstones of Europe's nature conservation policy, and achieving its expectations through the Natura 2000 network of sites is important for a healthy and biodiverse environment. The bad news is that coastal dunes remain one of the four most threatened habitat types in Europe, and are in need of urgent action. We will continue to press for and support actions that address this need.

In this edition we include a report by the Countryside Council for Wales on the first steps in a bold scheme to tackle the urgent issue of over-stabilisation of coastal dunes. We are pleased to have had the chance to assist in the initial development of this scheme of works, and look forward to supporting the extension of the project. Continuing the Welsh theme, we are glad to welcome Ffion Redmond as a new member of the Network team based at Liverpool Hope University. Ffion, who is a fluent Welsh speaker, joined us in January as a graduate intern. Read Ffion's article in the newsletter.

Finally, I wish to thank Liverpool Hope University, once again, for providing funds from the Higher Education Innovation Fund to support our work. This latest phase of funding will enable us to work with a statutory agency to draw up common principles and guidelines for the sustainable management of coastal change and flood risk management for coastal dunes. We intend to invite Network members to contribute their opinions and advice through a peer review process for part of this work. Watch this space

The Network team continue to work closely with both Natural England and Scottish Natural Heritage on projects centred on the conservation of coastal habitats, and more activity is planned throughout 2012.

Network News

Charlotte Durkin & Ffion Redmond



Ffion and I have been finalising the work we have been doing for Scottish Natural Heritage (SNH) over the past few months. This has involved analysing Site Condition Monitoring (SCM) survey reports to determine the status of coastal habitats within SSSIs in Scotland.

These surveys assess the condition of protected sites to see whether habitat conditions at different sites are improving, deteriorating or being maintained. Broadly speaking, fixed dunes were in the worst condition while shingle did better with the second fewest number of failures. On page four you can read about a more detailed survey which was recently undertaken on the Scottish shingle resource as a whole. Our analysis of the large SCM dataset has distilled the key messages for each habitat and will help SNH to plan and target management initiatives on a national and local basis.

It has been very useful having Ffion our intern on the Network team as she has provided capacity to complete this work and has made a very positive contribution to all the work we are involved in. Below, Ffion talks about her internship.



At the beginning of January this year I was provided with the opportunity to gain 3 months experience with the Sand Dune and Network Shingle as a graduate intern. This is part of Liverpool Hope University's Career Development service for students who have recently

graduated. I graduated from Hope with a BSc in Geography and Environmental Management last year, and have now moved on to expanding my knowledge by doing a Master of Science in Environmental Management at Hope. I'm already nearly at the end of my internship and the experience has been invaluable as it genuinely feels like I'm contributing to something worthwhile. I have learnt so much working alongside Charlotte, and I've enjoyed it too! From administration, collating and organising data in Excel to more challenging projects such as creating reports for consultancy work for SNH, it has all been valuable. The work ties in closely with my MSc modules, specifically coastal management. It has really given my practical and theoretical skills a boost, as well as better equipping me for this line of employment. Opposite, I have outlined some of the changes taking place in Wales regarding management of the natural environment.

I'r darllenwyr Gymraeg yn eich plith, hoffwn ddweud gair i cyflwyno fy hun. Fy enw yw Ffion ac rwy'n ddod o Llandderfel, yn ardal Y Bala, felly mae hi'n bleser i wybod fod rhai ohono chi'n cefnogi 'r arfordir a'i wahanol amgylchedday pwysig yng Ngymru, yn enwedig y twyni. Mae'r gwaith rydw i wedi fod yn rhan ohoni hefo'r Rhwydwaith yn werth chweil, ac wedi cyfranny'n werthfawr tuag at fy mhrofiaday gwaith. Un dydd hoffwn ddod yn ol i Gymru i weithio gyda cwmni sy'n gweithio tuag at gwella'r amgylchedd. Yn enwedig gyda'r newidiaday newydd i'r CCGC a fydd yn cael ei trafod yn diweddarach yn y Cylchlythy.

Welsh news

At the recent IEEM North West Section meeting, Dr David Parker FIEEM, Director of Evidence and Advice and Chief Scientist at the Countryside Council for Wales was the guest speaker. He introduced the group to some of the changes that are taking place in environmental policy in Wales. As we have our very own Welsh intern, Ffion outlines these changes for us.

Single Environmental governing body for Wales

The Environment Minister for Wales has made the decision to establish a single environment body for Wales. This would bring together the expertise of three agencies, The Environment Agency Wales (EAW), the Countryside Council for Wales (CCW) and the Forestry Commission Wales (FCW). The idea is that this will create a strong agency that can better function and manage the environment and the natural resources that we use, as well as being able to engage with all sectors of society. This conjoined approach is designed to provide better opportunities for organised management on a broader scale, ensuring all aspects of the natural environment in Wales is cared for. It is hoped that the creation of a single governing body will make management more effective and create significant savings which can be re-invested in achieving better environmental outcomes. The new agency is without a name and a consultation on various aspects of its operation is open until the 2nd of May available, here <http://wales.gov.uk/topics/environmentcountryside/consmanagement/seb/?lang=en>.

The Ecosystem Approach

The Convention on Biological Diversity (CBD) describes the ecosystem approach as “a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way”. This approach also encompasses human factors such as social, economic and cultural matters as they are seen as integral components of ecosystems. This serves to strike a balance between the environment’s ecosystems and human needs and development. The ecosystem approach makes explicit the link between the status of natural resource systems and ecosystem services that support human well-being. It seeks to maintain the integrity and functioning of ecosystems as a whole to avoid rapid undesirable ecological change. It also recognises that the impacts of human activities are a matter of social choice, and are as integral to ecosystem interactions as ecosystems are to human activities. The ecosystem approach requires that any choices made between alternative stable ecosystem states and the levels of benefits they deliver should be open and explicit. For any area of land there are numerous stable ecosystem states possible, each with the potential for different combinations of services to reflect the different aspirations and requirements of the local and regional area as well as Wales as a whole. An example of this could be the designation of forest or moorland, both of which can be sustained in upland areas. The choices between these alternate states can be made through agri-environment

schemes to obtain desired service levels, such as carbon sequestration and water quality and storage. To create a better functioning ecosystem service it is best to manage a habitat which provides the most services as possible. If an ecosystem is primarily managed for only one service its ability to produce other ecosystem services is reduced. A forest managed for timber production would have less recreational value, would store less carbon and be less effective at retaining nutrients. Therefore it is imperative that an understanding of the relationships between habitats and the services they provide is understood so as to manage their interactions in the most viable and sustainable way possible. With regards to coastal planning the management of the coast in this sense is difficult due to its dynamic and ever-changing processes, especially so with the advent of climate change and sea-level rise. The ecosystem approach is already being used with Shoreline Management Plans for example in the Mawddach Estuary. The area includes a low-lying village on the coast, Fairbourne, which in future years will face the threat of rising sea levels. The ecosystem approach will look at the sustainability of settlements like this in the context of the whole estuary and attempt to strike a balance between ecosystem function and social and economic development.



Mawddach Estuary, Wales ©CCW

Ecosystem Approach Post note:

www.parliament.uk/briefing-papers/POST-PN-377.pdf

Rejuvenating Welsh Dunes - Twyni Cymreig Adnewyddol

Mike Howe & Scott Hand, Countryside Council for Wales
David Carrington, Bridgend County Borough Council
Andy Byfield, Plantlife

The plight of Welsh dunes was highlighted in the previous newsletter (Howe & Rhind, 2011), with increasing stabilisation threatening many of our most valued dune habitats and species. Since then, the Countryside Council for Wales has received a grant from the Welsh Government to attempt to reverse this trend. Over the winter period 2011-12, part of the grant has been used to undertake baseline geomorphological surveys on ten of the major dune systems including Llangennith Burrows and Whiteford Burrows on Gower, Laugharne & Pendine Burrows in Carmarthenshire, Brownslade & Linney Burrows and Broomhill Burrows in Pembrokeshire, Morfa Dyffryn and Morfa Harlech in Meirionnydd, Newborough Warren and Tywyn Aberffraw on Anglesey and Gronant Dunes – Talacre Warren in Clwyd. These surveys provide

an essential baseline to determine, on a site-specific basis, the need for dune rejuvenation and identify the most appropriate locations to undertake management work to best effect, the scale of the work required and what method of management to use. Similar surveys have already been undertaken at Kenfig NNR and Merthyr Mawr NNR, both in south Wales (Pye & Blott, 2011a&b).

The grant has also been used to undertake trial management at Kenfig NNR, following the recommendations given in Pye & Blott (2011a), in order to determine the efficacy of the management technique. Following the approval of the Kenfig trustees, and in partnership with Bridgend County Borough Council, who manage the site, and Plantlife, who are overseeing the work, diggers are being used to skim off the vegetation and expose the underlying sand on a 3.6ha plot in the north-western sector of the site (see Figure 1). The hope is that, as well as promoting pioneer habitats within the immediate plot, a plume of sand will be blown into the main body of the dune system to re-establish more dynamic processes. This should ultimately benefit species such as the fen orchid *Liparis loeselii* which is associated with winter-flooded, open dune slacks at Kenfig, where it is on the verge of extinction (Carrington et al., 2010).

Here is a link to the story covered by the BBC
<http://www.bbc.co.uk/nature/17339061>

References

Carrington, D., Hurford, C., Jones, A. & Pankhurst, T. 2010. The fen orchid - a species on the brink. *British Wildlife*, 22: 1-8.
Howe, M.A. & Rhind, P. 2011. Sand dune desperation in Wales. *Sand Dune and Shingle Network Newsletter*, 13: 9.
Pye, K. & Blott, S.J. 2011a. Kenfig Sand Dunes - Potential for Dune Reactivation. CCW Contract Science. 971. Countryside Council for Wales.
Pye, K. & Blott, S.J. 2011b. Merthyr Mawr Warren - Potential for Dune Reactivation. CCW Contract Science. 978. Countryside Council for Wales.
All photos © CCW

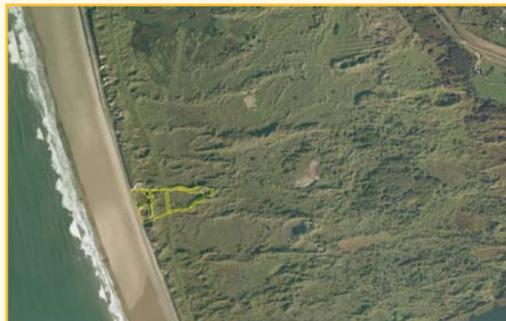


Figure 1. Location of rejuvenation work on Kenfig NNR, winter 2011-12.



Figure 2. The seaward half of the rejuvenation plot, 28th February 2012.



Figure 3. Digger at work, 28th February 2012.

Scottish Natural Heritage (SNH) undertakes validation of Coastal Vegetated Shingle Inventory

SNH recently commissioned GeoData Institute and consultant ecologists (Roland Randall, Jonathan Cox, Ian Strachan and Central Environmental Surveys) to undertake validation of its Inventory of Coastal Vegetated Shingle. The initial inventory (SNH Report CR423) was derived through Aerial Photographic Interpretation supported by ancillary data where it was available (e.g. NVC and SNH shingle database). The current work is validating the inventory through ground survey of the sites identified and identification of missing sites.

In addition to validating the extents of the macropolygons derived during the previous project, surveyors are also enhancing the dataset by mapping the Annex 1 habitats present (H1210 Annual vegetation of drift lines and H1220 Perennial vegetation of stony banks.). A further classification of shingle habitats will also be available which identifies broad classes of shingle vegetation (e.g. shingle saltmarsh, festuca grassland etc).

The survey is using mobile field computing (tablet PCs with onboard GPS, laser rangefinders etc) and is establishing transect

and quadrat locations for use in ongoing monitoring.

When completed, this dataset will form the most comprehensive description of coastal vegetated shingle habitats for Scotland (and will be the most detailed for the UK). SNH project Officer Susan Watt remarked that "The validated inventory will help SNH establish the current extent and condition of coastal vegetated shingle in Scotland and provides the baseline for reporting and ongoing monitoring of these habitats".

The field surveys are now being collated and the project report and validated inventory will be publicly available shortly, with a GIS layer to follow later this year. For further information about the project please contact Andy Murdock, GeoData Institute apm@geodata.soton.ac.uk

Murdock, A.P., Hill, C.T., Randall, R. and Cox, J. (2011). Inventory of Coastal Vegetated Shingle in Scotland. GeoData Institute, Scottish Natural Heritage Commissioned Report No.423



European Dune Network

Sharing experience across borders



20 years of the Habitats Directive



On 21st May 2012 the Habitats Directive will be 20 years old, a milestone well worth celebrating. The Habitats Directive laid down the foundations for establishing Natura 2000, a 'coherent European ecological network of special areas of conservation'. In tandem with the Habitats Directive the EU also established the LIFE fund for the environment. Twenty years on, we can look back to see how much has been achieved but also look forward to the challenges which, if anything, are greater than they were in 1992.

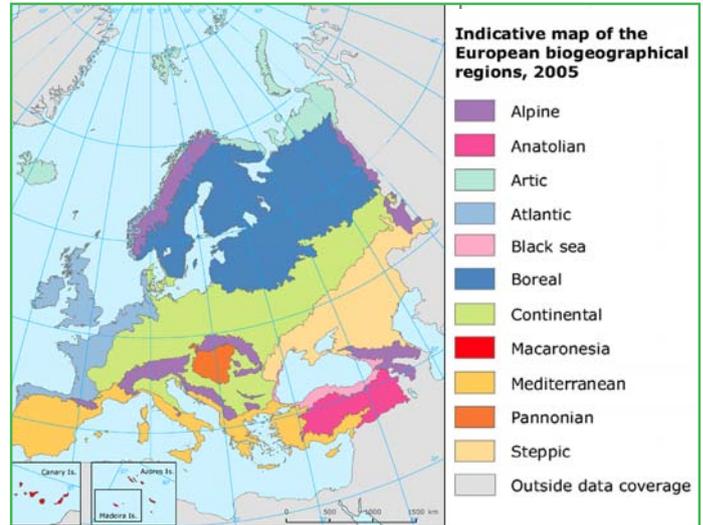
The Habitats Directive is based on a biogeographical region approach to European habitats and European species. Some habitats and species are listed as 'priority'* where the EU has a special responsibility for their conservation or where they are particularly rare or threatened. Taking sand dunes in the UK within the Atlantic Biogeographical Region, the following habitats are listed under 'coastal sand dunes and continental dunes':

- Embryonic shifting dunes
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)
- *Fixed dunes with herbaceous vegetation (grey dunes)
- *Decalcified fixed dunes with *Empetrum nigrum* (2 sites in Scotland)
- *EU-Atlantic decalcified fixed dunes (*Calluno-Ulicetea*)
- Dunes with *Hippophae rhamnoides* (2 sites in England)
- Dunes with *Salix arenaria*
- Humid dune slacks
- *Machairs (only in Ireland)
- *Coastal dunes with *Juniperus* spp. (2 sites in Scotland)

Each of these habitat types is represented in the selection of SACs in the UK, however no sites in the UK have yet been selected for 'wooded dunes of the Atlantic coast'. This is one reason we feel that a discussion on dune scrub and woodland in the UK is topical in relation to this anniversary of the Directive (see page 12 for details of our upcoming conference).

Whilst the designation of Natura 2000 sites gives another layer of site protection above the national protection of SSSI and ASSI it does not in itself bring additional resources for management. The main source of additional funding to help with the establishment of the Natura 2000 network comes from the EU LIFE programme. Across north-west Europe this has provided considerable sums of money to help dune projects in France, Belgium, the Netherlands and Denmark. In the UK to date, only the Sefton Coast in North West England has had significant support through a LIFE project which ran from 1995 to 1999. LIFE funding, however, has been extremely important for supporting European networking and the exchange of experience between countries.

Natura 2000 combines Special Protection Areas designated through the Birds Directive of 1979 with sites identified



©European Environment Agency

under the Habitats Directive to form the largest conservation network in the world. The most recent total is 26,106 sites covering 751,150 ha, or 17.5% of the EU terrestrial area. With Natura 2000 making up only 7.2% of the national territory, the UK has the lowest percentage of national territory designated of any EU country.

The Habitats Directive also requires periodic biogeographical reports on progress with the establishment of the network and the condition of habitats. The 'Article 17' reports give a snapshot of the state of nature. The most recent 'health check' covered the period from 2001-2006 and revealed that coastal sand dunes remain one of the most threatened habitats with a poor conservation status across all regions in Europe. Work has started on the reporting period for 2007-2012 for reporting in 2013 but we are not optimistic that the status of dunes will have improved.

There is still a need to push forward with the European Dune Network as a vehicle to highlight the continuing threats to European dunes and to promote improvements in practice and policy. Natura 2000 has been a huge success in terms of site selection which has largely been a political process advised by scientists and pushed forward in many cases by conservation NGOs. However, site managers now have to try to find the resources to bring this new map of Europe alive through conservation-led management practices which secure the long term viability of habitats and species. This will be challenging as resources are limited. Networks, partnerships and international projects all have a role to play. The next 10-20 years will be critical for European biodiversity.

For more information:

UK: http://jncc.defra.gov.uk/ProtectedSites/SACselection/SAC_habitats.asp

Europe: http://ec.europa.eu/environment/nature/index_en.htm

Article 17 reporting: http://ec.europa.eu/environment/nature/knowledge/rep_habitats/index_en.htm

Coasts of Estonia

Antje Ehrenburg

Estonia is the northernmost of the three Baltic states. It has the sea on two sides: the Baltic Sea Proper in the west and the Gulf of Finland in the north. It has a long coastline of nearly 3,800 km with lots of islands. Estonia is over 45,000 km² (a little bigger than the Netherlands). About half of it is covered with forest: mainly pine, spruce, birch and ash, while a fifth of the country is peat and marshland. There are five National Parks, three of which are coastal ones. The oldest and biggest is Lahemaa National Park on the southern coast of the Gulf of Finland, east of Tallinn.

Excursion

Our excursion was from the capital Tallinn along the northern coast to the west, where we visited some nice dune systems and cliffs. Then we went to an old seaside resort Haapsalu and Matsalu National Park, a vast swampy coastal plain rich in birds, with nice views from a watchtower and a famous birdringing station. Then we drove to Pärnu, an old harbour town in SW Estonia. South of Pärnu near the Latvian border we visited a miles long dune ridge system covered with pine forest parallel to the coast at Rannametsa. The next day we went to the western islands of Muhu and Saaremaa. Here we visited the only sandy beach with dunes on the northern coast of Saaremaa at Murika and a high erosion cliff of Panga. A spit made up of gravel and shingle eroded from the cliff was alas too far away to reach. Passing the biggest town of Saaremaa Kuressaare we drove to about 25 km long Sõrve Peninsula in the south-west. The most southern point Sääre contains every dynamic gravel spit, also with beautiful dune grasslands.

Coasts

At least 8 geomorphic types of seashores can be distinguished in Estonia:

- | | |
|-------------------------------------|---------------------|
| 1) cliff shore | 5) till shore |
| 2) scarp shore | 6) sandy shore |
| 3) rocky shore
(Vilsandi Island) | 7) silty shore |
| 4) gravel-pebble shore | 8) artificial shore |

On the excursion we saw five of them – cliff shore in Rannamõisa (Ordovician limestone) and Panga (Silurian): steep coast where erosion reveals the geological bed rock, gravel-pebble shore in Sõrve, sandy shore with foredunes and dunes in Vääna, Rannametsa and Murika, silty shore overgrown with reed in Matsalu and artificial shore in Haapsalu. In Rannametsa we saw a dune system of different age consisting of two decalcified dune ridges more or less parallel to each other and a former lagoon in between, which is covered with a thick layer of raised bog peat (Sphagnum) today. On Harilaid Peninsula I saw sandy, gravel-pebble and rocky shore: a dynamic spit zone of accretion and erosion.

Scarp shores are wide spread over Estonia and consist of a low gradient between coastal plain and sea, where erosion and deposition take place alternately. Examples: the

coastal plain around Tallinn and most of the northern coast of Saaremaa.



Photo: Dunes of Murika, northern coast of Saaremaa
(©Antje Ehrenburg)

Specialties

The coasts of Estonia are remarkable because they are relatively unspoiled and deserted. This has to do with recent history of Soviet occupation: for almost 50 years the entire coast was a strictly forbidden area for everyone, except only military border guard watchtowers. Since 1991 the coast is a free zone, but even nowadays there are not many (holiday) houses along the coast. This is because Estonia has a law which regulates no building activities within a 100 meter zone from the shoreline on mainland and 200 m in Saaremaa. So the coastal area is well protected. In the future there may be some touristic developments, but I don't expect massive hotels.

Dunes and vegetation

The dunes in Estonia are not very broad nor vast. From beach to inland, they often consist of a low, narrow first dune ridge with vegetation of Marram grass *Ammophila arenaria* in the west, or Lyme-grass *Leymus arenarius* in the north. In some places a narrow zone with open dune-grassland will follow, with Sand sedge *Carex arenaria* and Narrowleaf Hawkweed *Hieracium umbellatum*, sometimes also *Rosa rugosa*, and scattered low bushes of Juniper *Juniperus communis*, gradually getting open pinewood with *Pulsatilla vulgaris*. Then there can be a narrow zone of moist pinewood, followed by the somewhat higher hinterland with pine- or mixed broadleaf woods with understory of lichens, Falseilly *Maianthemum bifolium*, blackberry *Vaccinium myrtillus* and *Trientalis europaea*.

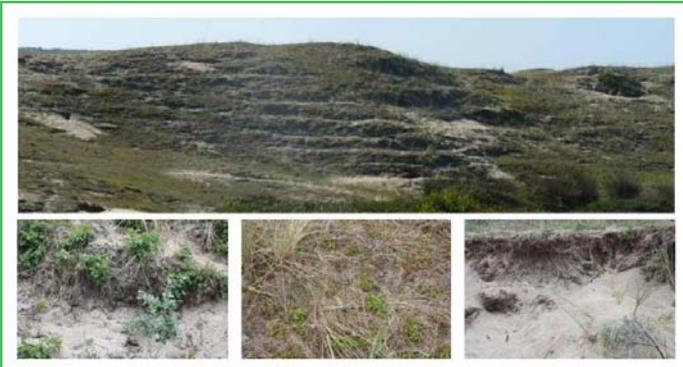
Future

The Estonian coasts are well preserved in 2011. A potential threat could be the increasing acquisition by private owners of parcels of land along the coast, including beaches. For the future conservation of the coasts of Estonia, the country will be challenged to develop a vision on its coasts to enhance a good balance between economy and ecology.

I am grateful to Are Kont and Urve Ratas (Institute of Ecology, University of Tallinn) for the very instructive and interesting excursion in their beautiful country, and their comments on this article.

Invertebrate habitats created by grazing

Terracettes created by livestock: valuable habitat for insects and spiders in Dutch coastal dunes
Bart Wouters & Rienk Slings



Clockwise from top: view of typical terracettes; a steep-sided blowout; comparable vegetated slopes without newly formed sandy patches; a close up of the terracettes

Large parts of the Dutch coastal dunes are grazed nowadays. On steep south facing slopes cattle and sheep can form sandy terracettes. Field observations have shown that these newly created sandy patches are frequently visited by insects, such as bees, wasps, ants and butterflies. We were interested in the importance of these structures as nesting sites for ground breeding insects, so we asked a couple of students to take a closer look.

A comparison was made between terracettes created by cows and sheep with naturally occurring steep-sided blowouts and comparable vegetated slopes (inclination and exposition) without newly formed sandy patches due to livestock grazing. Data was collected by observation and nest counting. The results were as follows:

Observations

1. On average, significantly more individuals were found on terracettes than in blowouts or on comparable vegetated slopes and the same was true (but not significantly so) for the number of species.
2. Bees, bumblebees, ants, butterflies and spiders seemed to have a preference for terracettes.

Nest counting

3. The average total number of nests was highest in blowouts, with 12 nests per m². This was more than one and a half times as much as on terracettes. On comparable vegetated slopes, less than 2 nests per m² were found.
4. Spiders and antlions seemed to prefer terracettes for nesting sites. All other groups preferred blowouts.
5. Terracettes created by cows seemed to a better habitat for ground breeding invertebrates than those created by sheep, with almost twice as many nests per m².

Although trampling by livestock is known to have negative effects, it can also create important new habitat for ground breeding invertebrates in grazed coastal dunes.

Effects of a wild fire in Sea buckthorn scrub

Mark van Til

In the summer of 2004 a wild fire in the Amsterdam Water supply dunes destroyed a small area of sea buckthorn (*Hippophae rhamnoides*) scrub. Fabienne Doveren, student of the University of Amsterdam, studied different vegetation and soil parameters in 2011. Small plots were located in burned scrub and unaffected scrub (control), and were compared with some adjacent grey dune plots (reference). In burned scrub the average number of grey dune species was significantly higher in comparison with the unaffected scrub (14, resp. 7), but not as high as in the grey dune plots (22). Sea buckthorn did not return. A remarkable difference with the reference plots is the open character of the vegetation, which is dominated by the moss *Tortula ruralis* var. *ruraliformis*. Vegetation structure in the burned scrub consisted of an alternation of sand, mosses, low herbs and dead remnants of sea buckthorn; the vegetation can be assigned to the Phleo-Tortuletum *ruraliformis*. The reference grey dune plots show a far more closed vegetation, belonging to the *Taraxaco-Galietum* *veri*. Regarding the soil, all plots have a highly calcareous top soil (pH > 7.5). The organic layer is well developed in the scrub plots (9 cm), whilst the burned scrub and grey dune plots have a thin organic layer (2, resp. 3 cm). Nitrogen content showed no significant differences.



The results illustrate that sea buckthorn scrub can be converted into open, calcareous grey dunes by wild fire. Rabbits which are present in high numbers in the area probably play a positive role in the vegetation development. Red Data Book insect species as the Lesser Marbled Fritillary (*Issoria lathonia*) and the Grizzled Skipper (*Pyrgus malvae*), and the Blue-winged Grasshopper (*Oedipoda caerulea*) turn up frequently and seem to profit from the vegetation change. The recovery of open grey dunes is favourable, considering the large scale transition of this habitat type towards dense grey dunes in the past decades, as a consequence of the introduction of cattle in order to tackle grass encroachment.

Too many barbies on the machair?

Stewart Angus (photos ©Scottish Natural Heritage)

During a visit to the Western Isles in August 2011, I was asked to assess tourism impact in the Uig area of south-western Lewis. There were the usual problems of caravans and motor homes being parked too close to the dune or machair edge (sometimes in very large numbers) and some less than successful attempts to counter the erosion probably caused by this, but overall, the machair illustrated its resilience, even to the extent of great carpets of frog orchids growing within a few tens of metres of a large caravan site.



Until recently, bringing a caravan or even a motor home across the Minch was prohibitively expensive, but the recent introduction of Road Equivalent Tariff has resulted in many of the islands on the west coast attracting (in local terms) vast numbers of motor homes. The numbers on the machair fronts were beyond anything I had previously seen.



Apart from the possible damage caused by the weight of these vehicles at the machair edge and contributions to erosion during access, the most striking aspect of the issue was the very high density of vegetation scars caused by barbecues. This was worst within

the caravan site at Traigh na Berie, but was also evident at Ardrol (Camas Uig), in an area previously inaccessible to vehicles – close to the spot where the famous Uig Chessmen are believed to have been found.



These were the obvious impacts, ones that are likely to lead to erosion by killing vegetation and opening the sand below to windblow, but in windy weather, shelter is often sought behind dunes or in blowouts, where the heat on bare sand will prevent any vegetation growth, thus prolonging erosion problems ... but that sort of impact is more difficult to assess.



There was a notice on the caravan site at Traigh na Berie asking people not to light fires, but it was barely readable. Improved education about the impact caused by these, perhaps with the provision of vegetation shields, would go a long way towards solving this problem. Advice should include a recommendation that they are also used on bare sand to protect the seed bank and root systems of sand-binding plants. The Outer Hebrides are fortunate in attracting the type of visitor who values the environment and who would seldom knowingly cause damage. Indeed, one of the worst cases of barbie-related damage I encountered was above a remote shingle beach, where the mystery of the smell of peat smoke more than ten miles from the nearest house led us to a circle of large pebbles, carefully built to prevent the campfire spreading ... no doubt in complete ignorance of the fact that the soil below the fire was combustible peat!

DUNETOSCA Layman's report in English available

We mentioned in our tenth Newsletter that DUNETOSCA had produced a detailed and interesting report of their LIFE project activity in Italian. This booklet is now available to view for free in English here (http://www.parcosanrosso.org/sites/default/files/LIFE_Dunetosca_low_resolution_en.pdf).

DUNETOSCA have established an Italian coastal dune network to combat dune degradation and to conserve biodiversity. The Migliarino San Rossore Massaciuccoli (MSRM) Regional Park was founded in 1979 with the purpose of protecting 12,500 ha of natural and semi-natural coastal environment. Dune systems make up only 228 ha (1%) of the Park territory, but extreme anthropological urban and recreational pressure is concentrated in this area due to the commercial value of the land and the enormous influx of tourists and economic activity. Through the co-financed funding of the EU and LIFE, DUNETOSCA aims to intervene on coastal economic planning with ecological restoration and conservation.

The Tuscan dunes stretch for 150 km², but have been seriously degraded by several factors from infrastructure developments, re-forestation, and tourism to invasive alien species. The work of the LIFE Nature Conservation project (2005) provided a strategy to refine 2002 objectives of planning, vigilance, promotion, research with the addition of conserving biodiversity, resources and services that ecosystems supply through, ecological restoration, direct land management, environmental communication and scientific monitoring. It is hoped that the quality of dunal and fresh-water habitats of community interest which are under threat will be restored and improved.

Thanks to the project the objectives achieved included a decrease in the presence of the alien *Yucca gloriosa* by 80ha; over 13ha of coastal wetlands have been restored and there has been an increase in the annual permanence of fresh water; the communications strategy has promoted understanding and sharing conservation objectives. This proves how it is possible to achieve positive results in terms of nature conservation even in areas heavily frequented by man.

The European Dune Network newsletter has been compiled by John Houston and Charlotte Durkin, Department of Geography, Liverpool Hope University, Liverpool, L16 9JD.

The newsletter is produced in association with the Coastal and Marine Union-EUCC.

Please contact us on dunes@hope.ac.uk

Websites: <http://www.hope.ac.uk/coast/europe.html> and www.eucc.net



Impacts of a coast protection scheme on sand-dunes in Sefton, northwest England

Philip H. Smith

In September 2011, Sefton Council began a coast protection project involving beach replenishment at Hightown, Merseyside, where housing built in the 1980s is considered threatened by a low rate of dune erosion. The required 30,000 tonnes of sand was sourced from a 4ha dune ridge at Crosby Marine Park, about 5km to the south. Part of the rationale for the scheme was to resolve a long-standing problem of sand-blow from this ridge affecting the park and adjacent properties.

Although not statutorily protected, the Crosby ridge was recognised as a Site of Local Biological Interest, supporting particularly fine examples of mobile and semi-fixed dune habitats. Among over 140 vascular plants was the largest population of the Isle of Man Cabbage (*Coincya monensis* ssp. *monensis*) on the Sefton Coast. This nationally scarce yellow-flowered crucifer is endemic to Britain, being restricted to a scattering of Irish Sea coastal sites between Ayrshire and Wirral (including the Isle of Man) with an outlier in South Wales. The area of dune removed included the whole of the Isle of Man Cabbage colony as well as spectacularly large populations of the regionally notable Sea Holly (*Eryngium maritimum*) and Sea Spurge (*Euphorbia paralias*).



Sand-blow Crosby Marine Park, December 2011 © Philip H. Smith

During December 2011 and January 2012, high spring-tides coupled with unusually severe gales washed away a significant proportion of the sand deposited at Hightown. However, this had the effect of raising the beach level which was a desired outcome. At Crosby, the bare sand exposed by the removal of the dunes blew up to 200m westwards across the park and into neighbouring gardens, while remaining dunes damaged by informal recreation are encroaching onto the Marine Lake. A management strategy for the Crosby dunes is now being formulated, one of its aims being to re-vegetate the damaged areas.



Sand lorry depositing sand at Hightown © Philip H. Smith

Representations by conservation bodies resulted in significant changes to the original plans, including reduced impact on shingle beach plant communities, re-routing a haul road through the dunes to miss rare plants and avoidance of Sand Lizard (*Lacerta agilis*) habitat at Hightown. As part of the mitigations, arrangements were made to translocate some of the Crosby Isle of Man Cabbage population to two protected sites elsewhere on the coast. Over 800 1st-year plants were moved by volunteers in August 2011 but previous experience suggests that high mortality of transplants can be expected and it will be some years before the results can be evaluated.



Hightown erosion & raised beach level © Philip H. Smith

Since the late 1970s, the Sefton Borough Council has gained an enviable reputation for best practice in sand-dune conservation and management. However, some have suggested that this reputation has been compromised by the loss of habitat and other environmental problems arising from this project.

Drought stress and vegetation characteristics on dune slopes

Ruud P. Bartholomeus, Jan-Philip M. Witte and Johannes Runhaar

Bartholomeus RP, Witte JPM, Runhaar J. (2011) Drought stress and vegetation characteristics on sites with different slopes and orientations. *Ecohydrology*, DOI: 10.1002/eco.271.

Droughts will affect vegetation characteristics, which may for instance influence the groundwater recharge rates and the availability of fresh water for e.g. agriculture and drinking water. To anticipate changes in climatic conditions, we need to be able to predict possible vegetation responses to increased drought conditions. In this paper, we introduce an ecologically relevant measure of drought stress and its relationship with vegetation characteristics.

Drought stress depends on soil type and climatic conditions. The effect of the latter can be observed by differences in vegetation characteristics on surfaces with different slope and aspect, where received solar radiation determines the spatial variability in vegetation characteristics due to spatially variable drought conditions. Solar radiation is a key determinant of vegetation characteristics, not only at large spatial scales, but also at local scales where slope and aspect may vary. Higher solar radiation on equator-facing slopes relative to polar-facing slopes results in a higher evaporative demand, and, consequently, drier soils. As a consequence of such dry conditions, the vegetation on equator facing surfaces is more xeric, has a lower aboveground biomass and plant cover, and is more patchy than on polar facing surfaces.

Not only in arid and semi-arid regions, but also in humid areas, small-scale differences in topography and meteorological conditions cause significant differences in vegetation characteristics. It has long been recognised that differences in the proportion of xerophytes are causally connected to drought. This is confirmed by our field data from the Netherlands, showing that the proportion of xerophytic plant species within a vegetation plot is higher on south slopes than on north slopes, and is higher on sandy than on clayey soils. Although other stresses may affect vegetation characteristics as well, drought stress is the most important stress factor for plant growth and primarily determines the vegetation characteristics. Other stresses (e.g. heat stress and nutrient limitation) are often initiated by drought stress. When soil moisture availability is too low to meet the water demand for transpiration, a plant suffers from drought stress.

This definition of drought stress, also called physiological drought, implies that not only water availability but also vegetation's demand has to be considered. Starting from this ecological basis, we focused on transpiration

reduction as the vegetation response to drought stress, thus considering both the supply and demand of water.

We used process-based simulations of reference drought stress on inclined surfaces with different soil type, slope and aspect to get insight into the drought statistics that explain small-scale differences in vegetation characteristics. We used the integrated Soil Water Atmosphere Plant model 'SWAP', to simulate the daily moisture deficit, i.e. the daily difference between potential and actual transpiration of plots. From these transpiration reductions we deduced various drought statistics, such as the average duration, frequency and intensity of drought events.

We introduce a simple, physiology-based measure of drought stress, based on the finding that plants respond to extremes rather than to mean intensities of stress events. Using extremes instead of mean intensities makes information on duration and frequency of stress events superfluous. Focusing on extremes rather than on means is especially important in predicting the effects of climate change, as the frequency of these extremes are predicted to increase. Based on our simulations of drought stress for sites in the Netherlands we found that climate change might increase the future proportion of xerophytes on average by ~15%. Although potential evapotranspiration is predicted to increase due to climate change, actual evapotranspiration is largely determined by the future actual vegetation characteristics, like water use efficiency, soil cover and aboveground biomass. As xerophytes generally have a low aboveground biomass, low cover and high water use efficiency, we argue that the increase in xerophytic vegetation, through altered actual evapotranspiration, may affect the future groundwater recharge. Therefore, in order to analyze climate change effects on the future freshwater availability, it is important to predict the effects of climate change on future vegetation characteristics affecting actual evapotranspiration.

Recently the Netherlands Centre for Coastal Research (NCK) hosted the NCK-days conference at the University of Twente. The NCK is a cooperation of Dutch universities and institutes on coastal research and management. Founded in 1991, the NCK aims at increasing the quality of coastal research in The Netherlands, enhancing the exchange of knowledge to the applied research community and reinforcing coastal research and education capacities at Dutch universities. There are several strands to their research but the proceedings from this Jubilee conference contain several relevant articles on dunes and are available free at the link below

<http://proceedings.utwente.nl/165/1/NCKdays2012.pdf>

They also have a website which has information on their research and outreach activities and looks particularly relevant for anybody involved with the coastal engineering side of sand dune management. nck-web.org

References

Vegetation

Andersone, U. et al. (2011) **The use of nondestructive methods to assess a physiological status and conservation perspectives of *Eryngium maritimum* L.** *Journal of Coastal Conservation*. **15**: 509-522.

Faggi, A. and Dadon, J. (2011) **Temporal and spatial changes in plant dune diversity in urban resorts.** *Journal of Coastal Conservation*. **15**: 585-594.

Mateille, T. et al. (2011) **Plant-associated nematode communities in West-palaearctic coastal foredunes may relate to climate and sediment origins.** *Applied Soil Ecology*. **49**: 81-93.

Peyrat, J. and Fichtner, A. (2011) **Plant species diversity in dry coastal dunes of the southern Baltic coast.** *Community Ecology*. **12**: 220-226.

Nielsen, K.E. et al. (2011) **A Native Species with Invasive Behaviour in Coastal Dunes: Evidence for Progressing Decay and Homogenization of Habitat Types.** *Ambio*. **40** (7):819-823

Santoro, R. et al. (2012) **Effects of Trampling Limitation on Coastal Dune Plant Communities.** *Environmental Management* **49** (3): 534-542
DOI: 10.1007/s00267-012-9809-6

Spalding, A. et al. (2012) **The importance of host plant-habitat substrate in the maintenance of a unique isolate of the Sandhill Rustic: disturbance, shingle matrix and bare ground indicators.** *Journal of Insect Conservation*.
DOI: 10.1007/s10841-012-9470-7

FREE Waugh, J. M. and Aarssen, L. W. (2012), **Size distributions and dispersions along a 485-year chronosequence for sand dune vegetation.** *Ecology and Evolution* (Online first)
DOI: 10.1002/ece3.62

Flood Risk

Anselme, B. et al. (2011) **Storm extreme levels and coastal flood hazards: A parametric approach on the French coast of Languedoc (district of Leucate).** *Comptes Rendus Geoscience*. **343**: 677-690.

Baart, F. et al. (2011) **Using 18th century storm-surge data from the Dutch Coast to improve the confidence in flood-risk estimates.** *Natural hazards and Earth System Sciences*. **10**: 2791-2801.

Cunningham, A.C. et al. (2011) **Extracting storm-surge data from coastal dunes for improved assessment of flood risk.** *Geology*. **39**: 1063-1066.

Suanez, S. et al. (2012) **Dune recovery after storm erosion on a high-energy beach: Vougot Beach, Brittany (France) Review Article.** *Geomorphology* **139-140**: 16-33

Sutherland, J., Thomas, I. (2011) **The management of Pevensey shingle barrier.** *Ocean & Coastal Management*. **54** (12):919-929.

Geomorphology

Bakker, M. A. J. et al. (2012) **Recent Coastal Dune Development: Effects of Sand Nourishments.** *Journal of Coastal Research* (Online first)
doi: <http://dx.doi.org/10.2112/JCOASTRES-D-11-00097.1>

Bramato, S. et al. (2012) **Natural Recovery of a Mixed Sand and Gravel Beach after a Sequence of a Short Duration Storm and Moderate Sea States.** *Journal of Coastal Research*. **28** (1):89-101.

Hart, A.T., Hilton, M.J., Wakes, S.J. and Dickinson, K.J.M. (2012) **The Impact of *Ammophila arenaria* Foredune Development on Downwind Aerodynamics and Parabolic Dune Development.** *Journal of Coastal Research*. **28** (1):112-122.

Jackson, N.L. and Nordstrom, K.F. (2011) **Aeolian sediment transport and landforms in managed coastal systems: A review.** *Aeolian Research*. **3** (2):181-196.

Miccadei, E. et al. (2011) **Geomorphological Features of Coastal Dunes along the Central Adriatic Coast (Abruzzo, Italy).** *Journal of Coastal Research*. **27**: 1122-1136.

Milne, F. D. et al. (2012) **Natural Variability and Anthropogenic Effects on the Morphodynamics of a Beach-Dune System at Montrose Bay, Scotland.** *Journal of Coastal Research* **28** (2): 375 – 388.
DOI: <http://dx.doi.org/10.2112/JCOASTRES-D-10-00115.1>

Morkunaite, R., Bauziene, I. and Cesnulevicius, A. (2011) **Parabolic dunes and soils of the Curonian Spit, south-eastern Baltic Sea coast.** *Baltica*. **24** (2):95-106.

Nuno Martins, V. et al. (2012) **Modelling of coastal vulnerability in the stretch between the beaches of Porto de Mós and Falésia, Algarve (Portugal).** *Journal of Coastal Conservation* (Online first)
DOI: 10.1007/s11852-012-0191-6

Other

Chaaban, F. et al. (2012) **Geographical information system approach for environmental management in coastal area (Hardelot-Plage, France).** *Environmental Earth Sciences*. **65** (1):183-193.

Wouters, B. et al. (2012) **The effect of shifting vegetation mosaics on habitat suitability for coastal dune fauna - a case study on sand lizards (*Lacerta agilis*).** *Journal of Coastal Conservation* **16**:88-99. doi: 10.1007/s11852-011-0177-9

Robins, N. S. and Jones, M. L. M. (2012) **Ecohydrological 'indicators of alteration' – a robust measure of change in dune slacks.** *Ecohydrology* (Online first)
doi: 10.1002/eco.1264

Other events

Dune Scrub and Woodland Conference

12th/13th September 2012

Have you signed up for our conference yet? We had many offers of papers in advance of the first call deadline of 15th March and would like to see more coming in – especially from network members. There will be a poster session and a number of smaller workshops which would be an ideal place to exhibit results from local projects or pilot schemes, MSc/PhD research or for anyone who would prefer a more informal presentation style for their work. Poster sessions are an excellent way of networking and finding out about research or projects outside of the mainstream.

www.hope.ac.uk/dunewoodlands

have all expressed to us how eye opening and valuable the experience has been to them in providing an international context to the work they do in the UK. The guides that we work with in the Netherlands are all at the forefront of dune management in Europe, trialling innovative projects and finding ways to satisfy multiple demands on the dune resource.

This year we will be visiting the Port of Rotterdam and the nature areas which were created to compensate for the loss of habitat associated with the expansion of the port. We will revisit Voorne and Kwade Hoek (details in the occasional paper from 2010 <http://www.hope.ac.uk/coast/occasional-papers.htm>).

We will spend time in the Meijndel dunes, including discussions on the [Sand Motor](#) and the concept of 'building with nature'.

Costs of the trip will be slightly different this year. The hostel we are staying in has a limited number of rooms and single occupancy has a hefty supplement so we are suggesting that people wishing to join the tour book their own accommodation as well as flights. We will therefore charge only £100 to cover the costs associated with travel within the Netherlands (bike, coach) and our own administration time in planning and preparing the trip. Already many professionals from the Netherlands, Germany and Belgium have said they will join the tour so it seems it will be as diverse and stimulating as previous years. Please email dunes@hope.ac.uk if you'd like more information.

Netherlands tour

12th - 16th May 2012

We are now in our 4th year of visiting the Netherlands with our MSc students taking a coastal management module. In the past we have had professionals join us from National Trust, local Wildlife Trusts, Countryside Council for Wales, Natural England, Centre for Ecology and Hydrology, Isle of Man Government. These people

Coastal Ecology Workshop

The Coastal Ecology Workshop will be returning to the north of the Netherlands to celebrate its 20th anniversary, and will be organized by the Community and Conservation Ecology Group of the University of Groningen from September 23rd – 27th 2012. As every year, the workshop is especially intended to present and discuss the research of PhD students and other early career researchers that are working on coastal ecology topics. This year it will convene in De Lauwer, in [Lauwersoog](#), in the middle of National park de [Lauwersmeer](#).

Field excursions will be made to two sites on the mainland coast of Friesland: In Noord Friesland Buitendijks (NFB) participants will visit the experimentally de-embanked site (since 2001) and the large grazing trial currently being conducted (since 2010); in the Peazemmerlannen there is a visit to a 40-yr old de-embanked summerpolder.

Travel to the venue can take place on Sunday 23rd and an optional visit to the island Schiermonnikoog can be made on Thursday September 27th.

Email cew2012@rug.nl to be added to the mailing list and kept up to date.

Dune-baby

We don't often get to make such happy announcements as this...congratulations to Graham and Claire Weaver on the birth of their daughter Genevieve on the 15th February. Graham has been a member and champion of the Network for a long time and both have joined us on a variety of Network events in the past. We'll reserve a place for Genevieve on the members' list!

This newsletter has been compiled by Charlotte Durkin and John Houston

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Cover Photo: Shingle spit in the Culbin Sands SSSI, Moray Firth copyright SNH

The Sand Dune and Shingle Network is based at Liverpool Hope University

