Dune habitat conservation status assessment review

CCW carried out an assessment of the condition of the dune habitats of the SAC in the summer of 2005 and concerns about the application of Common Standards Monitoring (CSM) criteria & sampling methods used have led to this review. The results of this CCW conservation assessment underpin their requirement that large areas of Newborough forest should be removed. The following review would indicate that conclusions drawn by CCW as to the condition of the dune habitats of the SAC should be reassessed.

Key principles

JNCC provide guidance to all the UK conservation agencies on how they should monitor the protected habitats of the Natura 2000/SAC network of protected sites. CSM guidelines are provided to ensure a common standard of monitoring is achieved for all types of habitat and across all national agencies. These CSM guidelines are important because they ensure continuity of monitoring standards.

Regarding the extent and character of the habitats to be protected under the terms of the Habitats Directive JNCC has stated the following regarding the concept of conservation baseline:-

Source: http://www.jncc.gov.uk/PDF/comm02D07.pdf

JNCC 02 D07
December 2002

4. Main conclusion

4.1 *The concept of a conservation status baseline*

i. The references to range, to habitat extent, and to species maintaining themselves, in the definitions of favourable conservation status provided in <mark>Article 1(e) and 1 (i) clearly point to the general intention of the Directive, as being that of maintaining the habitats and species at their contemporary levels.</mark> If there is a date for such a 'baseline' it is likely to be that of the coming into force of the Directive (i.e. 1994), but, in practice the baseline will relate to the date nearest to that for which satisfactory information is available.

That is the Directive requires the protection of the habitats present at the time of SAC designation and with respect to zonation that is the zonation present when a SAC was set up. At Newborough we should therefore expect the criterion that: 'zonation should be intact along 95% of the coastal frontage' to apply to the coastal frontage where zonation was present when the SAC was created and NOT along the whole coastline of the SAC. The monitoring assessment is designed to ensure that zonation present when the SAC was set up is still intact at least to 95% of the extent present when the SAC was created. In fact it is likely at Newborough that zonation is 100% intact.

Regarding the sampling methodology there are concerns because CSM guidelines have routinely been altered and sampling strategy conducted in a manner that may have biased results. In particular habitat quality criteria thresholds have been raised, sample plot sizes were varied in a manner that may have biased observations and the location of sampling points in the dune slacks may have biased results. Details of these concerns will be provided below when looking at particulars of the dune habitat assessments.

Dune habitats assessments (Newborough)

The following will deal with the dune habitats conservation monitoring assessments in two sections: the mobile dune habitats - strandline, embryonic & shifting dunes and fixed (grey dunes); and separately the more complex dune slack habitats (2190 & 2170).

Note: the 'quality' criteria are the characteristics that define the habitat.

Mobile dune habitats:

Strandline, embryonic shifting dunes and shifting dunes with *Ammophila arenaria* (marram grass) - 'white dunes:-

- Strandline - 149 out of 151 sampling points of good quality i.e. ≥ 60%. The quality criteria are favourable.
- Embryonic shifting dunes - 46 of 62 sampling points (74%) are good quality i.e. ≥ 60%. The quality criteria are favourable.
- Shifting dunes with *Ammophila arenaria* - 'white dunes' - 76 of 77 sampling points (99%) have good quality i.e. ≥ 60%. The quality criteria are favourable

* Sampling the 'white dunes' concentrated on 'young' shifting dunes on the seaward side of the foredunes.

Note: JNCC state that if shifting dunes are present then sand mobility is being maintained and that these dune types will disappear if sand stabilizes. In this case they are present and exceed the quality targets. The mobile dune habitats at Newborough are in favourable condition with respect to the features that characterize the habitats.

Fixed dunes:

Fixed dunes with herbaceous vegetation (grey dunes); habitat type 2130:-

In assessing this habitat type CSM thresholds were raised and sample plot size varied in a manner that would tend to under assess positive indicator species (+ve sps) and over estimate negative indicator species (-ve sps). For example, regarding +ve and -ve indicator species:

CSM guidelines are that assessments should be made in sample areas of about 4m². However, instead of standardizing the sample plot size for assessing +ve and -ve sps CCW assess +ve sps in reduced area plots of radius 50cm, an area of 0.785m², and -ve sps in enlarged plots of 2m radius, an area of 12.566m². The area for assessing positive features is less than 25% of that recommended and the area assessed for negative

features more than three times the CSM standard; negative species were assessed in areas 16 times larger than the area for assessing positive species.

Regarding vegetation quality thresholds:

CSM - calcareous dune grassland: ≥ 8 +ve indicator sps @ more than <u>occasional</u> level
    - acid dune grassland: ≥ 6 +ve indicator sps @ more than <u>rare</u> level
CCW change these → calcareous dune grassland: 8 +ve sps must be present
                          acid dune grassland: 6 +ve sps must be present

Regarding negative species:
CSM - non-native species no more than rare; any one of the other -ve indicator species no more than frequent throughout the sward or singly. Together cover of -ve indicator species should be no more than 5%
CCW change this → no -ve indicator species within the 2m radius sample plots i.e. -ve sps must be absent.

Despite raising the quality threshold and varying the assessment plot areas in a manner that may lead to over estimating the presence of negative indicator species and under estimating the presence of positive indicator species the fixed dune habitat meet the quality target and are found to be in favourable condition with respect to quality, the characteristics that define the habitat.

Summary - mobile dunes and fixed dunes other than slacks:

The mobile dune habitat types [strandline, embryonic shifting dunes, shifting dunes with *Ammophila arenaria* (marram grass) - 'white dunes'] and fixed dunes with herbaceous vegetation are all found to be in favourable condition with respect to the 'quality' characteristics that define the habitats. However, they are all designated in 'unfavourable' condition because the zonation criterion has been misapplied to the whole coastline of the SAC instead of the coastal frontage where zonation was present when the SAC was designated.

Dune slacks assessments

Key concerns:

- Sampling strategy - position of assessment plots within the slacks; how were slacks selected for assessment?
- Significant changes to the CSM standards for assessing 'quality' characteristics that define the habitats, in particular, raising quality thresholds, changes to the criterion that defines humid dune slacks and varying the areas assessed for positive and negative features.

Sampling strategy:

From the CCW report:-

• **Sampling method**: Two sampling methods were chosen for monitoring the humid dune slack and dunes with *Salix repens* vegetation at Abermenai to Aberffraw Dunes SAC.

o Firstly, a systematic grid recording method was utilized, which employs a systematic, regular grid of points as a sampling layout. The sample plots were set up in large, near homogenous stands of both humid dune slack and dunes with *Salix repens* vegetation. The grid size chosen to monitor both types dune slack vegetation was quite large (10m grid), however the spacing of the points was appropriate for acquiring enough habitat condition data without over sampling both types of dune slack vegetation. The sample size for recording attributes 1-3 (humid dune slack vegetation) and 1-5 (dunes with *Salix repens* vegetation) was a 1m radius from the point on the grid, whilst the sample size for attributes 4 and 5 (humid dune slack vegetation) and 6 and 7 (dunes with *Salix repens* vegetation) was a 2m radius. The lager radius size allowed those attributes to be picked up on a wider scale in the sample area.

o Secondly, a similar method to the above was employed primarily at Newborough Warren, whereby the slacks were sampled on a point basis following the outside edge of the slack, and then again, approximately 3m within the first circle of points. It was hoped that by using this approach the effects of drying and succession would be picked up on a fine scale, and could be used as a baseline for long term surveillance of the slacks, i.e. by not concentrating on the good condition habitat in the centre of the slack, poor condition, drying and succession would be picked up earlier.

This narrative would suggest that sample distribution was intentionally biased to avoid 'concentrating on good quality habitat in the centre of the slack'; looking to observe 'poor condition, drying and succession'. In fact the wetter, low lying central areas of the slacks appear to have been excluded and not assessed at all.

Dune slacks are depressions rising to dune ridges at their boundaries. By their nature and topography a natural progression should occur from wetter low lying central areas of the slack to drier higher ground near the boundaries. The characteristics of vegetation would follow this progression from moist to drier conditions. Sampling points at the lowest lying central areas of the slacks should therefore represent the wetter 'humid dune slack' features and drier areas at the boundaries the slacks with Salix repens. Sampling only 3m from the boundary sampling points was likely to sample areas of intermediate character and should therefore not have been chosen as representative of humid dune slack (habitat type 2190) conditions. The purpose of the assessment monitoring is to determine the condition of the protected habitats not to undertake research, however necessary or useful, into the succession of dune slack characteristics across the slacks.

JNCC & CCW acknowledge the complexity of this habitat type and note the difficulty in differentiating between the two dune slack habitat types; the one, humid dune slacks, representative of the wetter, low lying areas of slacks and the Salix dominated slacks representing drier areas on rising ground near the boundaries.

JNCC:-

'Creeping willow is often found in dune slack vegetation and the boundaries between humid dune slacks and 2170 dunes with *Salix repens* ssp. *argentea* are often diffuse and difficult to define on

the ground. While humid dune slacks include creeping willow, the Annex I type excludes those sites where the species is dominant.'

A better sampling regime would have sited sampling positions radiating from the low lying central areas of the slacks. The characteristics observed would have then allowed the sampling points to be assigned as representative of either one slack habitat type or the other. The sampling regime employed assigned all slack sampling points as 'humid dune slack' if not >50% cover of *Salix repens*. This assigned all the intermediate vegetation character stages of slack habitat to the humid dune slack type. This is well above the <33% level of willow cover standard set by the CSM. Slack sample points assigned to the humid dune slack type should not have been and may well have biased results. The sampling strategy employed was likely to produce a less than objective and clear assessment of the condition of the humid dune slacks.

Regarding the selection of dune slacks for assessment it is unclear how this was done. Reference is made to slacks A - T at Newborough Warren, however, neither of these slacks appear in the records. It would be helpful to understand how the seven assessed slacks were selected as representative of the conservation condition.

Changes to 'quality' criteria - humid dune slacks

Significant changes were made to the CSM 'quality' standards that may well have biased results.

Range of zones:
- CSM - all humid dune slack communities present: embryonic dune slacks (high % bare ground) to greater vegetation cover & up to 33% *Salix repens* cover; early slack successional stages at least occasional.
- CCW change to the use of petalwort, *Petallophyllum ralfsii*, as an indicator of embryo dune slacks. * see later note regarding this species.

Vegetation composition - forbs/grasses ratio
- CSM - sward should contain >30% forbs & <70% grass cover
- CCW - grass cover ≤25% in 1m radius sample plots

Vegetation composition - typical species
- CSM - 4 or more +ve sps at least frequent (found in 41-60% of sample plots)
      - 2 or more +ve sps at least occasional (found in 21-40% of sample plots)
      - Bryophytes at least occasional (found in 21-40% of sample plots)
- CCW - 5 +ve sps must be present (1m radius plots) & bryophytes must be present; 2 +ve sps must be present in embryo dune slacks (50cm radius plots).

Vegetation composition - negative indicator species
- CSM - non-native species no more than rare (<20% of plots); no more than one other -ve indicator sps more than frequent (found in 41-60% of plots) or singly; together -ve indictor sps <5% cover
- CCW - negative indicator species were required to be absent from all 2m radius plots

Salix spp. Cover

- CSM - cover to be <33%
- CCW - up to 50% *Salix spp.* cover assessed as humid dune slack habitat

Scrub & trees
- CSM - in addition to *Salix spp.* no more than occasional or <5% cover
- CCW - scrub or trees must be absent from 2m radius plots; 1m radius plots for embryo slacks

Note: Regarding the use of *Petallophyllum ralfsii* as an indicator of embryo dune slacks:

http://home.clara.net/adhale/bryos/pralfsii.htm

'Status in Britain: *Red Data Book*
Additional: *Wildlife and Countryside Act Schedule 8; European Red Data Book; EC Habitats Directive; Biodiversity Key Species*.

This tiny but beautiful liverwort consists of a thickened central midrib usually obscured by delicate folded "wings". The wings are only a single cell thick giving them a delicate, translucent appearance. It is found in calcareous dune slacks around the Welsh coast. It is best seen in the autumn and early spring: at many sites it is submerged in winter due to flooding of the dune slacks, and in summer it's above ground parts dry up and disappear completely. It is thought to be perennial with new aerial growth arising each autumn from underground stems which survive the summer.'

Half of the dune slack assessments were made in the summer (June), the end of May or beginning of September when the above ground parts of the indicator species may well have been absent or hard to observe. This could well have affected the assessment.

Regarding the dune slacks with Salix repens (2170) the assessment was similarly affected by raised thresholds altering the CSM standards and use of varying sample plot areas.

Summary

- Sample distribution within the slacks - sampling the boundaries and 3m within the slack was unlikely to give a representative population of sampling points to provide an objective assessment of the condition of the humid dune slacks.
- Changing the CSM threshold of <33% *Salix repens* cover to up to 50% cover altered a key characteristic standard for humid dune slack habitat and was likely to lead to unrepresentative assessments.
- Changing the CSM threshold for negative species from 'non-native species no more than rare', 'one other negative species no more than frequent or singly' and overall cover to be <5% to a requirement that these species were absent from all 2m sample plots significantly alters the assessment standard.
- Changing the requirement that bryophytes should be 'at least occasional', i.e. found in 21-40% of sample plots, to a requirement that they should be present again significantly alters the assessment standard.
- Raising the positive species requirement to 5 species within 1m sample plots significantly raised the threshold from the CSM standard of 4 or more +ve sps to

be frequent (in 41-60% of plots) and 2 or more other +ve sps occasional (in 21-40% of plots). This may have affected the assessments.

- Varying the sample plot areas by enlarging the area for negative species assessment and to reduced area for positive species assessment could significantly have affected the results.

We can conclude that unrepresentative distribution of the sampling points within the slacks and raised thresholds for assessing the 'quality' characteristics of the habitats could have significantly affected the assessment of the conservation condition of the dune slacks.

Conclusion:

- **The mobile dune habitats [strandline, embryonic & shifting dunes with Ammophila arenaria] and fixed dunes with herbaceous vegetation have been assessed to be in 'favourable' condition with respect to the 'quality' characteristics that define the habitats. They have been classified as in 'unfavourable' condition solely on the basis of the inappropriate application of the 95% zonation criterion to the whole SAC coastline.**

- **Unrepresentative sample distribution within the dune slacks and inappropriate and significant changes to the CSM habitat 'quality' assessment criteria mean that the conservation condition of the dune slacks is unclear. Including habitat outside the reference criteria for 'humid' dune slack [up to 50% Salix repens cover] and sampling only the drier outer areas of the slacks meant an unrepresentative sample population was surveyed. Despite the inappropriate changes to reference 'quality' criteria the drier slacks with Salix repens were in 'favourable' condition. It should be remembered that the forest has been a significant presence for over fifty years and hydrological impact on the slacks should have manifest itself long since. The lack of any significant impact on the dune slacks over this fifty year period needs to be explained.**