Annotated document key *- Item Conmments Emphasised*

Assessment of the Welsh Governments -

Newborough:
Review of proposals 2013-2015

(original document is* here *)*

* The Welsh Government having first kept the origin of this document hidden ultimately admitted authorship by one of its own officers.

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15 August 2013'

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Abermenai to Aberffraw Dunes SAC/SCI/cSAC (UK0020021): Welsh Government's Review of the Newborough Review of Science in consideration of proposals for shifting dune rejuvenation and hydrological monitoring work for winters 2013-14 & 2014–15

Introduction

This short review considers sources of relevant available evidence, including information from contracted independent professional scientists (e.g. Pye 2013) in addition to the advice of Welsh Government's nature conservation advisory agency the Countryside Council for Wales (CCW) and Forestry Commission Wales (FCW) [both now, from 1 April 2013, within the new Natural Resources Wales (NRW) body], as well as a mix of site-specific (e.g. Ranwell 1958, 1959 & 1960) and more general ecological UK dune science research, generated in the main from discussions held between Welsh Government and involved parties since 2009 under the Newborough Review of Science.

The purpose of the review is twofold - (i) to establish if submissions made by NRW (as CCW) and the Newborough Forest Partnership (NFP) as part of the Newborough Review of Science (NRS) raise any specific objections to the selective felling/dune remobilisation/rejuvenation and hydrological monitoring works proposed for winter 2013 and provide an overview of the proposals, and (ii) to summarise Welsh Government's opinions and present its position on the main arguments laid out in the respective cases presented by CCW and the NFP in the NRS. In both regards it strives to be impartial and objective in its findings and conclusions. In addition, certain contentious issues around the interpretation and implementation of the Habitats Directive relevant to the Newborough debate are briefly discussed.

In other words the WG has appointed itself as the 'independent and mutually accepted' arbitration 'panel' - one officer within the WG Dept. for Natural Resources & Food. So much for the commitment to truly independent arbitration - having to substantiate their claims regarding conservation issues, their science and their interpretation of the HD; to substantiate their claims before an independent panel of sand dune, forest and HD experts.

The following document despite the stated objective of providing an impartial and non-partisan review of information fails in almost every respect to achieve this aim. It is clearly far from objective and fails to review CCW's claims with a critical eye and has by and large ignored and/or failed to check the information provided to the Science Review that criticised CCW's position. There is no clear review or rebuttal of information that was provided in support of opposition to CCW's views.

Key documents scrutinised include: (i) historical Newborough documents held by Welsh Government (ii) Welsh Government's Newborough science pack, distilled from (a) the FCW Newborough FMP 2010-2015, (b) CCW's Core Management Plan (CCW 2008) and (c) Prof. Pye's recent CCW contract science study (Pye 2013).

Background

It has become widely recognised in recent decades that over-stabilisation ('fossilisation'), as an unintended consequence of the success, in part, of earlier erosion countermeasures

(peaking in the mid-1980s) having slowed or frozen natural formational processes, as well as progressive natural consolidation, poses a major long-term threat to the continuity of existence of early-seral stage European Community (EC) Habitats Directive (92/43/EEC) (HD) priority dune vegetation communities and the survival of their associated specialised species dependent on open sand for all or part of their life cycles (Howe *et al.* 2012).

i.e. In other words the conservation agencies consider that there isn't enough open sand in dune systems mostly because of natural successional development of the characteristic plant communities. However, this idea doesn't comply with the UK's sand dune management guidelines regarding bare sand requirements; these CSM standards provide a quality assurance system for UK management of sand dune habitats. Furthermore the action proposed but unspecified in this document fails to apply remedial action to the actual Annex 1 habitat of the SAC where this problem is supposed to exist and ignores the UK standards for sand dune management, the CSM standards.

The Joint Nature Conservation Committee (JNCC) 2nd UK report (2007) on the conservation status of H2120 '*Ammophila* shifting white dunes' habitats concluded that the total UK area (based on remote sensing data) relative to the UK baseline reference was unfavourable due to dune stabilisation, though the report for H2110 'embryonic dunes' concluded the area (extent) of that habitat remained favourable. It is important to stress that the UK reference baseline represents not the habitat area at designation but the viable UK baseline defined by the JNCC.

This conservation status assessment should trigger some serious questions about either the quality or analysis of the remote sensing data or dynamic processes in UK dune systems. If embryonic dune area is favourable what has happened to the associated shifting dunes 2120 that develop from those embryonic dunes? They are colonized by Ammophila (marram) generating new shifting dunes 2120. On the landward side of shifting dunes transformation to fixed dune habitat can only occur where reduced wind dynamics allow. Have there been significant changes to aeolian processes in UK dune systems? The conservation status conclusions regarding shifting dune area & range needs to be queried since the supposed loss has been attributed to dune stabilisation; colonization of shifting dune habitat by plants that are characteristic of fixed dune habitat.

Following on from the Review of Science NRW (as CCW) has advised Welsh Government that for the SAC to move towards FCS and comply with Article 6.1 of the Habitats Directive conifers need to be removed from a limited area in order to re-establish a more intact and naturally active complete zonation (from fore-dune to yellow-dune to dune slack to fixed dunes) and to lessen likely hydrological impacts on groundwater levels affecting wet-slack vegetation in the system.

CCW's advice that there is a need to create additional zonation is not supported by either the actual conservation status of the mobile dunes of the Newborough site nor the specific requirements of the Directive or CSM standards regarding zonation or bare sand/mobility requirements.

Neither the claim of unfavourable conservation status nor the need for additional zonation or hydrological impact by the forest on the humid dune slacks has ever been substantiated and

CCW's statements have never been reviewed with a critical eye by either this author or an independent and appropriately qualified arbitration panel as required by the Science Review.

Appendix I lists the Annex I & II Features at Abermenai to Aberffraw Dunes SAC as submitted to Europe on the Natura 2000 standard data form.

Precedents

Concern about and recognition of the problem of dune inactivity is confined not just to the UK in Europe. Precedents exist for major positive management intervention work focussed on rejuvenating mobile dune habitats in other European Members States (MS), for example the recent large-scale remobilisation in the Netherlands of Habitats Directive dune systems that had become dominated by semi-natural phanerophytic woody vegetation of a type corresponding more closely to Annex I Atlantic Dune Woodland (ADW) than conifer plantation ever could (see section on ADW), involving extensive and whole-scale removal of mature scrub and proto-woodland communities.

The Dutch clearance of semi-natural scrub to create bare sand has little relevance to the Newborough situation. The 'scrub', much of which may well have been Salix repens one of the characteristic plants of the Annex 1 dune habitats, is a rather different scenario from what is present at Newborough a mature woodland that is a non-qualifying habitat within the SAC. In effect the Dutch were restoring existing Annex 1 dune habitat to favourable conservation status. This is not what is proposed at Newborough the clearfelling of woodland to create additional, new areas of dune habitat; an attempt to turn the clock back to a pre-Directive era before the 1940s.

The scientific evidence base for the successful delivery of desired outcomes for works of this kind is developing. In 2012 Welsh Government funded work at Kenfig Dunes NNR (SAC) in Glamorgan to convert a few hectares of priority fixed grey dune habitat (2130) to mobile dune (2120). Although appearing a 'sacrificial' conversion of one European priority type for another the work was justified by Welsh Government because the increase in 2130 at Kenfig post-SAC notification meant conversion would not reduce Annex I habitat areas below the area given at notification. The work is now being monitored.

The Directive is explicit that conservation management should never sacrifice one Annex 1 habitat for another. At Kenfig that key principle has been ignored. The argument that the net effect would still match the SDF document designation area of fixed 'grey dunes' despite the destruction because post SAC designation grey dune area had increased naturally is nonsense and counter to the key principles of the Directive. The Directive requirement is that protected habitat area & range should be maintained or increasing naturally. At Kenfig, having increased naturally that increase in Annex 1 grey dune habitat area has then been destroyed by supposed mobility/conservation measures. The SDF designation area & range is the baseline state and the Directive requirement is that any natural increase in dune habitat area should be conserved not intentionally destroyed.

Overview

SAC Features Monitoring & Favourable Condition Status (FCS)

In the last SAC monitoring round (2005) CCW reported the condition of the Abermenai to Aberffraw Dunes SAC features 1-5 (Appendix 1) to all be unfavourable. For each feature a summary of the conservation objectives, performance indicators and operational limits for factors affecting the feature is contained in the CCW core site management plan (CCW 2008). The conservation status for the features and their management requirements in light of the assessment are summarised in section 5 of the management plan. For a feature to be in FCS then all processes and factors affecting current and future prospects must be controlled.

This statement is incorrect and suggests the author is unfamiliar with the Habitats Directive concept of conservation status. CCW's 2005 survey reports actually reported that all Annex 1 dune habitats with the exception of humid slacks [2190] were in favourable condition comfortably meeting all of their habitat condition assessment targets; targets that in significant ways were set at higher thresholds than required by the CSM standards.

It is important to note that the mobile dune habitats that the conservation agency claims need more bare & mobile sand easily met all of their condition targets [CCW's own assessment, 2005]. Having found each of the Annex 1 dune habitats to be in favourable condition CCW then resorted to a misinterpretation of the CSM zonation target to arrive at a conclusion of 'unfavourable conservation status.'

The humid slack surveys were compromised by poor methodology and use of targets that set higher standards than those required by the CSM standards. The actual condition of humid slacks was therefore unclear. A detailed critique of the survey methods applied in the humid slacks was presented in the Science Review but appears not to have been reviewed by the author.

For SAC feature 1, embryonic shifting dunes (2110), the feature failed largely because the target for the full range of intact zones, i.e. from embryo- to yellow- to fixed dune-types, within the vegetation structure (a Common Standards Monitoring (CSM) mandatory attribute) along 95% of the site frontage was not met, primarily because of afforestation of management unit 20 (CCW database no. 001901), i.e. Newborough Forest. The 95% target applies to the entire frontage, including afforested sections, since the SAC feature naturally extends along the forest frontage as reflected in the designated boundary of the SAC. The identified main action to achieve FCS was the removal of the conifer plantation near the shore in order to restore the natural dune zonation.

The author seems to be suggesting that because there are fringing mobile dunes along the forest margins there must be a hindshore zone of fixed dunes behind this foredune zone of marram dominated mobile dune habitat. This is not true. Mobile dunes depend on a sand supply from the sea and wind to create the characteristic dune profiles. There is no conservation requirement for mobile dune habitats to be backed by fixed dunes. They will function and exist quite happily without zonation and the conservation agency is well aware of this.

This claim that the CSM '95% zonation' target has not been met is spurious and an attempt

to justify felling having found the mobile dunes to be in good condition [after 50+ years of supposed detrimental impact by the forest]. The CSM zonation target requires conservation agencies to take into account existing features of the coastline present at the time of SAC designation; the assessment must be 'site specific' [CSM assessment guidance notes]. In other words if there was a classic hindshore dune system with all of its zonation present at the time the SAC was created then that must be protected and maintained. Where full zonation does not exists at the time of SAC designation this is a 'site specific' feature of the coastal frontage. It is not a reason to fail the site for having not met the CSM zonation target. At Newborough full zonation is only present to the SE of the forest, the Warren. Elsewhere there are salt marshes, Llanddwyn Island, carparks - both the newly refurbished main carpark and residents carpark - roads; the Aber Menai spit AND the forest. All existing features at the time of SAC designation and therefore not places where zonation should be present for conservation assessment purposes. At Newborough all the zonation present at the time of SAC designation is 100% retained.

What NRW are carrying out is an attempt at landscape engineering; an attempt to turn the clock back to a former pre-1940s era and create new areas of dune habitat at the expense of the forest. There is no remit in the Habitats Directive for such an action. The requirement is to protect and maintain the area and range of dune habitat present when the SAC was created. NRW have had to resort to spurious claims of 'unfavourable conservation status' based on the misapplication of the CSM zonation target; the mobile dunes unhelpfully being in good condition.

For the same reason the conservation status of SAC feature 2, shifting Marram 'white dunes' (2120), was also determined as unfavourable.

SAC feature 3, 'fixed grey dunes' (2130) was similarly unfavourable because of the truncation of the natural zonation due to the conifer plantation.

The condition of SAC feature 4, 'dunes with creeping willow' (2170), was favourable at Newborough, but unfavourable for the SAC as a whole.

The condition of SAC feature 5, 'humid dune slacks' (2190), was also unfavourable, due to operational limits for water table targets not being met.

One of the problems with humid slack assessment in the Warren has been a lack of dipwell data - there was no data available from 1997 - 2006. Environment Agency/CEH research has also concluded that hydrological requirements for humid slack habitat are complex and poorly understood and that changes to humid slack habitat can occur without any significant change to the hydrological conditions. Current research is trying to better define the hydrological requirements of wet dune slacks. How CCW have set meaningful water table targets and operational limits for those targets is a mystery. No such target failures were reported in the 2005 habitat condition assessments and water table targets were never cited as a reason for concluding unfavourable conservation status.

Other measures of habitat condition, e.g. positive indicators of floristic composition, were found to generally be satisfactory, but for the SAC overall the condition of the primary Annex 1 features was assessed as unfavourable.

Untitled excerpts from a Review of Science paper on the Welsh Government science pack appear to directly contradict these findings and, confusingly, assert that the Annex I habitats are and have been in 'favourable condition' since the site was notified. There is an absence of supporting information explaining the origin of this material.

The author has obviously ignored or failed to check submissions to the Science Review. All the information supporting the 'favourable condition' statements was presented at the Science Review and based exclusively on CCW's own 2005 survey reports not external or independent assessments. The CCW reports themselves, of course, also provide the information. The author could also have sought clarification from the independent participants in the Review if he'd found supporting information difficult to access.

The confusion evident in the Review of Science document around differences in meaning between the terms 'favourable condition' and 'FCS' has been clarified. The Directive looks at conservation status and then lists when that conservation status will be considered favourable. The term 'favourable condition' is not contained in the Habitats Directive or in the Habitats Regulations. A feature may appear currently favourable (based on quantitative numerical attributes such as cover, frequency, abundance, no. of individuals etc.) but if the functionality of the supporting system is absent, e.g. zonation, hydrology and dynamism, then it cannot be said to have achieved FCS in a sustainable sense because processes are not in place to ensure its long-term survival. The Review of Science process highlighted misunderstandings in the precise meaning of the word 'status' as used in the parlance of the EU Habitats Directive. The word 'status' in this specific context strictly refers to the 'health' of Annex 1 & II habitats and species.

In accordance with the UK SAC monitoring protocol the CCW monitoring methodology follows the JNCC Common Standards Monitoring (CSM) framework and guidelines. Welsh Government recognises that as part of the Review of Science the NFP (un-dated and un-authored excerpt from paper in science pack) provided a detailed critique of certain aspects of the monitoring methodology. However, this review does not further consider the points raised in respect of methodological detail as the Welsh Government science file does not contain all pertinent scientific information, e.g. original field data and maps from the SAC monitoring reports, on which to base a response, for example information on the selection and location of monitoring points and the issue of variation in sample sizes employed when recording different attributes. Welsh Governemnt recognises this issue was a major area of contention between CCW and NFP during the Science Review. However, recent discussions between Welsh Government and NRW ecologists have clarified issues around differing sample sizes for positive and negative performance indicators and Welsh Government is fully satisfied of the scientific objectivity and integrity of the monitoring methodology.

CCW's 2005 surveys altered CSM targets and guidelines significantly raising thresholds for achieving a favourable condition assessment. Since despite the raising of thresholds to meet favourable condition standards the habitats (with the exception of humid slacks) were all reported to be in favourable condition this was not pursued at length in the Review.

However, with the humid slack surveys there were considerable problems both in methodology and assessment targets set which did not correspond to those of the CSM

standards. There were significantly higher thresholds used for the habitat to be considered in favourable condition. They even changed the criteria for differentiating the two slack types, Salix dominated and humid slacks. The survey methods and distribution of sample plots were also unsound. All of the survey information that this critique is based on is available in CCW's 2005 survey reports so why this was unavailable to the author is a mystery. Again clarification of any unclear critique of CCW's surveys could have been sought if the author had bothered.

CCW did not follow the CSM targets and guidelines as the author states but made significant alterations to both targets and guidelines. The humid slack survey methodology also failed to follow sound scientific practice and habitat monitoring methods. Details of why this was the case were presented at the Science Review and should have been available to the author.

To summarise, in the opinion of Welsh Government, based on the detailed information contained in the CCW SAC core management plan and summary documents, CCW's monitoring protocol, including the selection and measurements of attributes (performance indicators) and target setting, followed standard recommendations for sand dune habitats in line with JNCC CSM guidelines and monitoring results indicate that the N2K features as summarised above are currently assessed as having Unfavourable Conservation Status.

This conclusion is unjustified because NRW have still not substantiated their claims of unfavourable conservation status (despite the bold text and underling!).

Proposed Works

(i) Dune Frontage Works

The shifting dune remobilisation plan proposed for 2013 targets a c.300m length of the artificially formed high fore-dune ridge immediately N of Ynys Llanddwyn. The intention is to create three 'blow-out' gaps through which sand can migrate inland for a limited distance. Conifers (including stumps) will be selectively removed from linear corridors directly behind the gaps in order to assist landward sand movement. These works will take place entirely within the area allocated for mobilisation works in the Forest Management Plan 2010-15. The trees in the target areas are stunted and poorly grown, and many are dead. Precise details of the proposal and a work plan are being developed and areas for felling (as per original locations identified in the Newborough Forest Management Plan) are currently being marked out (July 2013). The work will be staged, a third of the area being completed in winter 2013 and monitored, then half of the remaining two thirds carried out in each of the following two years. Mitigation measures for significant plant species that may be within the mobilisation corridors, e.g. *Dactylorhiza purpurella* var. *purpurella, D.purpurella* var. *maculosa, D.* x *venusta* (*D.purpurella* x *fuchsii*) and possibly *Mibora minima,* have recently been discussed between Welsh Government and NRW.

The planned destruction of good quality shifting dunes with Ammophila (marram) - corridors through the foredune ridge - is a clear breech of the HD requirement that you never harm a protected habitat in order to further some conservation aims such as creation of 'zonation' or mobilisation. The required level of sand movement is already present because the marram is in such good condition. It can only be so with appropriate levels of bare sand and sand

mobility. This target of large scale sand movement is not part of any CSM target for mobile dunes, the UK guidance for sand dune management.

A proposal for mobilisation works along c.300m in the south-east corner of the forest (zone 1 east in the FMP 2010-15) is also under consideration.

This clearfelling is likely to mobilise sand that would blow onto fixed dunes of the Warren inundating both slacks and so-called 'grey dunes'; another case of harming one protected habitat in pursuit of some dubious sand mobility objective. A breech of a key HD requirement; a key requirement also reiterated in the JNCC, 2004, CSM guidance for sand dune management:

'4.1 Extent

Extent is the most important attribute and must always be assessed. Extent will be subject to natural change, as dune systems are dynamic. Monitoring should identify trends on sites that can then be investigated further to identify causes, or be used to check the effectiveness of current management. The requirement is that net extent of all designated habitats should be maintained, but not at the expense of other designated categories (see Section 7.2).'

As primary interventions the proposed remobilisation and selective clearance works are considered proportionate in respect of their planned extent, peripheral location and modest scale relative to natural dune habitat placement within the dune ecosystem, and the overall representation of specific habitat elements, i.e. the proposal is small-scale relative to the size of the plantation.

The size of the proposed felling relative to the forest area is irrelevant. It is not the extent of the undefined proposed felling that is the problem it is the failure to provide robust conservation, scientific and/or Directive justification for the intervention. The areas to be felled are the beach-forest margin, a key site asset and where the most visitors wish to go: somewhere sheltered from sun, wind and rain AND where the seascapes, coast, Llanddwyn island and the Cefni estuary can be appreciated in even the poorest weather. The area to be felled shelters visitors from freezing winter wind and rain and provides shade in the summer. The proposals seriously degrade a key asset that supports tourism, a major component of the island's struggling economy.

Though the remobilisation areas may appear small-scale relative to the large size of the SAC they are considered by Welsh Government to be sufficiently large for an attempt to address the objective of creating new shifting dune habitat. Monitoring will inform on the likely location-specific issues of temporal persistence (see monitoring section) and the relationship between system self-perpetuation and the critical mass of the remobilised sand bodies.

The shore frontage is where embryo dune communities would occur naturally and the plan does not propose creating mobile dune habitat outwith the natural biogeographical position of the habitat within the context of the overall site. The location in forest zone 1 (west) is optimum because it occupies part of the shore where shifting dunes with *Ammophila arenaria* (2120) would naturally be expected to form and because it contains an artificial dune that partially breached in the early 1990s and was then artificially reconstructed.

Furthermore, flats and patches of open sand providing readymade head-starting conditions and sources of plant propagules, e.g. seeds and rhizomes, already exist alongside tracks and within the plantation matrix behind the dune ridge. Zone 1 (east) has also been highlighted by CEH as likely to have hydrological and aeolian effects on the open dunes of the warren.

This statement makes little sense since there is already a well developed foredune ridge of mobile dunes (shifting dunes with Ammophila 2120) immediately in front of the proposed clearfelling area. Furthermore there is little chance of embryonic dunes forming in front of the proposed clearfell zone because that section of Traeth Penrhos is eroding and the sand being mobilized to the NE along the beach to where embryonic dunes are naturally forming at present. Sand supply in front of the clearfell area is limited by the natural dynamics of that part of the shoreline; it is eroding section of Treath Penrhos.

(ii) Hydrological Monitoring

It is proposed (Stratford *et al*. (2007), and confirmed in the Science Review) that a carefully designed hydrological monitoring/research study is initiated, involving selective felling, located on the warren-plantation interface, to investigate site-specific relationships between tree cover and water-table levels.

All this will do is show what happens when trees are removed from a section of ground and have little if any relevance to water levels far out in the Warren where the humid slacks occur; the nearest humid slack is over 300m from the forest boundary. There has never been any convincing evidence that the Warren significantly relies on water from under the forest.

Concerning the issue of potential interactions between artificially afforested dunes and groundwater levels it is a scientific fact that conifer plantations established on sand dunes can modify and depress, i.e. lower, the characteristically shallowly domed water-table profile under dune systems by directly intercepting rainfall (affecting aquifer re-charge rates and volumes) and by increasing evapotranspirational losses of water via tree leaves (Ranwell & Boar 1986). A Centre for Ecology and Hydrology (CEH) scientist has flagged up concerns in this respect at Newborough, as have Stratford *et al.* (2007). Dipwell data from Newborough demonstrate a clear trend of falling water levels between 2006 & 2011 (Pye 2013), who stated that '*tree growth within Newborough Forest may have contributed to this trend*', while being careful to stress that the evidence was not absolutely clear-cut because of changes in rainfall in recent decades and an increasing temperature trend perhaps also influencing water levels. Other factors are undoubtedly important too, such as the stage, density and health of the conifer crop, and also structural characteristics of the dune vegetation itself and the shoreline geometry affecting the groundwater mound. The overwhelming weight of evidence suggests a likely significant effect but one which is not yet possible to quantify and it cannot be asserted on the basis of objective evidence that the plantation has no likely significant effect on the SAC, which raises the issue of the precautionary principle.

i.e. In other words we have no evidence of significant forest impact on the Warren!

Drawdown effects can occur around a zone of interference proximate to plantation edges and CEH has highlighted the Warren-plantation boundary zone as being the part of the site where slacks are most likely to be affected. The magnitude of the effect is uncertain and more research is needed. Concerning the potential interplay between free sand movement and trees, it has been shown that the wind-shadowing effect of conifer plantations can reduce wind strength for distances of up to 25 times their height (Sturgess & Atkinson 1993). Plantations can also deflect wind (Pye 2013). CEH has advised that wind-direction at Newborough could also be affected locally by the plantation.

The Stratford et al., 2006, review of hydrological research and data actually concluded that CCW's argument that trees had impacted the slacks, especially the humid slacks, had not been substantiated. The following is the report conclusion:

'3.4 Conclusion

Although many studies of Newborough Warren have been undertaken, it is not felt that they adequately address all the issues relating to the issue of the falling water table. The main concerns, in our view, are that:

• Many of the studies have started off from the view point that the trees are causing a lowering of the water table and are hence setting out to prove this rather than standing back and considering all the causal factors.

• Transpiration has been overestimated for both the forest and the dune vegetation. Interception has been overestimated for the forest vegetation.
• The effects of soil moisture deficit have not adequately been accounted for.

• The groundwater model could only be made to work by using unrealistic values for recharge, suggesting an underlying problem with the conceptual model.

For these reasons it is not felt that any questions relating to the effect of the forest on the water table can be adequately answered by the reviewed reports.'

Thus there is little scientific doubt that plantations can interfere in various ways with the natural functioning of dune systems, though the science is highly complicated by the variability of other compounding environmental factors, and it is important to retain scientific objectivity, to refrain from assumptions and not to rush to judgement, as demonstrated at Whiteford Dunes NNR, Gower, where much smaller conifer blocks had been assumed to be the main factor responsible for (and are likely to contribute to) the drying out the Fen Orchid slacks, but recent CEH research has shown that the primary cause was the loss in a storm event of the beach front sand-wedge which, until its loss, had acted like a dam slowing freshwater egress from the system.

The Salix dominated slack and fixed dune habitat types close to the forest [CCW habitat maps] were both assessed to be in favourable condition [CCW 2005 habitat assessments]. Humid slacks only occur 300m or more from the forest edge so proximity impacts on humid slack hydrology are unlikely. The case for more general hydrological impact on the wider Warren mosaic of dune habitats has not been substantiated. The wind shadow effects referred to also help conserve moisture in the wind sheltered area by significantly reducing

wind speed, the dominant control on evapotranspiration. The reduced wind speed close to the forest edge is irrelevant with regard to sand mobility since all the habitat types are 'fixed' dune habitats with low target levels of bare sand. However the shelter effect will certainly have a positive impact on moisture retention in the dune habitat close to the forest.

Atlantic Dune Woodland – Concepts and Definitions

Much purported Atlantic Dune Woodland (ADW) in Wales represents nascent forms, comprising various types of phanerophyte-dominated scrub communities, some possibly representing semi-natural plagioclimax scrub-types, developing on fixed dunes and wet slacks in response to seral (successional) processes often accelerated by reduced grazing pressure. The composition of these communities is incredibly variable and none of them are adequately described, if at all, in the National Vegetation Classification (NVC) system. On the basis of the European Union's definition of ADW the JNCC considers that substantive examples of ADW do not exist in GB. However, in Wales at least, patches of semi-natural wooded vegetation of very limited extent, sometimes comprising no more than a few trees or bushes, do occur on dune systems, especially *Salix cinerea* carr-woodland around dune slacks.

At the Liverpool Hope University dune scrub and woodland conference in September 2012, non-UK (Dutch & Scandinavian) MS N2K site managers stated that although the conceptual essence of ADW in the HD was a semi-natural one in their experience the European Commission was accepting of a broad definition of woody vegetation types qualifying as ADW and, depending on local ecological contexts, the Commission was prepared to include, in some cases, even long-established (temporally undefined in the EC interpretation manual) conifer plantations spawning spontaneously developed woodland communities. The point was made in respect of artificially established conifer plantations proximate to mixed natural/semi-natural ADW containing native coniferous elements, a situation arising only in some MS, e.g. French Aquitanian Atlantic-dune woodlands, which have mixes of Pines, e.g. *Pinus pinaster* and broadleaves, e.g. *Quercus ilex* and *Q.suber*, as well as interesting sub-canopy and scrub-layer components, including such species as *Arbutus unedo* (Strawberry Tree), *Rubia peregrina* & *Ruscus aculeatus*. Having posed the question 'what is ADW?' in the title of his presentation Prof Rodwell concluded the answer in a plain sense was 'woody vegetation on Atlantic dunes', to the general agreement of conference delegates.

Except for the presence of small patches of scrub-woodland it is debatable that 'true', i.e. in the strictly natural/semi-natural and expansive sense of the Habitats Directive, ADW occurs anywhere in Britain. Treating the tree as an honorary native the most persuasive candidate in Wales is perhaps the Sycamore woodland (originally planted) at Stackpole NNR, where some trees support epiphytic lichen species indicative of woodland of long ecological continuity, including the rare *Collema subnigrescens*. Compositional descriptions of postulated UK ADW appropriate for N2K sites should not be criticised for excluding non-native trees.

Concerning the feasibility of creating ADW by the gradual modification of content and structure of the existing plantation at Newborough the FCW Forest Management Plan states that ADW is not known to have occurred at Newborough in the distant past. The 'vision statement' for the site in CCW's management plan (CCW 2008) mentions the possibility of 'encouraging' dune woodland development on inland parts of the fixed dunes where soil

development has progressed with the implicit aim of attaining a complete sea-to-woodland zonation. From what is known of the system's history and development the past extent of bare blown sand must have precluded woodland development of any kind. This makes the problem of deciding on an ecologically appropriate composition for anthropogenically, or more naturally directed, manufactured type or types all the more difficult.

Irrespective, however, of the esoteric issue of whether or not the conifer plantation at Newborough could, should or does conform to ADW in the loosest sense, depending largely on definitions of 'time in existence' continuums ('long-established' to 'recent') and parallel development of the non-planted semi-natural fraction, a key issue in respect of the Habitats Directive is whether the plantation was categorised as a qualifying Annex I ADW at notification (following its addition post-'SAC moderation' review).

Section 3.1 (ecological information) of the Natura 2000 standard data form submitted to Europe for the site does not list or recognise ADW as a habitat type present on the site and nor is it listed as a qualifying habitat for the SAC on the JNCC SAC website. Since priority has to be given to Annex I habitats (and Annex II species) for which the site was designated then even if it could be successfully argued that the plantation is, in some highly eccentric ecological sense, a type of ADW, then the condition and quality of the notified Annex I & II features must take precedence, notwithstanding the requirement for measures to take into consideration the ecological needs of all Annex I & II habitats/species on the site, not merely those for which the site was designated.

Interestingly, an untitled 'habitat map' (provided by CCW by email) on the Welsh Government science pack appended to the N2K data form shows in dark green patches of 'forest' and in light green 'woodland' set within the conifer plantation (centred N of Cerrig-duon) and, confusingly, both 'forest' and 'woodland' are listed as 'Annex I habitat types' in the legend on the map. The coniferous woodland component was allocated under s.4.1 as an element of 'general site character' on the N2K standard data form, as pointed out by NRW (then CCW) during the Science Review process, and appears under this category on the SAC summary data for the site on the JNCC UK website. Occupying c.37.8% of the SAC the plantation area is currently slightly smaller than the area of all Annex I habitats combined (c.37.96%), though the situation is not unusual, e.g. <20% of Eryri SAC is Habitats Directive feature.

CCW's statements that ADW does not exist at Newborough are irrelevant since no one has ever suggested that it did. All that has ever been suggested was that it would be worth investigating the practicality of a long term modification of Newborough Forest to meet the habitat definition of ADW. This suggestion was made for several reasons - an improvement in bio-diversity and if sensibly applied supporting the development of habitat useful to red squirrels and also meeting a UK Biodiversity Action Plan (BAP) target to create five areas of ADW since none exist in the UK. This could have met the public and local community's wish to retain their forest, enhanced the tourism asset the forest represents and also improved bio-diversity. A potential 'win/win' scenario that has been squandered by current NRW forest management actions: planting large number of North American cedar and also birch an especially invasive species that in the long term threatens to invade the existing open dune habitat.

CCW's patronizing statement that they might consider the modification of forest to ADW on

inland areas of 'fixed dunes' fails to acknowledge that the so-called fixed dunes are nothing of the kind. The areas referred to by CCW are 'conifer woodland', a non-qualifying habitat within the SAC, and defined as such by the SAC designation document, the Natura 2000 SDF.

Annex II Species

***Rumex rupestris* (Shore dock)**

This European endemic, GB Red Data Book (Endangered) maritime dock (also Wildlife & Countryside Act (1981) schedule 8 listed), occurring on sandy or rocky shores, the lower slopes of sea-cliffs, cliff ledges, strandlines, bases of flushed cliffs and sometimes even in standing water in dune slacks, unusually has a requirement for a constant supply of freshwater in an inherently halophytic habitat. The known populations at Newborough are remote from the areas where work is being proposed, but consideration could be given to taking advantage of any opportunities arising from having machinery on site for potential positive habitat management work. The CCW management plan 'seeks to support viable populations' of the species. It would be interesting to know if salt water incursion is an actual, or potential threat, (trees can promote this on dune systems by inverting the naturally domed water table) and if so if it is limiting the extent of suitable habitat. The present population occurs on a rock ridge c. 15m above ordnance datum (NRW), but potential areas for population expansion could potentially be limited if this is a factor.

***Petalophyllum ralfsii* (Petalwort)**

The FCW Newborough Forest Management Plan hints at the possible presence of *P.ralfsii* within the forest, but the wording of statements is unclear, creating uncertainty, e.g. 'not generally in the forest' (Table 2.2) and 'does not generally occur within the forest' (section 2.3.3.a.). It would be important to avoid inadvertent damage and disturbance to *P.ralfsii* habitats during felling operations, or as part of the hydrological monitoring proposals. Recent advice from NRW indicates *P.ralfsii* is known to occur on ground compacted by trampling in one slack adjacent to the main car-park where it is not threatened by the proposed operations, but being a small and easily misidentified liverwort (one that is frequently confused with commoner *Fossombronia* spp.) it could occur elsewhere on site in slack-type habitats.

***Triturus cristatus* (Great crested newt (GCN))**

GCN are not a qualifying feature or reason for selection of the SAC, but they are however a European Protected Species and their conservation is a material consideration in plans and projects affecting SACs. Whilst documentation regarding GCN has not formed part of the material for review, GCN do occur in the forest, and licenses have been issued for works affecting them. The same caveats regarding disturbance from works applies to the possibility of GCN using habitat elements in the forest as places of rest or shelter. Recent advice from NRW indicates that GCN are not normally found in the frontal dune areas.

Is there a regulatory requirement to remobilise the designated early seral habitat features at Newborough?

Based on an interpretation of the aim (Article 2) and intent of the Habitats Directive NRW has argued that because the conservation status of the site at designation was identified as being unfavourable and the need for restoration (alluded to under s.4.3 on the N2K data form) was stated at that time, then an obligation exists, as enshrined in Articles 2-4 & 6 of the Directive.

This is nonsense. The Standard Data Form (SDF) designation document for the SAC states that the conservation status of the Annex 1 habitats at designation were either grade A - excellent conservation status or grade B - good conservation status. Where this claimed unfavourable conservation status comes from is a mystery. The author should have checked the actual SDF form for the SAC. The legal advice is flawed because it starts from an incorrect premise. No one would have argued about a need for appropriate action if the habitats were genuinely in need of being 'restored to favourable conservation status.'

Article 2 includes Art. 2(3) which also requires conservation agencies & WG and their SAC management measures to take into account the local community and their economy, history, traditions etc. etc.

The problems 'alluded' to in the Vulnerability section of the SDF were not statements of a need for restoration of favourable conservation status. How could they be? The SDF states the habitats are in grade A (excellent) or B (good) conservation status not unfavourable. The Vulnerability statement is CCW alluding to unsubstantiated conservation issues; issues that with regard to hydrology, for example, were found by the Centre for Ecology & Hydrology (CEH) to be unsubstantiated (2006 CEH report). CCW's views have still not been examined by informed, well qualified independent experts - an appropriately constituted arbitration panel. The arbitration that was a requirement of the Science Review and promised by the conservation agency with the full backing of the Welsh Government.

Welsh Government acknowledges that the clearing of some elements of forestry could improve the conservation status of the Annex I habitats for which this site was designated. Welsh Government also confirms the obligation on Member States (MS) to restore FCS to sites not at FCS when listed, noting the obligations under Article 3(1) of the Habitats Directive. Art 3(1) discusses the requirement to maintain or where relevant restore the FCS.

Irrelevant legal advice because it starts from a false premise that all the dune habitats are in unfavourable conservation status. If they were then the advice would be sound but since they're not the advice is worthless.

You do not 'advance the existing designated features of the SAC to favourable conservation status' by creating more of the habitat; increasing their area and range within the SAC. The Habitats Directive legal requirement is that the Annex 1 habitats' area and range should be 'maintained or increase naturally'. There is no legal remit or justification for landscape engineering to create more dune habitat.

The supposed unfavourable conservation status has been challenged and the information and evidence supporting this challenge never credibly refuted. None of the actual legal requirements of the Habitats Directive have ever been challenged by those who oppose CCW's plans. The argument is about the true conservation status of the dune habitats. CCW's claim of unfavourable conservation status is not supported by their own habitat assessments

and they had to resort to a misinterpretation of a CSM target to arrive at their unfavourable conservation status conclusion.

While recognising that the plantation is not without biodiversity value and that other significant non-Habitats Directive nature conservation/biodiversity features (e.g. Red squirrels, fungi, Ravens etc.) can be taken into consideration when formulating habitat recovery options, such measures should not undermine those required under the Habitats Directive to correspond to the ecological requirements of Directive habitats and species present on the sites. In equivalent vein, economic, social and cultural requirements, together with regional and local characteristics, can all be taken into consideration but as in line with Article 2 of the Habitats Directive and case law from the European Court of Justice, any proposed measure cannot be based purely on these considerations but on a balanced position, which seeks to achieve FCS for the site (*Commission v Belgium, Case 247/85).*

Since the people of Anglesey and the local community at Newborough have never been informed or consulted about the proposed clearfelling plans, the well advanced scheme has failed in every aspect to fulfil the legal requirements of Art. 2(3) of the Directive and the Århus Convention. There is no 'balance', the public at large and the local community have been ignored.

The legal advice has also misunderstood what is and what is not habitat that must be kept or restored to favourable conservation status. The forest is not habitat that is in need of being restored partially or otherwise to any pre-1950s condition. It is designated in the SDF Natura 2000 legal document as a habitat class: 'conifer woodland' - a non-qualifying habitat within the SAC. The habitat to be conserved and protected is the habitat designated as sand dune habitat; the five Annex 1 dune habitats occupying 36% of the SAC according to the SDF; protected dune habitat combined with beaches occupy 55% of the SAC.

Welsh Government notes that in accordance with the Habitats Directive, the contemporary levels for the extent of the site and the percentage of habitats within that site are those listed with the Commission and that its FCS is based on the criteria as required under the Directive for listing of the site.

This makes it clear that where Annex I & II features are not in FCS an obligation does indeed exist for MS to restore those features to FCS. The point regarding the relative proportions (percentage representation) of habitats as opposed to absolute area values is an interesting one, as it would seem to imply that changes in extent of Annex I habitats necessitates proportional changes in others. Sand dunes are of course inherently dynamic systems and the conservation objectives for the SAC recognise that dynamic change in the percentage and precise location of habitats is inevitable and indeed desirable.

In other words the HD requires that the area and range of protected habitats must be 'maintained or increasing naturally'. The reference status is the area and range present when the SAC was created. This is the concept of a conservation status baseline [JNCC, 2002]. There is no remit in the Directive to landscape a site to artificially create more protected habitat!

In summary, Welsh Government concludes a phased approach is indicated (as proposed),

with monitoring at each stage to ensure efficacy before proceeding further. This is seen as compliant with the requirements of the Habitats Directive as long as it is proportionate and necessary for the attainment of the aim of restoring FCS and appropriate in terms of the means used, which is the case.

This reference to a phased approach makes it clear that the undefined and undisclosed clearfelling proposals for the winter 2013 are only the first phase of a more extensive but unspecified clearfelling plan none of which has been justified by this report or CCW's earlier arguments and information. Once again the local community and public at large have been ignored and excluded from the decision-making process.

***Sciurus vulgaris* (Red squirrel)**

Without doubt Red squirrels are a significant biodiversity element of the plantation. However, as outlined above, European features for which the SAC was notified must assume priority if conflict arises between interest features. In Welsh Government's view the work proposals, which involve very limited and selective clearance of trees, cannot reasonably be considered to constitute any significant threat to the Red squirrel population.

Monitoring and Related Issues

Monitoring is crucial for interpreting and understanding the response of systems to change, natural or enforced. The importance of running a scientific monitoring programme in parallel with the work, and not just as an inconvenient add-on or afterthought, cannot be overstated. Both proposals should be monitored by detailed, scientifically designed (with careful siting and selection of controls and replicates) programmes, developed alongside work planning. Work planning should define all links in the activity chain, including how to deal with excavated material, equipment/machinery on-site storage, access routes etc. All activities should be described and recorded. An added value from monitoring schemes is using knowledge gained to guide, inform and refine any future management interventions at Newborough, or on similar dune sites elsewhere. Meteorological data are important in this regard and the possibility of utilising data from the on-site Environmental Change Network Met station facility should be investigated. Experimental design for monitoring should ensure potential compounding effects with other factors are excluded as far as possible and ideally absolutely. For example, the Newborough Forest Management Plan includes drain blocking proposals (to try and encourage winter flooding of slacks within the plantation and hydrological connectivity) currently planned for the west side of the forest about 2km away from the warren boundary where hydrological trials are proposed, but monitoring needs to take account of such potential interactions in order to separate out possible compounding factors, such as the influence of natural streams and ditches on water-table levels. In this regard fluctuations in the severity of outbreaks of Red-band needle blight fungus affecting a variety of *Pinus* spp. in the plantation resulting in premature needle-fall (leaf loss) could influence evapotranspirational characteristics of affected stands and needs to be taken into consideration in experimental design and the selection of locations for dipwells.

A significant issue and one raised by several stakeholders is the question of the temporal persistence of artificially created mobile dune habitat, i.e. the longevity of gain in extent. How long will remobilised sand remain mobile? This is both an ecological and an economic,

i.e. cost-benefit, issue. Permanency of effect is a problem for all forms of habitat management in general. Monitoring should provide enlightenment on this issue as different claims have been made based on over-generalised research findings extrapolated from seemingly identical sites, which may or may not hold true as site characteristics are often unique. For example, it is usually assumed that open sand communities are short-lived. Many undoubtedly are, but anecdotal evidence from other dune systems in Wales suggests some deeply channelled blow-out features aligned perpendicularly to the shoreline on spit dune systems (created in part from erosion initiated in the period 1940-60) and backed by high dune slopes with steep angles of repose can persist for decades, i.e. seemingly almost indefinitely on human timescales. There is likely to be a range of longevity time spans for artificially created and topographically different dune-scapes on different sites. Similarities between systems can be superficial and differences subtle.

Stakeholders must realise that although the weight of scientific evidence points to a high probability of a successful outcome justifying evidence can never be absolutely irrefutable. Even with careful advance planning, execution and scientific objectivity in respect of predicted effect, because of the complexity of interacting and compounding environmental variables, especially climatic factors, e.g. weather conditions in the period over and after the event, operating on what is an inherently dynamic ecosystem, there can never be absolute certainty of precise outcomes in time and space, and that unpredicted results might possibly arise. Such risks are here considered to be very low, but no matter how rigorous the science base they can never be zero. In this sense it has to be accepted that to an unknown degree any intervention work is experimental in nature, but will ultimately serve to test what is achievable and what is effective.

On accreting shorelines embryonic and mobile fore-dunes typically form gradually in orderly, progressive sequence in response to natural factors operating under spatio-temporally mediated geomorphological processes, yet they can also develop rapidly, for example at Ynys-las NNR the development of a new spit-point dune (entirely comprising habitats conforming to Habitats Directive 2110 & 2120 categories) has taken <10 years, in which time it attained on its eastern side a maximum elevation of c.6m. The dune is ringed by embryo dunes supporting typical strandline pioneering species, such as *Cakile maritima, Elytrigia juncea, Honckenya peploides* & *Salsola kali. Eryngium maritimum* Sea Holly has recently colonised. This observation is included here as it demonstrates that dune formation still occurs readily on Welsh systems when conditions are favourable. At Newborough embryonic dunes forming to the northwest immediately outside the SAC could potentially be included in the SAC in due course. The fact that these new dunes are engulfing intertidal habitat within the Glannau Mon SAC demonstrates the interconnectedness and dynamic nature of coastal ecosystems and that these realities need taking into account when drawing lines on the ground for site designation and for site management.

i.e. dune processes - conservation status function (with respect to mobile dunes) - are uncompromised at Newborough

The challenge of replicating dune forms by direct intervention is one of either creating readymade profiled landforms *in situ* or setting their development in train by allowing natural process to do the work. In reality on pre-established systems a combination of both approaches occurs as formed sand mounds will be reworked. Interventions already carried

out elsewhere on N2K dune sites in Wales, e.g. Kenfig, in effect have utilised both, i.e. de-vegetating dunes pre-formed by natural processes in anticipation of resuscitating natural processes operating before dunes had become stabilised but after they had formed.

At Kenfig another example of the failure to follow a guiding principle of the Directive - never harm one protected habitat to further an objective for another protected habitat. Here good quality fixed dunes were not only maintained but increasing naturally. Instead of the natural increase being 'conserved' it was destroyed to further ill defined objectives of large scale sand movement that are inappropriate for a temperate climate hind shore dune system.

The potential for introducing or transferring pathogenic or problem invasive non-native species, including microorganisms (e.g. *Phytophthora* spp., *Hymenoscyphus pseudoalbidus* (*Chalara fraxinea*) & *Chytridiomyces*), to or around the site during works means biosecurity should be a major work planning consideration. Machinery is notorious for introducing plant seeds, particularly when contractors have been on jobs in other parts of the country. At Ynys-las dunes NNR (part of Dyfi SAC) construction of the new visitor centre in 1997-98 created large areas of bare sandy ground and sand heaps on which the non-natives *Solanum physalifolium* Green Nightshade (native of S. America) and the grass *Bromopsis inermis* ssp. *inermis* Hungarian Brome (native of E. Europe) appeared. By sheer good fortune, rather than intelligent planning, the *Solanum* eventually petered out and the grass has remained confined to one sand mound where it is declining under competition from *Urtica dioica*, but may equally well have become a serious problem for management. This example is provided as a cautionary tale – positive management works can potentially create future management problems.

Conclusions

Other than a concern expressing that the works may signal the commencement of forest clearance by stealth and comment reflecting on the need for a comprehensive and better understanding of the scientific complexity surrounding many of the key issues, especially site hydrology, no specific objections to the works proposed for winter 2013-14 have been identified. Nor have any specific objections been found to other proposals referred to in this paper for action before the end of the current FMP (2010-15).

So apparently we've never expressed any objections to these proposals, specific or otherwise! NRW have failed to make the WG fully aware of the widespread public opposition demonstrated since 2004 over similar CCW/FCW plans. The Habitats Directive requires conservation agencies & WG to take into account social, economic and cultural benefits to the local and wider community when planning conservation measures.

These matters are not being given sufficient consideration by NRW, who lack expertise in these areas. These plans could seriously damage the Anglesey recreation & tourism industries. The chief stakeholders in all of this are the public of Anglesey who have been ignored and excluded from the decision-making process.

In the opinion of the Welsh Government the proposed, phased work is in compliance with the requirements of the Habitats Directive. It is important to emphasise that the proposed works will not be undertaken at the expense of other Annex I & II Habitats Directive features

present on the site, and works are aimed at restoring FCS of habitats for which the SAC was notified as made explicit under Article 6(1) of the Directive.

In other words none of the planned work is on the actual Annex 1 habitats of the site that are supposed to be in unfavourable conservation status and in need of action to restore their conservation status. The work is an attempt to create additional areas of dune habitat. This is not a requirement of the Habitats Directive as made absolutely clear in the 'Concept of a Conservation Status Baseline' report [JNCC, 2002]. Another document the author and legal advisors to WG seem to have failed to consider. Since the claims of unfavourable conservation status have never been substantiated the whole project is unjustified.

As noted earlier the legal advice received by WG is irrelevant since it starts from a false premise that the dune habitats, especially the mobile dune habitats, are in an unfavourable conservation status.

The importance of embryonic and shifting dune habitats is recognised in section 4.2 ('Quality and Importance') of the Natura 2000 standard data form, where it receives special mention as being considered rare, since its total extent in the UK is estimated at less than 1000ha. The phased proposal would serve to restore the natural dynamism of the targeted area and create open dune habitat where it would naturally have occurred, restoring the condition, extent and functionality of the natural open dune Annex I habitat components in accordance with the aims of the Habitats Directive.

The sand supply doesn't exist at this section of beach to provide the material for embryonic dune formation. Sand is being moved from this section along Traeth Penrhos to where it is forming embryonic dunes already [Pye 2012]. The attempt to create more dune habitat is a breech of the conservation status baseline concept - maintain or increase naturally the area and range of protected habitat. [JNCC, 2002].

The FCW Newborough Forest Management Plan 2010-2015 discusses the proposed works (including hydrological monitoring) in principle and in detail, e.g. options for felling zones, without raising specific objections, while stressing FCW (NRW) support ultimately depended on the decision of the then planned science review arbitration panel. The FCW management plan recognises that FCS is not currently being met, that the forest is constraining coastal processes from operating freely and that the work will restore natural zonation between foreshore and frontage dunes, all issues flagged by CCW at designation in section 4.3 (Vulnerability) on the N2K datasheet.

The FMP repeatedly reiterates the statement that no clearfelling can take place until NRW's claims have been substantiated through independent and mutually acceptable arbitration. This document is not arbitration and definitely not independent or objective. The inclusion in the FMP of the proposed clearfelling was solely at the insistence of CCW. FCW did as they were told!

Objections were raised at the inclusion of proposed felling plans that were dependent on the outcome of the Science Review. The proposals were only included at CCW's insistence and the caviat later added by FCW because of the expressed objections. It was made clear that the public considered the FCW underplanting plans and plans to leave zones 3 & 4 'unmanaged' as clear indication of CCW's ultimate plan to only leave zone 5 unfelled; zones 3 & 4 to be

destroyed by malign neglect following the felling of zone 1.

The proposals suggested by Pye (2013) for the creation of artificial cuts in trial areas in parabolic frontal dunes on Traeth Llanddwyn on the warren itself, coupled with selective de-vegetation to encourage sand movement, could also be effective in bringing the net area and overall proportion of mobile sand closer to its area at designation.

Such actions would destroy sections of foredune Annex 1 mobile dune habitat, threaten fixed dune habitat behind the foredune ridge and almost certainly lead to contravention of CSM bare sand targets for various dune habitats.

There is every expectation of success and general scientific agreement over the likelihood of success. Available science points to a strong consensus that the proposed intervention will have the desired effect. CEH confirm the proposed locations are likely to provide benefits to the dune system in term of both wind-speed and hydrology.

Why has this highly pertinent CEH advice not been made public and available to independent participants in the Science Review? It is also clear from this document that WG, NRW, private sector consultants (Pye Associates) and CEH are all aware of the details of the proposed felling plans but the public have been kept in the dark. This is a serious contravention of the requirements of Art.2(3) of the Directive and the Århus Convention.

It is Welsh Government's view that the proposals here outlined are measured and balanced, i.e. proportionate, and focussed on specific outcomes in respect of restoring FCS, advancing scientific knowledge of mobilisation techniques and resolving issues around hydrological impacts.

Recommendation

That Welsh Government, NFP, NRW and all involved stakeholders and partners support all three work proposals for winter 2013-14.

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Appendix I

Annex I & II Features at Abermenai to Aberffraw Dunes SAC as submitted to Europe on Natura 2000 standard data form (dated 27 July 2011). Habitats and species in **bold** are primary reasons for site selection.

Annex I Habitats	**Code**	**Extent (%)**
Embryonic shifting dunes	2110	1.5
Shifting dunes along the shoreline with *Ammophila arenaria* Marram Grass ('White dunes')	2120	4.2
Fixed dunes with herbaceous vegetation ('Grey dunes')	2130	21.1
Dunes with *Salix repens* ssp. *argentea* Creeping Willow (*Salicion arenariae*)	2170	6.8
Humid Dune Slacks	2190	2.4
Atlantic decalcified fixed dunes (*Calluno – Ulicetea*)	?	0 (0.05)
Natural eutrophic lakes etc.	3150	1.6
Transition mires and quaking bogs		0.3
Annex II Species		
Populations of *P. ralfsii (Petalwort)*	1395	
Populations of *R.rupestris* (Shore dock)	1441	
Populations of *T. cristatus (*Great crested newt)		