Habitats Regulations Assessment of Botley Neighbourhood Plan

for

Botley Parish Council

April 2024

Status: Issue

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The Landscape Partnership Ltd is a practice of Chartered Landscape Architects, Chartered Town Planners and Chartered Environmentalists, registered with the Landscape Institute and a member of the Institute of Environmental Management & Assessment & the Arboricultural Association.

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Quality standards

This report is certified BS 42020 compliant and has been prepared in accordance with The Chartered Institute of Ecology and Environmental Management's (CIEEM) Technical Guidance Series '*Ecological Report Writing'* and Code of Professional Conduct.

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Non-technical summary

The Landscape Partnership was commissioned by Botley Parish Council to undertake a Habitat Regulations Assessment (HRA) of its Neighbourhood Plan.

It was found that Policy 7, which allocated residential development, and Policy 9, which recognises and accepts a residential allocation in the Eastleigh Borough Local Plan, would if no mitigation were applied, cause recreational harm to Solent European sites, recreational harm to New Forest SAC / SPA and Ramsar site, and contribute additional harm to Solent European sites from discharge of nitrates via sewage and run-off. No other policies, individually or cumulatively, would impact any European site.

Policy 8 now prescribes mitigation for impacts on European sites. Mitigation to remove any recreational impact on Solent European sites comprises of developer contributions towards implementing the Solent Recreation Mitigation Strategy. Contributions range from £465 for a one bedroom dwelling to £1207 for a five bedroom dwelling.

Mitigation for recreational disturbance in the New Forest SAC / SPA / Ramsar site will be provided in agreement with Eastleigh Borough Council and Natural England.

Mitigation to prevent any additional nitrate from entering the Solent European sites can be delivered through purchase of nitrate credits by the developer. Each kilogramme of nitrate per year produced by the development is mitigated by a one-off payment of £3000 to the Council. The money is spent on removing land from arable production, thus stopping the nitrate run-off from that land into groundwater and thence into the Solent.

It is ascertained that the Botley Neighbourhood Plan will have no adverse effect upon the integrity of any European site acting alone, or in combination with other development.

1 Introduction

1.1 The plan being considered and context

1.1.1 Botley Parish Council is preparing a Neighbourhood Plan. This HRA considers the Screening Draft Neighbourhood Plan ahead of its publication. The Neighbourhood Plan adds detail to that found in the Eastleigh Borough Local Plan which was adopted in April 2022. For example, the Neighbourhood Plan allocates land for residential development in Botley, consistent with the number of dwellings proposed in the Local Plan. This gives the Parish Council a greater level of influence than if the Neighbourhood Plan did not exist.

1.1.2 A map of the Neighbourhood Plan area is provided in Appendix 1.

1.2 The Botley Neighbourhood Plan

1.2.1 Following many consultations with the community, the Steering Committee drew up the Vision and Objectives which captured all the comments and ideas which were brought out during the consultation exercise. These have been used to formulate policies which will deliver the Vision and Objectives for the community[1].

1.2.2 The objectives are to

- Preserve existing employment in Botley, as well as promoting retail development at Botley Mills, Boorley Park and Boorley Gardens
- Protect existing green space and archaeological and heritage assets as well as the River Hamble and local flora and fauna
- Create a Botley Museum as well as improving pedestrian access from the Village Square to Botley Mills and improve parking at the Botley Centre
- Improve movement routes which link all key services from existing and any new developments.
- Ensure that any future development doesn't have a detrimental impact on the village
- Provide housing which meets local needs, including affordable housing on site
- Make sure that any new building takes account of the high-pressure pipelines which pass through Botley
- Support the use of renewable energy systems.
- Make sure there is sufficient parking provision for all users of Botley schools
- Maintain and improve community infrastructure

1.3 Iterations of this report

1.3.1 This report was first issued in May 2022. Since then, there has been some variation of policies, with an amended Neighbourhood Plan at final submission stage dated January 2023. This version of the Habitats Regulations Assessment reflects the revised policies and discussions help between the Neighbourhood Plan Committee team, Eastleigh Borough Council and Natural England regarding European site mitigation.

1.4 What are the Habitats Regulations?

1.4.1 The Conservation of Habitats and Species Regulations 2017 (as amended) generally follow the Birds Directive and Habitats Directive but unlike the Directives there is no role for the European Union; the UK Government has taken that role following the end of the Brexit transition period on 31st December 2020. The following paragraphs consider the case in England only, with Natural England given as the appropriate nature conservation body.

[1] https://www.botley.com/?view=category&id=164

1.4.2 Special Protection Areas and Special Areas of Conservation are defined in the regulations as forming a national network of 'European sites'. The Regulations regulate the management of land within European sites, requiring land managers to have the consent of Natural England before carrying out management. Byelaws may also be made to prevent damaging activities and if necessary land can be compulsorily purchased to achieve satisfactory management.

1.4.3 The Regulations define competent authorities as public bodies or statutory undertakers. Competent authorities are required to make an appropriate assessment of any plan or project they intend to permit or carry out, if the plan or project is likely to have a significant effect upon a European site. The permission may only be given if the plan or project is ascertained to have no adverse effect upon the integrity of the European site. If the competent authority wishes to permit a plan or project despite a negative assessment, imperative reasons of over-riding public interest must be demonstrated, and there should be no alternatives to the scheme. The permissions process would involve the Secretary of State. In practice, there will be very few cases where a plan or project is permitted despite a negative assessment. This means that a plan such as the Botley Neighbourhood Plan has to be assessed, and the assessment must either decide that it is likely to have no significant effect on a European site or ascertain that there is no adverse effect upon the integrity of the European site.

1.5 Habitats Regulations Assessment process

1.5.1 A Habitats Regulations Assessment is a step-by-step process which is undertaken in order to determine whether a project or plan will have a likely significant effect (LSE) upon a European site. Before a competent authority can authorise a proposal, they must carry out an Appropriate Assessment of a plan or project in line with procedure detailed in the Habitats Regulations. The whole procedure is called a Habitats Regulations Assessment, with the Appropriate Assessment being part of one of four stages necessary to complete an HRA. The results of the HRA are intended to influence the decision of the competent authority when considering whether or not to authorise a proposal.

Stages of Habitats Regulations Assessment

1.5.2 *Stage One of the HRA is 'Screening'.* Plans or projects will be investigated for their potential to have a likely significant effect upon a European site. If the plan is likely to have a significant effect, and is not connected to the management of the site, an Appropriate Assessment is required. Proposals that are found not likely to have a significant effect upon a European site will be 'screened out' at this stage and no further investigation will be required.

1.5.3 *Stage Two of the HRA is the 'Appropriate Assessment and the Integrity Test'.* The plan-making authority must undertake an Appropriate Assessment which seeks to provide an objective and scientific assessment of how the proposed Local Plan may affect the qualifying features and conservation strategies of European sites. The whole plan must be assessed, but a 'scoping' exercise helps decide which parts of the plan have potential to give rise to significant effects and therefore where assessment should be prioritised. Natural England is an important consultee in this process and the public may also be consulted.

1.5.4 The UK Government accepts the definition for the 'integrity' of a site as *'the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which the site is (or will be) designated.'* Other factors may also be used to describe the 'integrity' of a site. The plan-making authority must ascertain, using scientific evidence and a precautionary approach, that the plan will not adversely affect the integrity of a European site, prior to adopting the plan. Information provided in the Appropriate Assessment will be used when considering the Integrity test.

1.5.5 *Stage Three of the HRA is 'Imperative reasons of overriding public interest and compensatory measures'.* If the Competent Authority determines that there are imperative reasons of overriding public interest notwithstanding adverse impacts upon the integrity of the European site, and there are no alternatives, the plan may be given effect. In this case, the plan-making authority must notify the Secretary of State at least 21 days before authorisation; the Secretary of State may

give a direction prohibiting the plan from being given effect. It is unlikely that this stage would be reached.

Consultations

1.5.6 Natural England is a statutory consultee, and so should be consulted at the draft and final plan stage. The public may also be consulted if it is considered appropriate, for example if the appropriate assessment is likely to result in significant changes to the plan. In practice, consultation on the Neighbourhood Plan will include consultation on this HRA.

Iterations and revision

1.5.7 The process is iterative; the conclusions of an earlier assessment may result in changes to the plan, and so a revision of the assessment would be required. If the revised assessment suggests further plan changes, the iteration will continue.

1.5.8 Iterative revisions typically continue until it can be ascertained that the plan will not have an adverse affect on the integrity of any European site.

1.5.9 There are further provisions for rare cases where over-riding public interest may mean that a land-use plan may be put into effect, notwithstanding a negative assessment, where there are no alternatives to development, but these provisions are not expected to be routinely used.

Guidance and good practice

1.5.10 This report has taken account of published guidance and good practice. A key source of information which summaries of legislative requirements, good practice guidance and case law (Tyldesley and Chapman 2013, regularly updated)[2] has been used during the writing of this report.

1.6 Why is Appropriate Assessment required?

1.6.1 The appropriate assessment process is required under the Conservation of Habitats and Species Regulations 2017 (as amended). Regulation 105 states that

> (1) Where a land use plan—
>
> (a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and
>
> (b) is not directly connected with or necessary to the management of the site,
>
> the plan-making authority for that plan must, before the plan is given effect, make an appropriate assessment of the implications for the site in view of that site's conservation objectives.
>
> (2) The plan-making authority must for the purposes of the assessment consult the appropriate nature conservation body and have regard to any representations made by that body within such reasonable time as the authority specify.
>
> (3) The plan-making authority must also, if it considers it appropriate, take the opinion of the general public, and if it does so, it must take such steps for that purpose as it considers appropriate.
>
> (4) In the light of the conclusions of the assessment, and subject to regulation 107, the plan-making authority must give effect to the land use plan only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).
>
> (5) A plan-making authority must provide such information as the appropriate authority may reasonably require for the purposes of the discharge by the appropriate authority of the obligations under this chapter.

[2] Tyldesley, D., & Chapman, C. (2013). *The Habitats Regulations Assessment Handbook*. DTA Publications Ltd

(6) This regulation does not apply in relation to a site which is—

(a) a European site by reason of regulation 8(1)(c); or

(b) a European offshore marine site by reason of regulation 18(c) of the Offshore Marine Conservation Regulations (site protected in accordance with Article 5(4) of the Habitats Directive.

1.6.2 The plan-making authority, as defined under the Regulations, is Eastleigh Borough Council, which will give legal effect to the Neighbourhood Plan following a positive referendum. The appropriate nature conservation body is Natural England.

1.7 European sites

1.7.1 European sites (also known as Natura 2000/N2K sites) are sites that have been classified or designated by Defra/Welsh Ministers or Natural England/Natural Resources Wales, as Special Protection Areas (SPA) for those sites where birds are the special interest feature, and Special Areas of Conservation (SAC) where the habitats or species (other than birds) are the reason for designation.

1.7.2 Wetlands of International Importance, designated under the Ramsar Convention, are not European sites. There may often be considerable overlap between the special interest features and boundaries of Ramsar sites, with European sites. However, for the purposes of planning and development, Government policy in the National Planning Policy Framework states that Ramsar sites should be treated equally/in the same way as European sites. The same applies for sites under consideration for designation including potential Special Protection Area (pSPA), Site of Community Importance (SCI), Candidate Special Area of Conservation (cSAC) and proposed Ramsar sites. In summary, although Appropriate Assessment only legally applies to European sites, National Planning Policy provides further obligations to ensure that all those sites previously mentioned are subject to assessment. Therefore, for the purposes of this report, the term 'European site(s)' refers to all sites under assessment.

1.7.3 As the interest features of the Ramsar sites are usually very similar to the interest features of the SPA and / or SAC designations, both geographically and ecologically, the assessment below, for clarity does not always repeat Ramsar site names. The assessment does however consider Ramsar sites fully, and if an assessment for a Ramsar site was found to differ from that for the respective SPA / SAC, this would be clearly identified.

1.7.4 European Marine Site (EMS) is a term that is often used for a SPA or SAC that includes marine components (i.e. land/habitats up to 12 nautical miles out to sea and below the Mean High Water Mark). A European Marine Site does not have a statutory designation of its own but is designated for the same reasons as the relevant SPA or SAC, and because of this they are not always listed as a site in their own right, to save duplication. For the purpose of this document, an EMS is referred to as an Inshore SPA (or SAC) with Marine Components and it will be made clear if an SPA/SAC has marine components.

1.8 Relationship with Eastleigh Borough Local Plan

1.8.1 The Eastleigh Borough Local Plan was adopted in April 2022. The Neighbourhood Plan is in general conformity with the policies which affect Botley, although further detail is included in the Neighbourhood Plan.

1.8.2 Habitats Regulations Assessment of the Eastleigh Borough Local Plan by Urban Edge Environmental Consulting (May 2021)[3] concluded that *The Eastleigh Borough Local Plan can be considered compliant with the Habitats Regulations with regards to: Emer Bog SAC, Mottisfont Bats SAC, New Forest SAC/SPA/Ramsar; River Itchen SAC; Solent Maritime SAC; Solent & Dorset Coast SPA; and Solent & Southampton Water SPA/Ramsar*. It is understood that this conclusion is equivalent to the conclusion necessary for Local Plan adoption; that it was ascertained that the

[3] Available at https://www.eastleigh.gov.uk/planning-and-building/planning-policy-and-implementation/local-plan/local-plan-adoption accessed on 11th May 2022

Local Plan would have no adverse affect upon the integrity of any European site, provided that suitable mitigation was implemented.

1.8.3 The HRA prepared by Urban Edge is referred to several times in this report, and the use of the work by Urban Edge is gratefully acknowledged.

2 European sites potentially affected

2.1 European sites

2.1.1 A search using Natural England's Interactive 'Magic Map'[4] revealed that a number of European sites lie within 20km of Botley Parish. European sites are those designated as Special Protection Areas (internationally important birds), and Special Areas of Conservation (internationally important habitats and species other than birds). Ramsar sites (globally important wetlands) are not European sites but are treated in planning policy if they are European sites; in practice there is usually great overlap between designated features and site boundaries.

2.1.2 European sites and Ramsar sites within 20km of Botley are

- Portsmouth Harbour Ramsar / SPA
- Chichester and Langstone Harbours Ramsar / SPA
- Solent and Southampton Water Ramsar / SPA
- River Itchen SAC
- Emer Bog SAC
- New Forest Ramsar / SAC / SPA
- Solent and Isle of Wight Lagoons SAC
- Solent Maritime SAC

2.1.3 Portsmouth Harbour Ramsar / SPA, Chichester and Langstone Harbours Ramsar / SPA, Solent and Southampton Water Ramsar / SPA, Solent and Isle of Wight Lagoons SAC and Solent Maritime SAC are collectively grouped together under the name of 'Solent European sites'.

2.1.4 Conservation Objectives for the SAC sites are

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring [To the extent applicable to qualifying natural habitats or qualifying species]:

- *The extent and distribution of qualifying natural habitats and habitats of qualifying species;*
- *The structure and function (including typical species) of qualifying natural habitats;*
- *The structure and function of the habitats of qualifying species;*
- *The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;*
- *The population of qualifying species; and*
- *The distribution of qualifying species within the site*.

2.1.5 Conservation objectives for the SPA sites are

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- *The extent and distribution of the habitats of the qualifying features;*
- *The structure and function of the habitats of the qualifying features;*
- *The supporting processes on which the habitats of the qualifying features rely;*
- *The population of each of the qualifying features; and*
- *The distribution of the qualifying features within the site*.

[4] http://magic.defra.gov.uk

Ramsar sites do not formally have Conservation Objectives; the overlap between designated site boundaries and qualifying features are such that the objectives for Ramsar sites which are also European sites would be similar.

2.1.6 Appendix 2 contains the New Forest SAC and SPA citations, Conservation Objectives and Natural England's supplementary advice on Conservation Objectives, together with its Ramsar data sheet. Appendix 3 contains the Solent European site SAC and SPA citations, Conservation Objectives and Natural England's supplementary advice on Conservation Objectives, together with its Ramsar data sheet. Appendix 4 is the River Itchen SAC citation, Conservation Objectives and Natural England's supplementary advice on Conservation Objectives. Appendix 5 is the Emer Bog SAC citation, Conservation Objectives and Natural England's supplementary advice on Conservation Objectives.

2.2 Other relevant Plans or Projects potentially affecting these sites

2.2.1 In addition to the potential impact that Botley Neighbourhood Plan may have upon the nearby European sites described above, other plans/documents/guidance may also impact upon these sites. The most relevant amongst these is the Eastleigh Borough Local Plan, with which the Botley Neighbourhood Plan is in general conformity.

3 Likely significant effects of Botley Neighbourhood Plan

3.1 The policies being assessed

3.1.1 The policies proposed in the initial screening draft of the BNP are:

- Policy 1: Retention of Existing Commercial Premises
- Policy 2: Retail development sites
- Policy 3: Protection and maintenance of Local Green Spaces
- Policy 4: Developer contribution
- Policy 5: Settlement gaps
- Policy 6: New cemetery provision
- Policy 7: SLAA-3-20-C northern parcel Woodhill School * (Policy 7 & 8 combined in submission copy and Policy 8 becomes "Mitigation")
- Policy 8: SLAA-3-21-C southern parcel Woodhill School *
- Policy 9: Site BO3 (Strategic Allocation)
- Policy 10: Utilities Provision
- Policy 11: Flood mitigation
- Policy 12: Strategic high and intermediate pressure pipelines and high voltage electric cables
- Policy 13 Parking standards for new residential developments
- Policy 14: Housing mix and affordable housing
- Policy 15: Built form, design and materials
- Policy 16: Renewable energy
- Policy 17: Off-road parking for educational facilities
- Policy 18: Community infrastructure.

3.2 Necessary or connected with management of European sites?

3.2.1 It is considered that the Botley Neighbourhood Plan is not necessary for, or connected with, the nature conservation management of any European sites.

3.3 Likely significant effects which might arise from policies and allocations within Botley Neighbourhood Plan

3.3.1 There are a number of potential impacts on European sites arising from policies and allocations within the Neighbourhood Plan. These include

- Increased recreational pressure: trampling of vegetation or disturbance to birds, or providing difficulties in site management for example.
- Increased pressure on water resources: The new homes and businesses would require a reliable source of drinking water which could affect wetlands from increased abstraction.
- Pollution impacts: Waste water discharge from new developments, including foul water discharges may reduce the water quality of rivers or wetlands.
- Pollution impacts: Additional traffic movements increasing emissions to air such as Nitrogen oxides NOx and Sulphur dioxide SO_2 which have the potential to result in adverse impact upon vegetation or water quality.

- Increased urbanisation of the countryside: predation by cats, fly-tipping, increase in arson, vandalism of European site infrastructure such as fences, disturbance of livestock, etc.

3.3.2 There are no direct land-take impacts on any European site in the allocations.

3.3.3 Impacts arising from any of the above factors upon a designated European site are unlikely to occur from any development in Botley alone. There may be cumulative effects of a large number of smaller developments in Eastleigh Borough and elsewhere. For example, the recreational impact on European sites caused by residents of a single small residential development may in itself have imperceptible impact, but the total recreational impact of a number of residential developments could be significant.

3.4 Conclusion of assessment of likely significant effect ('screening' stage)

3.4.1 It is concluded that the proposed Botley Neighbourhood Plan is likely to have a significant effect upon one or more European sites. The Local Plan is not necessary for, or connected with, nature conservation management of European sites. It is concluded that an appropriate assessment of impacts is necessary.

4 Appropriate Assessment of Botley Neighbourhood Plan prior to mitigation

4.1 Introduction to the Appropriate Assessment

4.1.1 This appropriate assessment considers impacts of the Neighbourhood Plan policies individually and collectively, and in the context of the whole plan. Cumulative impacts with other plans or projects are then considered.

4.2 Assessment of construction impacts on any European site

4.2.1 No allocations are within or close to any European site, so there would not be any construction impacts such as land-take or disturbance from the construction activities.

4.3 Increased recreational pressure: potential impacts.

4.3.1 Recreational use of a European site has the potential to:

- Cause damage to soils and vegetation through trampling and erosion;
- Cause disturbance to sensitive species, particularly ground-nesting birds and wintering wildfowl.
- Cause eutrophication as a result of dog fouling;
- Cause littering, giving rise to potential animal mortality, nutrient enrichment and small-scale pollution
- Prevent appropriate management or exacerbate existing management difficulties, for example grazing being restricted.

4.3.2 Different types of European sites are subject to different types of recreational pressures and have different vulnerabilities. Studies across a range of species have shown that the effects from recreation can be complex. Recreational pressure is likely to be generated by an increase in residents associated with the new housing but less so for employment development.

Trampling pressure and mechanical/abrasive damage

4.3.3 Most types of terrestrial European site can be affected by trampling, which in turn causes soil compaction and erosion, depending upon soil conditions, or changes to the vegetation. Motorcycle scrambling and off-road vehicle use can cause serious erosion, as well as disturbance to sensitive species but significant impacts can also arise from walkers, cyclists and horses, resulting in reduction in vegetation cover.

4.3.4 Studies in a variety of vegetation types have shown that low-growing, mat-forming grasses appear most resistant to trampling, while tall forbs (non-woody vascular plants other than grasses, sedges, rushes and ferns) were considered least resistant. Cover of hemicryptophytes and geophytes (plants with buds below the soil surface) was heavily reduced after two weeks of trampling pressure, but had recovered well after one year and as such these were considered to have resilience in respect of trampling pressure. Chamaephytes (plants with buds above the soil surface) were least resilient to trampling.

4.3.5 In practice this can mean changes to the vegetation community compromising the viability of taller growing fragile plant species in favour of species which have a leaf rosette which lies flat to the ground and often leading to a loss of rarer, more vulnerable plant species in favour of more robust, common species.

4.3.6 Dune habitat and other coastal ecosystems, heathlands and wetlands are amongst the most sensitive to trampling and erosion, whereas woodlands and meadowlands are more robust.

Eutrophication

4.3.7 Walkers with dogs contribute to pressure on sites through nutrient enrichment via dog fouling and the total volume of dog faeces deposited on sites can be surprisingly large. For example, at

Burnham Beeches National Nature Reserve over one year, Barnard[5] estimated the total amounts of urine and faeces from dogs as 30,000 litres and 60 tonnes respectively. Nutrient-poor habitats such as heathland, chalk grassland and certain types of fen vegetation are particularly sensitive to the fertilising effect of inputs of phosphates, nitrogen and potassium from dog faeces. Most impacts occur close to paths.

Disturbance

4.3.8 The deleterious effect of disturbance on birds stems from the fact that the birds are expending energy unnecessarily and the time they spend responding to disturbance is time that is not spent feeding. This can adversely affect the 'condition' and ultimately survival of the birds. In addition, displacement of birds from one feeding site to others can increase the pressure on the resources available within the remaining sites, as they have to sustain a greater number of birds. Disturbance of ground-nesting birds may result in the bird leaving the nest and exposing the eggs or chicks to predators or bad weather. Disturbed areas become unavailable for nesting even though the habitat may otherwise be suitable.

4.3.9 Walkers with dogs have potential to cause greater disturbance to fauna as dogs are less likely to keep to marked footpaths and move more erratically and this has been shown by number of studies, with birds flushing more readily, more frequently, at greater distances and for longer periods of time when dogs are present, particularly off-lead.

4.3.10 Where increased recreational use is predicted to cause adverse impacts on a site, avoidance and mitigation should be considered. Avoidance of recreational impacts at European sites involves location of new development away from such sites or provision of an alternative recreational resource.

Site management

4.3.11 Public access can cause conflict between people and habitats in terms of compromising effective site management. Dogs, rather than people, tend to be the cause of many management difficulties, notably by worrying grazing animals or necessitating moving cattle away from footpaths.

4.4 European sites affected by recreational impacts

4.4.1 Policy 7 of the Botley Neighbourhood Plan allocates approximately 58 dwellings to development at the former Woodhill Preparatory School. The nearest point of the allocations to Solent European sites is around 920 metres. However, there is no direct access to the nearest point of the Solent European site from the allocation sites, with no open access land or rights of way for some considerable distance. This is sufficient to conclude that the allocations in Policy 7 would have no adverse affect on the integrity of the European sites acting alone. There are likely to be adverse affects on the integrity of European sites cumulatively with other developments in Eastleigh Borough prior to the application of mitigation.

4.4.2 Strategic Allocation BO3 of the Eastleigh Borough Local Plan is referenced as Policy 9 within the Botley Neighbourhood Plan. The development is very slightly under 1km from Solent European sites, with River Hamble Country Park intervening and extending to the European site boundary. The Country Park, which is managed by Hampshire County Council, is sufficient to conclude that the allocation at BO3 would have no adverse affect on the integrity of the European sites acting alone. There are likely to be adverse affects on the integrity of European sites cumulatively with other developments in Eastleigh Borough prior to the application of mitigation

4.4.3 Other policies within Botley Neighbourhood Plan are unlikely to have any impact on any European site. The cumulative impact of recreation from all residential development in Botley, the remainder of Eastleigh Borough, and neighbouring Districts / Boroughs is likely to have an adverse affect upon some European sites prior to the application of mitigation. European sites affected by recreational impacts are Solent and Southampton Water SPA / Ramsar, which is within 5.6km of

[5] Barnard, A. (2003) Getting the Facts - Dog Walking and Visitor Number Surveys at Burnham Beeches and their Implications for the Management Process. *Countryside Recreation*, 11, 16 - 19

Botley, and New Forest SAC / SPA / Ramsar which is within 20km of Botley. Recreation impact include disturbance to birds, trampling of vegetation, etc. See Policy DM11 of the Eastleigh Borough Local Plan and the Local Plan's HRA for more detail.

4.4.4 There is no proposed development promoted by Botley Neighbourhood Plan which would affect a site known to be used by Waders and Brent Geese at times when these bird species fly from the SPA[6].

4.5 Increased pressure on water resources

4.5.1 The new homes would require a reliable source of drinking water. Proposed employment facilities would need a source of water for the domestic needs of the employees, and might also need water for manufacturing or other industrial processes such as washing.

4.5.2 The Eastleigh Borough Local Plan HRA explains that Southern Water is able to obtain authorisation from the Agency for abstractions over and above its revised abstraction licence under certain conditions, but a series of ecological monitoring, mitigation and compensation measures have been detailed to ensure there will be no adverse effects on integrity of any European site. Policy DM10 of the Eastleigh Borough Local Plan is also relevant. Development proposed within the Botley Neighbourhood Plan is in general conformity so that it can be concluded that increased water demand from the development in Botley would not impact any European site.

4.6 Pollution impacts: Waste water discharge

4.6.1 Reduction of water quality, from increased discharges of sewage and surface water drainage, or from pollution incidents, either during, or after, construction has potential to impact upon wetland and coastal European sites downstream of a settlement. The types of habitat which might be sensitive to that change would depend very much upon the nature and scale of the impact.

4.6.2 It is assumed that waste water discharge from developments, including foul water discharges, would be treated, but treatment does not remove all nitrate. There is also potential for chemical spillages and examples of discharge of untreated sewage[7].

4.6.3 In the absence of mitigation, residential development promoted in policies of within Botley Neighbourhood Plan would have an adverse affect upon the integrity of the Solent European sites through the addition of additional nitrate from treated and untreated sewage, and from urban run-off. See Policy DM11 of the Eastleigh Borough Local Plan and the Local Plan's HRA for more detail.

4.7 Pollution impacts: Additional traffic movements increasing emissions to air

4.7.1 The main airborne pollutants of concern in the context of their potential to give rise to adverse impacts upon European sites are oxides of nitrogen (NOx), ammonia (NH_3) and sulphur dioxide (SO_2).

4.7.2 The primary pollutants SO_2, NO and NO_2 are oxidised in the atmosphere to form SO_4^{2-} and NO_3^- respectively, while NH_3 reacts with these oxidised components to form NH_4^+ (ammonium). These pollutants know as aerosols can travel long distances, and together with primary pollutants can be deposited in the form of wet or dry deposition[8].

4.7.3 The Air Pollution Information System (APIS) provides a useful summary of the main pollutants, the effects they have on vegetation and other features for which European sites might be designated. Concentrations and deposition of air pollutants are assessed against a range on criteria to protect both human health and the environment. Environmental criteria include critical loads[9] for nitrogen deposition (kg Nitrogen ha^{-1} $year^{-1}$) and acid deposition and critical levels for ammonia (µg m^{-3}), sulphur dioxide (µg m^{-3}), nitrogen dioxide (µg m^{-3}), and ozone (ppb hours).

[6] https://solentwbgs.wordpress.com/page-2/ accessed on 11th May 2022

[7] For example, see https://www.bbc.co.uk/news/av/uk-59050129 accessed on 11th May 2022

[8] http://www.apis.ac.uk/starters-guide-air-pollution-and-pollution-sources

[9] http://www.apis.ac.uk/overview/issues/overview_Cloadslevels.htm

There are some critical loads for heavy metals but these are not currently used to assess impacts. There are no critical levels or loads for other pollutants but in some cases there are other assessment criteria such as environmental quality standards (EQS) and environmental assessment levels (EAL) which are not relevant to the present study.

4.7.4 NOx can have a directly toxic effect upon vegetation, but in addition to this, higher concentrations of NOx or ammonia within the atmosphere will lead to greater rates of nitrogen deposition to soils, leading to an increase in soil fertility, which can have a serious deleterious effect on the quality of semi-natural, nitrogen-limited terrestrial habitats. Most SAC sites are designated for the vegetation they support, and this is generally vegetation which would respond adversely to nutrient input, including increased input of Total Nitrogen. Both SO2 and NOx can lead to acid deposition and acidification of vegetation.

4.7.5 Housing development would be likely to give rise to increased levels of NOx arising from increased vehicle movements. Ammonia release is generally associated with increased numbers of agricultural livestock and certain industrial processes, including the production of energy from waste, and is unlikely to arise as a direct consequence of the Botley Neighbourhood Plan.

HRA of the Eastleigh Borough Local Plan concluded that there will be no adverse effect on the integrity of any European sites as a consequence of predicted changes in air quality arising from implementation of the Eastleigh Borough Local Plan, either alone or in combination with other plans and projects.

4.8 Increased urbanisation of the countryside

4.8.1 This class of impacts is closely related to recreational pressure in the sense that both types of impact arise from having an increased human population close to protected wildlife sites. The list of such impacts is extensive, but some of the more significant ones include the following:

Predation impacts from domestic pets

4.8.2 Predation by domestic cats can potentially affect small mammals, birds, amphibians and reptiles and results in injury, mortality and elevated levels of disturbance.

4.8.3 A survey undertaken in 1997 found that nine million British cats brought home 92 million prey items over a five-month period[10].

4.8.4 A large proportion of domestic cats are found in urban situations, and thus increasing urbanisation is likely to lead to increased cat predation. Domestic cats will potentially range up to 5km from home, although 60% of forays are over a distance of less than 400m[11] and the typical average distance for hunting excursions is around 375m[12] according to 20th century studies.

4.8.5 There have been two studies of cat ranging behaviour published in more recent years. These used GPS collars on cats in a village[13] and in Reading[14]. Both studies found that cats within the village and in urban / suburban areas of Reading has smaller home ranges than expected, with most cats in the village featured in the BBC study rarely leaving the village. The cat which roamed furthest in the BBC study went no more than 186m from its home.

4.8.6 The Reading study found that cats in dense urban areas travelled up to 79m, in suburban areas up to 141m and in town edge areas up to 148m. The suppression of cat travelling distances in areas of higher housing density suggests that as urban development progresses into the

[10] Woods, M. et al. 2003. Predation of wildlife by domestic cats Felis catus in Great Britain. *Mammal Review* 33, 2 174- 188

[11] Barratt, D.G. (1997). Home range size, habitat utilisation and movement patterns of suburban and farm cats Felis catus. *Ecography* 20 271-280

[12] Turner, D.C. & Meister, O. (1988). Hunting behaviour of the domestic cat. In: *The Domestic Cat: The Biology of Its Behaviour.* Ed. Turner, D.C. and Bateson, P. Cambridge University Press.

[13] BBC 'The Secret Life of Cats' at https://www.bbc.co.uk/news/science-environment-22567526 and https://www.bbc.co.uk/news/science-environment-22821639 both accessed on 16th December 2020

[14] Hugh J. Hanmer, Rebecca L. Thomas and Mark Fellowes (2017) Urbanisation influences range size of the domestic cat (Felis catus): consequences for conservation. Journal of Urban Ecology, 2017, 1-11

countryside, the cats on the former development edge would reduce their range in response to expansion of development into the area of countryside they formerly visited.

4.8.7 The predation impact of cats is therefore not cumulative as the introduction of 'new' cats because new development generally results in a reduction of 'existing' cats' range. The recent research suggests that even a 400m buffer zone from European in relation to cat predation may be over-precautionary and a 1km separation from allocations is more than adequate to prevent cat predation on qualifying features of European sites.

Fly-tipping

4.8.8 Fly-tipping tends to take place only a short distance from development and affects land alongside or close to highways[15]; often the terminus of a minor dead-end road, or adjacent to laybys on busier routes. The distance travelled will vary, but is likely to be usually less than 10km from source. Material dumped in this way is typically either household waste, including 'white goods' and green waste, tyres, or small-scale commercial waste. Depending upon the locality and nature of tipping, there may be harm to watercourses through pollution, damage to sensitive vegetation and in the case of green waste tipping in a woodland or wetland near to home, the release of alien invasive plant species into the wild; the species being dumped often being the more vigorous and hence potentially more invasive garden plants.

4.8.9 A 2016 report by Yorkshire Wildlife Trust[16] found that the greatest amount of fly-tipping and anti-social behaviour on its nature reserves, and theft from their nature reserves, were greatest when there were settlements within 100m. Where there were nature reserves 1km+ distant from the nearest settlement, these activities were still recorded but much less often.

Lighting

4.8.10 Light pollution can affect the foraging and commuting activities of bat species, although there may be minor impacts upon bird behaviour.

- The slower flying broad winged species, which include Barbastelle (a European site designated feature of Paston Great Barn SAC) generally avoid street lights[17] and well-lit areas.
- It is thought that insects are attracted to lit areas from further afield and this may result in adjacent habitats supporting reduced numbers of insects. This is a further impact on the ability of the light avoiding bats to be able to feed.
- Artificial lighting is thought to increase the chances of bats being preyed upon[18]. Many avian predators will hunt bats which may be one reason why bats avoid flying in the day. Observations have been made of kestrels (diurnal raptors) hunting at night under the artificial light along motorways. Lighting can be particularly harmful if used along commuting corridors such as river corridors, tree lines and hedgerows used by bats.

4.8.11 These urbanisation impacts are most likely to occur when a European site is within 1km of a settlement and therefore an allocation within 1km of a European site might increase urbanisation effects.

4.8.12 Policy 7 of the Botley Neighbourhood Plan allocates approximately 58 dwellings to development at the former Woodhill Preparatory School. The nearest point of the allocations to Solent European sites is around 920 metres. However, there is no direct access to the nearest point of the Solent European site from the allocation sites, with no open access land or rights of way for some considerable distance. This is sufficient to conclude that the allocation in Policy 7 would have no adverse affect on the integrity of the European sites acting alone. There are likely to be adverse affects on the integrity of European sites cumulatively with other developments in Eastleigh Borough prior to the application of mitigation

[15] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/595773/Flytipping_201516_statistical_release.pdf

[16] Rylatt, Garside and Robin (2017) Human Impacts on Nature Reserves – The Influence of Nearby Settlements. Yorkshire Wildlife Trust.

[17] http://www.bats.org.uk/data/files/bats_and_lighting_in_the_uk__final_version_version_3_may_09.pdf

[18] http://www.bats.org.uk/data/files/bats_and_lighting_in_the_uk__final_version_version_3_may_09.pdf

4.8.13 Strategic Allocation BO3 of the Eastleigh Borough Local Plan is referenced as Policy 9 within the Botley Neighbourhood Plan. The development is very slightly under 1km from Solent European sites, with River Hamble Country Park intervening and extending to the European site boundary. The Country Park, which is managed by Hampshire County Council, is sufficient to conclude that the allocation at BO3 would have no adverse affect on the integrity of the European sites acting alone. There are likely to be adverse affects on the integrity of European sites cumulatively with other developments in Eastleigh Borough prior to the application of mitigation.

4.9 Summary of adverse affect of individual Neighbourhood Plan policies

4.9.1 The policies of the Botley Neighbourhood Plan are summarised in the table below with respect to impacts upon European sites.

Policy	Description	Impact on European site	Mitigation requirement?
Policy 1: Retention of existing commercial premises	Policy encouraging the retention, provision and protection of existing business (Class E uses) in the Botley Neighbourhood Area	None – existing business use is not known to have an impact on European sites and no additional development is proposed.	No
Policy 2: Retail development sites	Policy which supports the provision of small business units, the provision of local shops and re-use of redundant agricultural buildings for business use	None – these developments are generally unlikely to impact on European sites and there are no allocations. If a non-allocated development came forward it may need an individual HRA under Local Plan Policy DM11.	No
Policy 3: Protection and maintenance of Local Green Spaces	Protective policy which identifies 30 existing open spaces for protection as Local Green Space	There are no impact pathway to European sites. Protection of Local Green Spaces maintains their current value as alternatives to visiting a European site.	No
Policy 4: Infrastructure investment priorities	Policy identifies projects for spending developer contributions	Projects such as increasing parking at Botley Centre and improving the network of movement routes are unlikely to result in air pollution or other impacts upon any European site.	No
Policy 5: Site for new cemetery	Policy supports the provision of a new cemetery in the Botley Neighbourhood Area but is not site specific	None – cemetery developments are generally unlikely to impact on European sites and there are no allocations. If a non-allocated development came forward it may need an individual HRA under Local Plan policy DM11.	No
Policy 6: Settlement gaps	Identifies a number of new settlement gaps including those proposed in addition to those identified in the emerging Eastleigh Borough Local Plan (2016-2036)	There are no impact pathway to European sites	No
Policy 7: SLAA-3-20-C / SLAA-3-21-C Woodhill School	Policy supports the development of approximately 58 dwellings which will include making use of the existing school building. 40%	Yes – the allocation will contribute to cumulative recreational impacts upon Solent European sites and New Forest SAC / SPA / Ramsar. The	Yes

Policy	Description	Impact on European site	Mitigation requirement?
	affordable housing is required along with associated open space	allocation will also contribute to increased nitrate reaching Solent European sites via treated and untreated sewage and run-off.	
Policy 8 Mitigation in Development	Development will only be permitted where adequate mitigation is provided in respect of cumulative recreation upon New Forest European sites, recreational impact and nitrate impacts on Solent European sites.	The policy will prevent an adverse affect of integrity on the European sites from residential development.	n/a
Policy 9 Site BO3 (Strategic Allocation) proposals	Policy proposes additional criteria further to that in Policy BO3 of the emerging Eastleigh Local Plan (2016-2036) if retained following consideration by the inspector. This includes additional requirements such biodiversity measures and the type of development (e.g. 40% affordable housing, the provision of a cemetery and allotments or community space).	Yes – by accepting and adding detail to this site which is already allocated in the Local Plan, the Neighbourhood Plan recognises and accepts the allocation. The allocation will contribute to cumulative recreational impacts upon Solent European sites and New Forest SAC / SPA / Ramsar. The allocation will also contribute to increased nitrate reaching Solent European sites via treated and untreated sewage and run-off.	Yes
Policy 10: Utilities Provision	Policy proposes to ensure that new development proposals have the required infrastructure for surface water drainage, wastewater and electricity.	There are no impact pathways to European sites.	No
Policy 11: Flood mitigation	Policy proposes that new development incorporates the use of Sustainable Urban Drainage Systems (SuDS) for ensuring the discharge of surface water flows.	There are no impact pathways to European sites.	No
Policy 12: Strategic high and intermediate pressure pipelines and high voltage electric cables	Policy seeks to ensure all new development complies with the existing safety requirements in relation to Consultation Distances around major accident hazard pipelines and for the Health and Safety Executive Planning Advice Web App to be used for identifying if a proposed site lies within the Consultation Distance of any of these strategic pipelines or cables.	There are no impact pathways to European sites.	No
Policy 13 Parking standards for new residential developments	The policy sets the requirements for off-street parking for new residential development (standards are	There are no impact pathways to European sites.	No

Policy	Description	Impact on European site	Mitigation requirement?
	proposed for 1-5 bed dwellings)		
Policy 14: Housing mix and affordable housing	The policy includes criteria for meeting specified local needs and requirements for affordable housing (e.g. all new development is expected to provide at least 35% affordable housing with 40% to be achieved on developments of 50 dwellings and above).	There are no impact pathways to European sites.	No
Policy 15: Built form, design and materials	Policy includes criteria for ensuring new development in the Botley Neighbourhood Area is well designed and promotes measures such as non-car use in larger schemes, EV charging points and facilities for storing refuse and recycling bins out of sight. This also includes new development being consistent with the requirements of the Botley Design Guide.	There are no impact pathways to European sites.	No
Policy 16: Renewable energy	Policy supports the provision of a range of small-scale and micro-scale renewable energy schemes in new development where possible and practical.	There are no impact pathways to European sites.	No
Policy 17: Off-road parking for educational facilities	Policy supports increased parking provision for where this is currently considered to be inadequate for users of educational facilities	There are no impact pathways to European sites.	No
Policy 18: Community infrastructure	Policy supports the retention of community facilities unless their replacement can be justified through the criteria included in the policy. New and improved community facilities are also supported.	There are no impact pathways to European sites. If a non-allocated development came forward it may need an individual HRA under Local Plan Policy DM11.	No

5 Mitigation for impacts of the Neighbourhood Plan

5.1 Recreational impacts, Solent European sites

5.1.1 To mitigate for the cumulative impact of residential development causing an increase in recreational harm, the Solent Recreation Mitigation Strategy[19] was prepared and adopted by several Local Planning Authorities including Eastleigh Borough Council. The Strategy delivers the following mitigation

- A team of 5-7 coastal rangers to advise people on how to avoid bird disturbance, liaise with landowners, host school visits, etc;
- Communications, marketing and education initiatives and an officer to implement them;
- Initiatives to encourage responsible dog walking and an officer to implement them;
- Preparation of codes of conduct for a variety of coastal activities;
- Site-specific projects to better manage visitors and provide secure habitats for the birds;
- Providing new/enhanced greenspaces as an alternative to visiting the coast;
- A partnership manager to coordinate and manage all the above.

5.1.2 Implementation of these measures and monitoring of their effectiveness, are funded by 'developer contributions' calculated according to the bedroom numbers of the property.

5.1.3 Contributions rise annually by the Retail Price Index. Contributions from 1st April 2024 are

- 1 bedroom property £465
- 2 bedroom property £671
- 3 bedroom property £875
- 4 bedroom property £1029
- 5 bedroom property £1207

5.1.4 There is a flat rate contribution of £777 per property if the dwelling mix is unknown, for example for outline permissions.

5.1.5 This mitigation is secured through the development management process by Eastleigh Borough Council implementing its Policy DM11. The mitigation is effective in preventing recreational harm to Solent European sites from development in Botley Neighbourhood Plan Policies 7 and 9.

5.2 Recreational impacts, New Forest SAC / SPA / Ramsar

5.2.1 Mitigation for recreational disturbance on the New Forest will be provided in agreement with Eastleigh Borough Council and Natural England. Until this agreement is reached and a scheme is in place, no residential development allocated by the Neighbourhood Plan can be permitted.

5.2.2 The mitigation will be effective in preventing recreational harm to New Forest SAC / SPA / Ramsar site from development in Botley Neighbourhood Plan Policies 7 and 9.

5.3 Nutrient neutrality

5.3.1 To prevent the proposed residential development in Botley Neighbourhood Plan from contributing additional nitrate via sewage works discharge and urban run-off to the Solent European sites, the development is required to demonstrate nutrient neutrality[20] under Policy DM11 of the Local Plan. If there is a calculated net output of nitrates, Eastleigh Borough has a scheme in place so that developers can offset their nutrient outputs against council land through the purchase of credits.

[19] https://birdaware.org/solent/wp-content/uploads/sites/2/2021/10/Solent_Recreation_Mitigation_Strategy.pdf accessed on 11th May 2022
[20] https://www.eastleigh.gov.uk/planning-and-building/water-quality-issues-in-the-solent-catchment-area accessed on 11th May 2022

There are three areas of arable land, in Botley, Bishopstoke and West End which are owned by the Borough Council and which are taken out of arable production to stop the leaching of nitrates into groundwater which then flows into the Solent. For each kilogramme of nitrate produced per year, the one-off cost to developers is £3000[21].

5.3.2 The mitigation is effective in preventing nitrates harm to Solent European sites from development in Botley Neighbourhood Plan Policies 7 and 9.

[21] https://www.eastleigh.gov.uk/planning-and-building/nutrient-neutrality-offset-scheme

6 Conclusions

6.1 Botley Neighbourhood Plan, acting alone

6.1.1 It is ascertained that the Screening Draft Neighbourhood Plan would have no adverse affect upon the integrity of any European site acting alone.

6.2 Botley Neighbourhood Plan in combination with other plans or projects

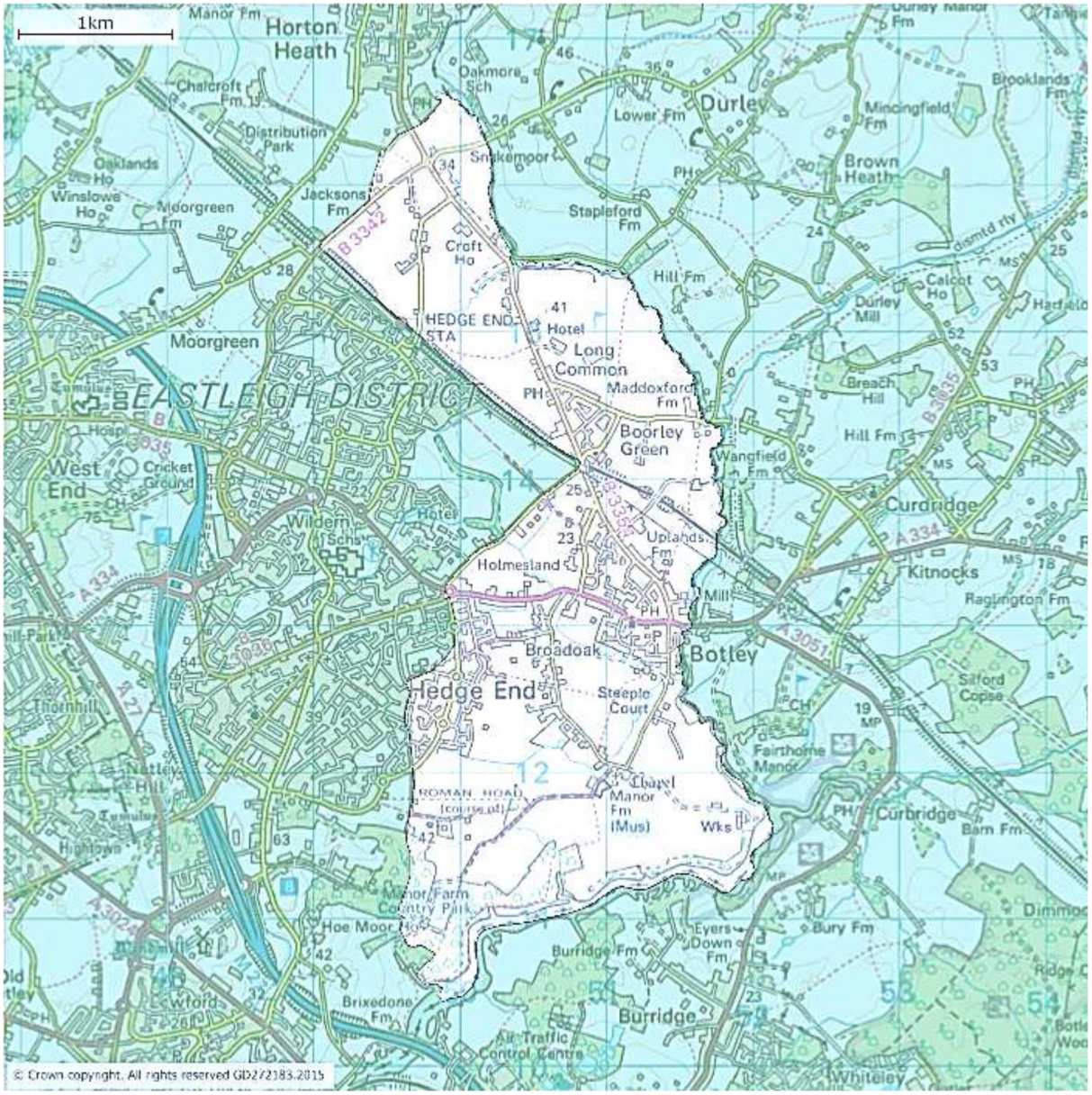
6.2.1 It is ascertained that the Screening Draft Neighbourhood Plan would have no adverse affect upon the integrity of any European site. Mitigation for recreational harm to Solent European sites, recreational harm to New Forest SAC / SPA / Ramsar site, and nitrate production causing harm to Solent European sites is secured through Policy DM11 of the Eastleigh Borough Local Plan. Mitigation for Solent sites consist of contributions to the Solent Recreation Mitigation Strategy and to nutrient neutrality credits. Mitigation for impacts on the New Forest SAC / SPA / Ramsar will be provided in agreement with Eastleigh Borough Council and Natural England. Until this agreement is reached and a scheme is in place, no residential development allocated by the Neighbourhood Plan can be permitted.

6.3 Overall conclusion

6.3.1 It is concluded that there would be no adverse affect upon the integrity of any European site from the Botley Neighbourhood Plan acting alone or in combination with any other plan or project.

Appendix 1

Map of the Botley Neighbourhood Area



Appendix 2

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	The New Forest
Unitary Authority/County:	Hampshire, Wiltshire
SAC status:	Designated on 1 April 2005
Grid reference:	SU225075
SAC EU code:	UK0012557
Area (ha):	29262.36
Component SSSI:	Landford Bog SSSI, Langley Wood and Homan's Copse SSSI, Loosehanger Copse and Meadows SSSI, Roydon Woods SSSI, The New Forest SSSI, Whiteparish Common SSSI

Site description:

The New Forest embraces the largest area of 'unsown' vegetation in lowland England and includes the representation on a large scale of habitats formerly common but now fragmented and rare in lowland western Europe. The intimate mosaic of habitats owes much to the local geology and traditional commoning grazing system, a situation which is uncommon in lowland England. The habitats include lowland heath, valley and seepage step mire, or fen, and ancient pasture woodland, including riparian and bog woodland. Nowhere else do these habitats occur in combination and on so large a scale. Within the matrix of habitats are pasture woodland and scrub dominated by oak, beech and holly; heathland and associated grassland; wet heath, valley mire-fen and plantations dating from various periods since the early 18th century, and a range of acid to neutral grasslands.

The New Forest contains the most extensive areas of active wood-pasture in north west Europe comprising mature, semi-natural beech *Fagus sylvatica*, which represent Atlantic beech forests in the most southerly part of the habitat's range, together with old oak *Quercus* spp. This mosaic, with other types of woodland and heath, has allowed unique and varied assemblages of epiphytic lichens and saproxylic (dead wood) invertebrates – in particular the stag beetle, *Lucanus cervus* – to be sustained in situations where the woodland is open and the tree trunks receive sunlight.

Occasionally in wet hollows, birch – willow *Betula – Salix* stands occur over valley bog vegetation, with fringing alder *Alnus – Sphagnum* stands where there is some water movement. These stands of bog woodland appear to have persisted for long periods in stable association with the underlying *Sphagnum* bog-moss communities. The rich epiphytic lichen communities and pollen record provide evidence for the persistence of this association.

The Forest also contains many streams and small rivers some of which are less affected by drainage and canalisation than those in any other comparable area in the lowlands of England. Associated with many of the streams, particularly those with alkaline and neutral groundwater, are areas of alder *Alnus glutinosa* woodland which, collectively, form an extensive resource with a rich flora. In places there are examples of transitions from open water through reedswamp and fen to alder woodland. In other places there are transitions to oak woods and beech forests with holly and sometimes yew in the shrub layer.

The site contains the most extensive stands of lowland northern Atlantic wet heaths in southern England, mainly of the *Erica tetralix – Sphagnum compactum* type; *Schoenus nigricans – Narthecium ossifragum* mire is also found on this site. The wet heaths are

important for rare plants, such as marsh gentian *Gentiana pneumonanthe* and marsh clubmoss *Lycopodiella inundata*, and a number of dragonfly species, including the scarce blue-tailed damselfly *Ischnura pumilio*, southern damselfly *Coenagrion mercuriale* and small red damselfly *Ceriagrion tenellum*.

The largest area of lowland dry heathland in the UK is also found in the Forest. It is particularly important for the diversity of its habitats and the range of rare and scarce species it supports. The dry heaths of the New Forest comprise two main communities; the *Calluna vulgaris – Ulex minor* heath type, and *Ulex minor – Agrostis curtisii* heath type. There are a wide range of transitions between dry heath and wet heath, *Molinia* grassland, fen, acid grassland and various types of scrub and woodland. The New Forest *Molinia* meadows are unusual in the UK in terms of their species composition and management. The heathy form of *Molinia caerulea – Cirsium dissectum* fen-meadow occurs in areas of heavy grazing by ponies and cattle in areas known locally as 'lawns', often in a fine-scale mosaic with wet heaths and other mire and grassland communities. These lawns occur on flushed soils on slopes and on level terrain on the floodplains of rivers and streams. The grasslands are species-rich, and particular features are the abundance of small sedges such as carnation sedge *Carex panicea*, common sedge *C. nigra* and yellow-sedge *C. viridula* ssp. *oedocarpa*, and the more frequent occurrence of mat-grass *Nardus stricta* and petty whin *Genista anglica* compared to stands elsewhere in the UK.

Hatchet Pond, and associated ponds, are examples of oligotrophic (nutrient-poor) waterbodies amidst wet and dry lowland heath developed over fluvial deposits. It contains shoreweed *Littorella uniflora* and isolated populations of northern species such as bog orchid *Hammarbya paludosa* and floating bur-reed *Sparganium angustifolium*, alongside rare southern species such as Hampshire-purslane *Ludwigia palustris*. This pond is important as a southern example of this lake type where northern species, more common in the uplands of the UK, co-exist with southern species.

The site also contains nutrient-poor vegetation on the edge of large temporary ponds, shallow ephemeral pools and poached damp hollows in grassland, which support a number of specialist species in a zone with toad rush *Juncus bufonius*. These include the two nationally scarce species coral-necklace *Illecebrum verticillatum* and yellow centaury *Cicendia filiformis*, often in association with allseed *Radiola linoides* and chaffweed *Anagallis minima*. Continuous grazing pressure is of prime importance in the maintenance of the outstanding flora of these temporary pond communities. Temporary ponds occur throughout the Forest in depressions capable of holding water for part of the year. Most ponds are small (between 5-10m across) and, although great in number, amount to less than 10ha in total area. Many of these contain great crested newt, *Triturus cristatus*.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Alkaline fens. (Calcium-rich springwater-fed fens)
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*). (Alder woodland on floodplains)*
- *Asperulo-Fagetum* beech forests. (Beech forests on neutral to rich soils)
- Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*). (Beech forests on acid soils)
- Bog woodland*
- Depressions on peat substrates of the *Rhynchosporion*
- European dry heaths
- *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*). (Purple moor-grass meadows)
- Northern Atlantic wet heaths with *Erica tetralix*. (Wet heathland with cross-leaved heath)
- Old acidophilous oak woods with *Quercus robur* on sandy plains. (Dry oak-dominated woodland)
- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea*. (Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels)
- Oligotrophic waters containing very few minerals of sandy plains: *Littorelletalia uniflorae*. (Nutrient-poor shallow waters with aquatic vegetation on sandy plains)
- Transition mires and quaking bogs. (Very wet mires often identified by an unstable 'quaking' surface)

Qualifying species: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Great crested newt *Triturus cristatus*
- Southern damselfly *Coenagrion mercuriale*
- Stag beetle *Lucanus cervus*

Annex I priority habitats are denoted by an asterisk (*).

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0012557
Date of registration: 14 June 2005

Signed: Trevor Salmon

On behalf of the Secretary of State for Environment, Food and Rural Affairs

European Site Conservation Objectives for The New Forest Special Area of Conservation Site Code: UK0012557

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of qualifying natural habitats and habitats of qualifying species**
- **The structure and function (including typical species) of qualifying natural habitats**
- **The structure and function of the habitats of qualifying species**
- **The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely**
- **The populations of qualifying species, and,**
- **The distribution of qualifying species within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H3110. Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*); Nutrient-poor shallow waters with aquatic vegetation on sandy plains

H3130. Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*; Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels

H4010. Northern Atlantic wet heaths with *Erica tetralix*; Wet heathland with cross-leaved heath

H4030. European dry heaths

H6410. Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*); Purple moor-grass meadows

H7140. Transition mires and quaking bogs; Very wet mires often identified by an unstable `quaking` surface

H7150. Depressions on peat substrates of the *Rhynchosporion*

H7230. Alkaline fens; Calcium-rich springwater-fed fens

H9120. Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae or Ilici-Fagenion*); Beech forests on acid soils

H9130. *Asperulo-Fagetum* beech forests; Beech forests on neutral to rich soils

H9190. Old acidophilous oak woods with *Quercus robur* on sandy plains

H91D0. Bog woodland*

H91E0. Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*); Alder woodland on floodplains*

S1044*. Coenagrion mercuriale*; Southern damselfly

S1083*. Lucanus cervus*; Stag beetle

S1166*. Triturus cristatus*; Great crested newt

* denotes a priority natural habitat or species (supporting explanatory text on following page)

*** Priority natural habitats or species**

Some of the natural habitats and species listed for which UK SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Habitats Directive. The term 'priority' is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the "Habitats Regulations"). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

European Site Conservation Objectives: Supplementary advice on conserving and restoring site features

The New Forest Special Area of Conservation (SAC)
Site code: UK0012557

Ancient Pasture Woodland in the New Forest. Photo: Bryan White

Date of Publication: 18 March 2019

About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to The New Forest SAC. This advice should therefore be read together with the SAC Conservation Objectives.

Where this site overlaps with other European Sites, you should also refer to the separate European Site Conservation Objectives and Supplementary Advice (where available) provided for those sites

This advice replaces a draft version dated 8 February 2019 following the receipt of comments from the site's stakeholders.

You should use the Conservation Objectives, this Supplementary Advice and any case-specific advice given by Natural England when developing, proposing or assessing an activity, plan or project that may affect this site'

This Supplementary Advice to the Conservation Objectives presents attributes which are ecological characteristics of the designated species and habitats within a site. The listed attributes are considered to be those that best describe the site's ecological integrity and which, if safeguarded, will enable achievement of the Conservation Objectives. Each attribute has a target which is either quantified or qualitative depending on the available evidence. The target identifies as far as possible the desired state to be achieved for the attribute.

The tables provided below bring together the findings of the best available scientific evidence relating to the site's qualifying features, which may be updated or supplemented in further publications from Natural England and other sources. The local evidence used in preparing this supplementary advice has been cited. The references to the national evidence used are available on request. Where evidence and references have not been indicated, Natural England has applied ecological knowledge and expert judgement. You may decide to use other additional sources of information.

In many cases, the attribute targets shown in the tables indicate whether the current objective is to 'maintain' or 'restore' the attribute. This is based on the best available information, including that gathered during monitoring of the feature's current condition. As new information on feature condition becomes available, this will be added so that the advice remains up to date.

The targets given for each attribute do not represent thresholds to assess the significance of any given impact in Habitats Regulations Assessments. You will need to assess this on a case-by-case basis using the most current information available.

Some, but not all, of these attributes can also be used for regular monitoring of the actual condition of the designated features. The attributes selected for monitoring the features, and the standards used to assess their condition, are listed in separate monitoring documents, which will be available from Natural England.

These tables do not give advice about SSSI features or other legally protected species which may also be present within the European Site.

If you have any comments or queries about this Supplementary Advice document please contact your local Natural England adviser or email HDIRConservationObjectivesNE@naturalengland.org.uk

About this site

European Site information

Name of European Site	The New Forest Special Area of Conservation (SAC)
Location	Hampshire, Wiltshire
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	1 April 2005
Qualifying Features	See section below
Designation Area	29,262.36ha
Designation Changes	n/a
Feature Condition Status	Details of the feature condition assessments made at this site can be found using Natural England's Designated Sites System
Names of component Sites of Special Scientific Interest (SSSIs)	The New Forest SSSI,Lymington River SSSI, River Avon System SSSI, Landford Bog SSSI, Langley Wood and Homan's Copse SSSI, Loosehanger Copse and Meadows SSSI, Roydon Woods SSSI, Whiteparish Common SSSI, Norley Copse and Meadows SSSI.
Relationship with other European or International Site designations	The boundary of the New Forest SAC overlaps with New Forest SPA and River Avon SAC

Site background and geography

The New Forest falls within the New Forest National Character Area (NCA Profile 131) and embraces the largest area of 'unsown' vegetation in lowland England and includes the representation on a large scale of habitats formerly common but now fragmented and rare in lowland western Europe. The intimate mosaic of habitats owes much to the local geology and traditional commoning grazing system, a situation which is uncommon in lowland England.

The New Forest sits in the centre of a dip in the surrounding chalk known as the Hampshire Basin and comprises a series of eroded terraces of soft sedimentary clays and sands capped with flint gravel, brickearth and other superficial deposits. The Soils are mainly acid, poor in nutrients, susceptible to leaching and only slowly permeable with locally enriched areas. This great variation in its soils is reflected in the New Forest's distinctive vegetation.

The habitats include lowland heath, valley and seepage step mire, or fen, and ancient pasture woodland, including riparian and bog woodland and a range of acid to neutral grasslands. Nowhere else do these habitats occur in combination and on so large a scale. Outstanding examples of thirteen habitats of European interest are represented together with two priority habitat types, bog woodland and riverine woodland, these habitats support an exceptionally rich diversity of fauna and flora which for much of the site are dependent on traditional management practices of grazing through Rights of Common complemented by annual heathland burning and cutting programmes. These provide structural diversity and a range of niches for plants and animals to utilise.

With substantial development close by the Forest and within easy reach of two major urban areas it is estimated by the National Park Authority that the New Forest receives over 13 million day visits a year.

Much of the New Forest SAC has permissive public access and there are a wide range of activities including traditional countryside pursuits and sports events permitted by the landowners. Within the SAC are ten campsites providing 3,300 pitches, three 18 hole golf courses and a number of cricket pitches.

A small part of the site, Kingston Great Common, is declared as a National Nature Reserve managed by Natural England.

About the qualifying features of the SAC

The following section gives you additional, site-specific information about this SAC's qualifying features. These are the natural habitats and/or species for which this SAC has been designated.

Qualifying habitats:

- **H3110. Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*); 'Nutrient-poor shallow waters with aquatic vegetation on sandy plains'**

This type of waterbody is restricted to sandy plains that are acidic and low in nutrients, and are therefore very scarce. The water is typically very clear and moderately acid. Destruction of lowland heaths, land drainage and nutrient enrichment have contributed to the scarcity of the habitat type. The habitat type is characterised by the presence of *Littorelletalia*-type vegetation. Such vegetation is characterised by the presence of water lobelia *Lobelia dortmanna*, shoreweed *Littorella uniflora*, or quillwort *Isoetes lacustris*.

One of the three ponds at Hatchet Pond in the New Forest is an example of an oligotrophic waterbody amidst wet and dry lowland heath developed over fluvial deposits. It contains shoreweed *Littorella uniflora* and isolated populations of northern species such as bog orchid *Hammarbya paludosa* and floating bur-reed *Sparganium angustifolium*, alongside rare southern species such as Hampshire-purslane *Ludwigia palustris*. Hatchet Pond is therefore important as a southern example of this lake type where northern species, more common in the uplands of the UK, co-exist with southern species.

- **H3130. Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*; 'Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels'**

The clear soft water which characterises this habitat type contains low to moderate levels of plant nutrients and supports a characteristic assemblage of plant species. The vegetation community is characterised by amphibious short perennial vegetation, with shoreweed *Littorella uniflora* being considered as the defining component. This species often occurs in association with water lobelia *Lobelia dortmanna*, bog pondweed *Potamogeton polygonifolius*, quillwort *Isoetes lacustris*, bulbous rush *Juncus bulbosus*, needle spike-rush *Eleocharis acicularis*, alternate water milfoil *Myriophyllum alterniflorum* and floating water bur-reed *Sparganium angustifolium*. Yellow water-lily *Nuphar lutea*, amphibious bistort *Persicaria amphibia*, stoneworts *Chara* spp., least bur-reed *Sparganium natans* and other pondweeds *Potamogeton* spp. may be present in more mesotrophic conditions.

In the New Forest vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea* occurs on the edge of large temporary ponds, shallow ephemeral pools and poached damp hollows in grassland, which support a number of specialist species in a zone with toad rush *Juncus bufonius*. These include the two nationally scarce species coral-necklace *Illecebrum verticillatum* and yellow centaury *Cicendia filiformis*, often in association with allseed *Radiola linoides* and chaffweed *Anagallis minima*. Heavy grazing pressure is of prime importance in the maintenance of the outstanding flora of these temporary pond communities. Livestock maintain an open habitat, controlling scrub ingress, and trampling the surface. Commoners' animals also transport seed in their hooves widely from pond to pond where suitable habitat exists. Temporary ponds occur throughout the Forest in depressions capable of holding water for part of the year. Most ponds are small (between 5-10 m across) and, although great in number, amount to less than 10 ha in total area.

- **H4010. Northern Atlantic wet heaths with *Erica tetralix*; 'Wet heathland with cross-leaved heath'**

Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils on impeded drainage. The vegetation is typically dominated by mixtures of cross-leaved heath *Erica tetralix,* heather *Calluna vulgaris,* grasses, sedges and *Sphagnum* bog-mosses

The New Forest contains the most extensive stands of lowland northern Atlantic wet heaths in southern England, mainly of the M16 *Erica tetralix – Sphagnum compactum* type. M14 *Schoenus nigricans – Narthecium ossifragum* mire is also found on this site. The wet heaths are important for rare plants, such as marsh gentian *Gentiana pneumonanthe* and marsh clubmoss *Lycopodiella inundata*, and a number of dragonfly species, including the scarce blue-tailed damselfly *Ischnura pumilio* and small red damselfly *Ceriagrion tenellum*. There is a wide range of transitions between wet heath and other habitats, including dry heath, various woodland types, *Molinia* grasslands, fen, and acid grassland. Wet heaths enriched by bog myrtle *Myrica gale* are a prominent feature of many areas of the Forest. Unlike much lowland heath, the New Forest heaths continue to be extensively grazed by cattle and horses, favouring species with low competitive ability.

- **H4030. European dry heaths**

European dry heaths typically occur on freely-draining, acidic to circum-neutral soils with generally low nutrient content. Ericaceous dwarf-shrubs dominate the vegetation. The most common is heather *Calluna vulgaris*, which often occurs in combination with gorse *Ulex* spp., bilberry *Vaccinium* spp. or bell heather *Erica cinerea*, though other dwarf-shrubs are important locally. Nearly all dry heath is semi-natural, being derived from woodland through a long history of grazing and burning**.**

The New Forest represents European dry heaths in southern England and is the largest area of lowland heathland in the UK. It is particularly important for the diversity of its habitats and the range of rare and scarce species which it supports. The New Forest is unusual because of its long history of grazing in a traditional fashion by ponies and cattle. The dry heaths of the New Forest are of the H2 *Calluna vulgaris – Ulex minor* heath type, and H3 *Ulex minor – Agrostis curtisii* heath is found on damper areas. There are a wide range of transitions between dry heath and wet heath, *Molinia* grassland, fen, acid grassland and various types of scrub and woodland. Both the New Forest and the two Dorset Heath SACs are in southern England. All three areas are selected because together they contain a high proportion of all the lowland European dry heaths in the UK. There are, however, significant differences in the ecology of the two areas, associated with more oceanic conditions in Dorset and the continuous history of grazing in the New Forest.

- **H6410. *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*); 'Purple moor-grass meadows'**

Molinia meadows are found mainly on moist, moderately base-rich, peats and peaty gley soils, often with fluctuating water tables. They usually occur as components of wet pastures or fens, and often form mosaics with dry grassland, heath, mire and scrub communities. This habitat type includes the most species-rich *Molinia* grasslands in the UK, in which purple moor-grass *Molinia caerulea* is accompanied by a wide range of associated species, including rushes, sedges and tall-growing herbs. The New Forest represents *Molinia* meadows in southern England.

The site supports a large area of the heathy form of M24 *Molinia caerulea – Cirsium dissectum* fen-meadow. This vegetation occurs in situations of heavy grazing by ponies and cattle in areas known locally as 'lawns', often in a fine-scale mosaic with 4010 Northern Atlantic wet heaths and other mire and grassland communities. These lawns occur on flushed soils on slopes and on level terrain on the floodplains of rivers and streams. The New Forest *Molinia* meadows are unusual in the UK in terms of their species composition, management and landscape position. The grasslands are species-rich, and a particular feature is the abundance of small sedges such as carnation sedge *Carex panicea*, common sedge *C. nigra* and yellow-sedge *C. viridula* ssp. *oedocarpa*, and the more frequent occurrence of mat-grass *Nardus stricta* and petty whin *Genista anglica* compared to stands elsewhere in the UK.

- **H7140. Transition mires and quaking bogs; 'Very wet mires often identified by an unstable `quaking` surface'**

The term 'transition mire' relates to vegetation that in floristic composition and general ecological characteristics is transitional between acid bog and 7230 Alkaline fens, in which the surface conditions range from markedly acidic to slightly base-rich. The vegetation normally has intimate mixtures of species considered to be acidophile and others thought of as calciphile or basophile.

In some cases the mire occupies a physically transitional location between bog and fen vegetation, as for example on the marginal lagg of raised bog or associated with certain valley and basin mires. In other cases these intermediate properties may reflect the actual process of succession, as peat accumulates in groundwater-fed fen or open water to produce rainwater-fed bog isolated from groundwater influence.

- **H7150. Depressions on peat substrates of the *Rhynchosporion***

Depressions on peat substrates of the *Rhynchosporion* occur in complex mosaics with lowland wet heath and valley mire vegetation, in transition mires, and on the margins of bog pools and hollows in both raised and blanket bogs. The vegetation is typically very open, usually characterised by an abundance of white beak-sedge *Rhynchospora alba*, often with well-developed algal mats, the bog moss *Sphagnum denticulatum*, round-leaved sundew *Drosera rotundifolia* and, in relatively base-rich sites, brown mosses such as *Drepanocladus revolvens* and *Scorpidium scorpioides*. The Nationally scarce species brown beak-sedge *Rhynchospora fusca* and marsh clubmoss *Lycopodiella inundata* also occur in this habitat.

The New Forest, one of three sites selected in southern England, is considered to hold the largest area in England of Depressions on peat substrates of the *Rhynchosporion*, in complex habitat mosaics associated primarily with the extensive valley bogs of this site. The habitat type is developed in three situations: in natural bog pools of patterned bog surfaces, in flushes on the margins of valley mires and in areas disturbed by peat-digging, footpaths, tracks, ditches etc. In places the habitat type is rich in brown mosses *Cratoneuron* spp. and *Scorpidium scorpioides*, suggesting flushing by mineral-rich waters. The mosaics in which this habitat type occurs are an important location for bog orchid *Hammarbya paludosa*

- **H7230. Alkaline fens; 'Calcium-rich spring water-fed fens'**

Alkaline fens consist of a complex assemblage of vegetation types characteristic of sites where there is tufa and / or peat formation with a high water table and calcareous base-rich water supply. There is considerable variation between sites in the associated communities and the transitions that may occur. Such variation can be broadly classified by the geomorphological situation in which the fen occurs, namely: flood plain mire, valley mire, basin mire, hydroseral fen (i.e. as zones around open waterbodies) and spring fen.

- **H9120. Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae or Ilici-Fagenion*); 'Beech forests on acid soils'**

This habitat comprises beech *Fagus sylvatica* forests with holly *Ilex*, growing on acid soils, in a humid Atlantic climate. Sites of this habitat type often are, or were, managed as wood-pasture systems, in which pollarding of beech and oak *Quercus* spp. was common. This is known to prolong the life of these trees. Typical species include holly *Ilex aquifolium*, bracken *Pteridium aquilinum* and bramble *Rubus fruticosus*, with wavy hair-grass *Deschampsia flexuosa* in the most acidic areas. Epiphyte richness can a key factor in defining hyper-Atlantic forms of this Annex I type.

The New Forest is the largest area of mature, semi-natural beech *Fagus sylvatica* woodland in Britain and represents Atlantic acidophilous beech forests in the most southerly part of the habitat's UK range. The mosaic with other types of woodland and heath has allowed unique and varied assemblages of epiphytic lichens and saproxylic invertebrates to be sustained, particularly in situations where the woodland is open and the tree trunks receive plenty of light. The traditional common grazing in the Forest by cattle and ponies provides opportunities to explore the impact of large herbivores on the woodland system

- **H9130. *Asperulo-Fagetum* beech forests; Beech forests on neutral to rich soils**

This Annex I type occurs on circumneutral to calcareous soils. UK stands of *Asperulo-Fagetum* beech forest belong to the central and northern European associations of the habitat but with correspondingly more Atlantic species, including holly *Ilex aquifolium* and bluebell *Hyacinthoides non-scripta*. Rare plants

associated with this form of woodland in the UK include red helleborine *Cephalanthera rubra*, wood barley *Hordelymus europaeus*, coral-root *Cardamine bulbifera* and box *Buxus sempervirens*. While many sites have a core of ancient woodland, planting of beech *Fagus sylvatica* and its natural spread on to adjacent grassland under reduced grazing pressures have led in places to an expansion of this habitat over the 20th century. Sites therefore often have a complicated history. The beech dominance in particular has often been emphasised by past silvicultural treatment.

The New Forest is the largest area of mature, semi-natural beech *Fagus sylvatica* woodland in Britain; much of it is a form of W14 *Fagus sylvatica – Rubus fruticosus* woodland that conforms to the Annex I type *Asperulo-Fagetum* beech forests. The mosaic with other types of woodland and heath has allowed unique and varied assemblages of epiphytic lichens and saproxylic invertebrates to be sustained, particularly in situations where the woodlands are open and the tree trunks receive plenty of light. The traditional common grazing in the Forest by cattle and ponies provides opportunities to explore the impact of large herbivores on the woodland system.

- **H9190. Old acidophilous oak woods with *Quercus robur* on sandy plains**

This habitat type comprises ancient lowland oak woodland on acidic, sandy or gravelly substrates. Veteran trees are relatively abundant in UK stands compared to examples in continental Europe, and are often associated with assemblages of notable lichens, fungi and invertebrates.

The New Forest is representative of old acidophilous oak woods in the southern part of its UK range. It is the most extensive area of active wood-pasture with old oak *Quercus* spp. and beech *Fagus sylvatica* in north-west Europe and has outstanding invertebrate and lichen populations. This site was preferred over other sites that lack a succession of age-classes because, although scattered over a wide area, the oak stands are found within a predominantly semi-natural landscape with a more balanced age-structure of trees. The traditional common grazing in the Forest by cattle and ponies provides opportunities to explore the impact of large herbivores on the woodland system. The New Forest has been identified as of potential international importance for its saproxylic invertebrate fauna by the Council of Europe (Speight 1989).

- **H91D0. Bog woodland*** (priority feature)

Under certain combinations of physical circumstances in the UK, scattered trees can occur across the surface of a bog in a relatively stable ecological relationship as open woodland, without the loss of bog species. This true Bog woodland is a much rarer condition than the progressive invasion of bogs by trees, through natural colonisation or afforestation following changes in the drainage pattern which leads eventually to the loss of the bog community. The habitat type has not previously been well described in the UK, and consequently knowledge of its ecological characteristics is limited

Within the New Forest, in southern England, birch – willow *Betula – Salix* stands occur over valley bog vegetation, with fringing alder *Alnus – Sphagnum* stands where there is some water movement. These stands appear to have persisted for long periods in stable association with the underlying *Sphagnum* bog-moss communities. The rich epiphytic lichen communities and pollen record provide evidence for the persistence of this association. The Bog woodland occurs in association with a range of other habitats for which the site has also been selected.

- **H91E0. Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*); 'Alder woodland on floodplains' * (priority feature)**

Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) comprises woods dominated by alder *Alnus glutinosa* and willow *Salix* spp. on flood plains in a range of situations from islands in river channels to low-lying wetlands alongside the channels.

The habitat typically occurs on moderately base-rich, eutrophic soils subject to periodic inundation. Many such woods are dynamic, being part of a successional series of habitats. Their structure and function are best maintained within a larger unit that includes the open communities, mainly fen and swamp, of earlier successional stages. On the drier margins of these areas other tree species, notably ash *Fraxinus excelsior* and elm *Ulmus* spp., may become abundant. In other situations the alder woods occur as a stable component within transitions to surrounding dry-ground forest, sometimes including other Annex I woodland types. These transitions from wet to drier woodland and from open to more closed communities provide an important facet of ecological variation.

The ground flora is correspondingly varied. Some stands are dominated by tall herbs, reeds and sedges, for example common nettle *Urtica dioica*, common reed *Phragmites australis*, greater tussock-sedge *Carex paniculata*, and meadowsweet *Filipendula ulmaria*, while others have lower-growing communities with creeping buttercup *Ranunculus repens*, common marsh bedstraw Galium palustre, alternate-leaved golden-saxifrage *Chrysosplenium oppositifolium* and marsh-marigold *Caltha palustris*.

The New Forest contains many streams and some small rivers that are less affected by drainage and canalisation than those in any other comparable area in the lowlands of England. Associated with many of the streams, particularly those with alkaline and neutral groundwater, are strips of alder *Alnus glutinosa* woodland which, collectively, form an extensive resource with a rich flora. In places there are examples of transitions from open water through reedswamp and fen to alder woodland. The small rivers show natural meanders and debris dams, features that are otherwise rare in the lowlands, with fragmentary ash *Fraxinus excelsior* stands as well as the alder strips.

Qualifying Species:

- **S1044*. Coenagrion mercuriale*; Southern damselfly**

The southern damselfly *Coenagrion mercuriale* has very specialised habitat requirements, being confined to shallow, well-vegetated, base-rich runnels and flushes in open areas or small side-channels of chalk rivers. Most sites are on wet heath.

The dragonfly's larvae live in flushes and shallow runnels, often less than 10 cm deep, with slow-flowing water. Adults fly from June to August. Females lay eggs onto submerged plants, and the predatory aquatic larvae probably take two years to mature

The New Forest in central southern England is an outstanding locality for this species, with several population centres and strong populations estimated to be in the hundreds or thousands of individuals and with a long history of records. With Preseli, Dorset Heaths and the River Itchen, it represents one of the four major population centres in the UK.

- **S1083*. Lucanus cervus*; Stag beetle**

The stag beetle *Lucanus cervus* is the UK's largest terrestrial beetle, and amongst the most spectacular, reaching 7 cm in length. Larvae develop in decaying tree stumps and fallen timber of broad-leaved trees in contact with the ground, especially of apple *Malus* spp., elm *Ulmus* spp., lime *Tilia* spp., beech *Fagus sylvatica* and oak *Quercus* spp. Such timber is an essential feature for conservation of structure and function of the habitat for this species. Development takes around 3-4 years. Adults are active on warm evenings, but probably only the males fly regularly and come readily to lights. Adults have been recorded from May to September or even October, though they are most abundant in early summer

The New Forest represents stag beetle *Lucanus cervus* in its Hampshire/Sussex population centre, and is a major stronghold for the species in the UK. The forest is one of the most important sites in the UK for fauna associated with rotting wood, and was identified as of potential international importance for its saproxylic invertebrate fauna by the Council of Europe (Speight 1989).

- **S1166 Great crested newt *Triturus cristatus***

The great crested newt is the largest native British newt, reaching up to around 17cms in length. Newts require aquatic habitats for breeding. Eggs are laid singly on pond vegetation in spring, and larvae develop over summer to emerge in August – October, normally taking 2–4 years to reach maturity. Juveniles spend most time on land, and all terrestrial phases may range a considerable distance from breeding sites.

The great crested newt is also fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended), making it a 'European Protected Species'. A Licence may therefore be required for any activities likely to harm or disturb great crested newts.

Table 1: Supplementary Advice for Qualifying Features: H3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletia uniflorae* and/or of the *Isoëto-Nanojuncetea* and H3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature **(H3130 and H3110**	**Extent of the feature within the site**	Restore the total extent of the feature H3110 at 6.7 hectares. Maintain the total extent of the feature H3130 at c10 hectares.	There should be no measurable net reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis. Within the New Forest SAC, the feature H3110 is limited to the main lake at Hatchet Pond. Feature H3130 relates to large temporary ponds, shallow ephemeral pools and poached damp hollows. They are relatively small (between 5-10m across) and as they have not yet been mapped in detail, the full extent is likely to have been underestimated	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature (H3130 Only)	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. The feature occurs in every habitat type and on every type of geology within the Forest and as a result show a huge diversity of pond types which in turn supports an exceptionally varied and rich community of freshwater plants and animals	Ewald N, Dunn F, Williams P and Biggs J, 2014
Structure and function (including its typical species) (H3110 Only)	**Fisheries**	Restore a total projected estimate for biomass of total fish production at less than 200kg/ha (this should take into account the growth potential of the resident and stocked fish).	Fish communities may exert a strong influence on overall lake ecology and may cause or exacerbate eutrophication symptoms. Where fisheries are present it should be a balanced mixed fishery. There should be a presumption against stocking non-native species, Common carp *Cyprinus carpio* and Common Bream *Abramis brama*. Eight species of fish have been recorded from Hatchet Pond; Northern Pike *Esox lucius*, European Perch *Perca fluviatilis*, Common Roach *Rutilus rutilus*, Eurasian Ruffe *Gymnocephalus cernuus*, Common Bream *Abramis brama*, Tench *Tinca tinca*, Common Carp *Cyprinus carpio*, Mirror Carp *Cyprinus carpio* and Common Eel *Anguilla anguilla.* - The minimum biomass present is estimated to be 159.3 kg/ha, although the actual fish stock was surmised to be above 200 kg/ ha. Hatchet Pond, whilst not actively stocked, is managed as a coarse fishery including Common/Mirror carp *Cyprinus carpio* and Common Bream *Abramis brama*. The common practice of ground baiting, which is popular with carp anglers, can introduce nutrients and there may also be deliberate extra feeding to encourage growth of specimen sized fish. In addition, benthivorous (bottom-feeding) fish contribute to high turbidity and algal biomass through their feeding habits.	Giles, N. 2002 Harwood, A., Tomlinson, M. & Perrow, M.2017 Aquilina R, Ewald N, Biggs J. 2015

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Changes recorded at Hatchet Pond are indicative of the early stages of eutrophication and algal growth is thought to have driven a decline in aquatic flora.	
Structure and function (including its typical species) (H3130 and H3110)	**Functional connectivity/ isolation**	Maintain the natural lack of connectivity of H3130 water bodies to other water bodies Restore the connectivity of Hatchet Pond (H3110) to Hatchet Stream	The natural isolation of many of the New Forest temporary ponds can provide some protection from threats such as pollution and invasive species. Hydrological isolation can also lead to unique or diverse species assemblages this may be due to genetic isolation or the absence of predators. These water bodies should have their isolated state maintained. In contrast other standing water bodies naturally rely on hydrological connectivity to other freshwater systems for water supply, and can support migratory species. The European eel *Anguilla anguilla* is a native species and is in serious decline. Obstruction created by a sluice structure is preventing Eel *Anguilla anguilla* passage upstream into Hatchet Pond Hydrological connectivity may also be important for geneflow, and habitat and species resilience. These water bodies should have their hydrological connectivity maintained	
Structure and function (including its typical species) (H3130 and H3110)	**Hydrology**	At a site, unit and/or catchment level maintain natural hydrological processes to provide the conditions necessary to sustain the feature within the site	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. Hydrology influences lake ecosystem functioning in two ways: determining residence time (flushing) and water level fluctuations. Flushing of lakes is important for dilution and removal of nutrients and phytoplankton, and for reduction in	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			sedimentation. The timing of different flushing rates within the year influences the biology of the lake. For example, reduced flushing in summer would encourage bloom conditions. Modifications of inflows and outlets or changes in hydrology, e.g. from flood control regimes, abstraction and gravel removal can lead to unnatural changes in lake levels.	
Structure and function (including its typical species) (H3130 and H3110)	**Invasive, non-native and/or introduced species**	Ensure non-native species categorised as 'high-impact' in the UK under the Water Framework Directive are either rare or absent but if present are causing minimal damage to the feature	Non-native species constitute a major threat to many open water systems. Impacts may be on the habitat itself (e.g. damage to banks and consequent siltation) or directly on characteristic biota (through predation, competition and disease), or a combination of these. The UK Technical Advisory Group of the Water Framework Directive produces a regularly updated classification of aquatic alien species (plants and animals) according to their level of impact. In general high impact species are of greatest concern but low or unknown impact species may be included in the target on a site-specific basis where there is evidence that they are causing a negative impact (for example high cover values or abundances). Those taxa considered likely to colonise lakes, are indicated by an 'L' in the UKTAG guidance. Examples of such high-impact species may include Water Fern *Azolla filiculoides*, New Zealand pygmyweed *Crassula helmsii* and the zebra mussel *Dreissena polymorpha*. New Zealand pygmyweed *Crassula helmsii* is present in many permanent and temporary ponds throughout the New Forest and poses a threat to the native flora due to a shared ecological niche with many New Forest rarities such as *Pilularia globulifera*. Colonisation of a pond is followed by rapid growth creating a blanket cover which out-competes the native flora. In 2009/ 2010 a total of 579 ponds were surveyed, approximately 60% of the New Forest resource, of these 20% contained *C. helmsii*, and was distributed in a distinct pattern associated with public access which suggests that the primary route of	Ewald, N.C. 2014 Natural England 2014

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			introduction is likely to be accidental or deliberate release by people or where vehicles and/ or equipment have been used which are likely to have come from an infected site. No effective method is currently available to eradicate the plant but grazing pressure, which is an essential element of the management of these ponds for rare and threatened native species is also critical in limiting the dominance of *C. helmsii*.	
Structure and function (including its typical species) (H3130 and H3110)	**Key structural, influential and/or distinctive species**	Restore the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature; **Structural** The characteristic species of H3110 and H3130 water bodies which may include; *Littorella uniflora, Isoetes lacustris, Isoetes echinospora, Lobelia dortmanna, Sparganium angustifolium, Luronium natans,* The constant and preferential plants of the NVC community types which forms key components of the SAC habitats present include *Littorella uniflora, Isoetes lacustris, Isoetes echinospora, Lobelia dortmanna, Eleogiton fluitans, Elatine hexandra, Myriophyllum alterniflorum, Apium inundatum, Luronium natans*. *Nitella flexilis agg spp, , Radioal lonoides, Anagallis minima,* **Influential** Grazing herbivores	Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; • **Structural** species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for the Annex I habitat features at this SAC is not necessarily exhaustive. The majority of the New Forest ponds are of exceptional importance of wildlife and at a landscape scale support at least 94 wetland plant species, 41 invertebrate families and 68 species	Ewald N., Dunn F., Williams P. and Biggs J., 2014

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Site-distinctive *Pilularia globulifera, Baldellia ranunculoides, Illecebrum verticillatum, Ranunculus x novae-forestae, Utricularia intermedia, Galium constrictum, cicendia filiformis, Mentha pulegium, Ludwigia palustris* Tadpole Shrimp *Triops cancriformis,* fairy Shrimp *Chirocephalus diaphanous,* ne-grooved diving beetle *Bidessus unistriatus* (may now be extinct), medicinal leech *Hirudo medicinalis,* pond mud snail *Omphiscola glabra*	of aquatic Coleoptera. This includes 21 plant species of conservation concern (Locally Common, Red Data Book or S41 species) and 13 beetle species of conservation concern (Nationally Scarce or IUCN Red List species). Hatchet Pond (H3110) supports 133 wetland plant species - more than a third of all the wetland plant species found in the UK and 99 species of freshwater macro-invertebrate species have been recorded, including eight species of conservation importance. Heavy grazing pressure is of prime importance in the maintenance of the outstanding flora and invertebrate interest of the pond communities in the New Forest The list may evolve, and species may be added or deleted, as new information about this site becomes available.	
Structure and function (including its typical species) (H3130 and H3110)	**Macrophyte community structure**	**For H3130** Maintain a characteristic zonation of macrophytes, with increasing depth, represented by *Littorella uniflora* then with overlapping zones of *Littorella uniflora* with *Lobelia dortmana* then *Isoetes* spp. **For H3110:** Restore maximum depth of plant colonisation. This will often be the maximum depth colonised by *Isoetes*, but in richer waters maximum depth of *Potamogeton* spp. is also important.	This is a strongly characteristic structural aspect of this habitat feature. It will be a response to water transparency, sediment type and disturbance. Although Hatchet Pond (H3110) is relatively species rich (15 aquatic species recorded in 2011 and 2009), the majority of aquatic macrophytes are rather rare within the lake; most being restricted to either very shallow water (<25 cm) or confined to the wetland area around the north-east of the site	Burgess, A, Goldsmith, B and Goodrich, S., 2014
Structure and	**Macrophyte**	Restore a characteristic and well	A hydrosere is a naturally-occurring plant succession which	Burgess, A, Goldsmith,

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
function (including its typical species) (H3130 and H3110)	**community structure**	defined hydrosere associated with the H3110 water body Maintain a characteristic and well defined hydrosere associated with the H3130 water bodies where this is present	occurs in an area of standing fresh water. Over time, an area of open freshwater will naturally dry out, ultimately becoming woodland. During this change, a range of different wetland habitat types such as swamp and marsh, will succeed each other. This structure around the margins of the lake creates a buffer zone that can help protect the lake from a limited amount of sediment and nutrient inputs. It also increases habitat heterogeneity providing additional food sources and refugia. Poaching the shoreline by ponies and cattle is essential to the maintenance of the H3110 habitat. Away from areas popular for recreation, the marginal habitats of Hatchet Pond are heavily grazed and of considerable interest. However, the aquatic community structure shows little obvious zonation apart from the North East shore which has a more extensive hydrosere with dense growths of *M. trifoliata & Ludwigia palustris.* Many of the H3130 ponds are temporary or have wide, shallow drawdown zones – an area of mud and vegetation which is flooded in winter and spring and progressively dries as water levels fall in summer providing ideal conditions for a number of rare plants and invertebrates	B and Goodrich, S., 2014
Structure and function (including its typical species) (H3110 only)	**Macrophyte community structure**	Restore characteristic zonations of vegetation with increasing depth, represented by *Littorella uniflora* then with overlapping zones *of Littorella uniflora* with *Lobelia dortmana* then *Isoetes* spp.	This is a strongly characteristic structural aspect of this habitat feature. It will be a response to water transparency, sediment type and disturbance. Although poaching of the shoreline by ponies and cattle is essential to the maintenance of the H3110 habitat, much of the shoreline suffers from erosion and disturbance from high visitor numbers and shore angling. Despite having areas of good marginal habitat, the aquatic flora is rather sparse, lacking the zonation and depth distribution expected from this site type. *L. uniflora* does not exceed 25cm depth and does not form the dense lawns normally associated with this species.	Burgess, A, Goldsmith, B and Goodrich, S., 2014
Structure and	**Physical**	Maintain the natural shorelines of	Inclusion of hard engineering solutions to lake management may	Burgess, A, Goldsmith,

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
function (including its typical species) (H3130 and H3110)	**structure - lake shoreline**	the lake and ponds.	have detrimental effects on lake ecology, replacing near-natural substrates with man-made materials. Alteration of the shoreline may also result in changes in water movements within the lake, which would have effects on patterns of sediment deposition. Much of the shoreline of Hatchet Pond (H3110) suffers from erosion and disturbance from high visitor numbers and shore angling	B and Goodrich, S., 2014
Structure and function (including its typical species) (H3130 and H3110)	**Physical structure - lake substrate**	**For H3130:** Maintain the natural and characteristic substrate for the lake. Substrate is typically sand, gravel, stones and boulders with low organic content, but there may be a locally high peat content. **For H3110:** Restore the natural and characteristic substrate for the lake. Substrate is typically sand, gravel and stones with low organic content, <5% loss on ignition.	The distribution of sediment particle size and organic content influences the biology of the lake and will affect the suitability of within-lake habitats for invertebrates and macrophytes, and fish spawning grounds. Increases in sediment loading from activities in the catchment area, including those on the lake shore, may result in the smothering of coarse sediments. Increased inputs of leaf litter, as a result of scrub encroachment, may also be cause for concern, as organic-rich sediments may be a poor rooting medium for macrophytes.	
Structure and function (including its typical species) (H3130 and H3110	**Sediment load**	**For H3130** Maintain the natural sediment load **For H3110** Restore the natural sediment load	Increased sediment loadings may result in clogging of the lake bed, increased siltation in the basin and deoxygenation of sediments. Blockage of coarser substrates with finer sediment restricts water flow-through, whilst increases in organic matter increase biochemical oxygen demand. Examples of causes of increases in siltation include: increased lake productivity, changes in catchment land-use (particularly over-grazing), lake level fluctuations or climatic fluctuations. Surveys over the last twenty years have noted increasing amounts of suspended silts in Hatchet Pond (H3110) the likely causes are bottom-feeding fish such as carp, bream and tench and increased recreation	Aquilina R, Ewald N, & Biggs J. 2015.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species) (H3130 and H3110)	**Supporting off-site habitat**	Restore the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the features	The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary. Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species. This supporting habitat may be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment. For H3110 **-** The passage of common eels upstream into Hatchet Pond are being restricted by a sluice For H3130 - Ponds are at risk from inputs and runoff from land adjacent to the SAC	
Structure and function (including its typical species)	**Water quality - acidity**	**For H3130:** Acidity levels should reflect unimpacted conditions, typically a pH of 5.5-7.0 for oligotrophic lakes and 7.0-8.0 for mesotrophic lakes. **For H3110** Acidity levels should reflect unimpacted conditions, typically with a pH value < 7.	Changes in pH can alter the entire freshwater community present within a water body affecting all trophic levels. Potential causes of a shift in pH include air pollution and direct application of lime to the water column as an acidification amelioration strategy (this should not be carried out). Acidity levels should reflect unimpacted conditions - values of Acid Neutralising Capacity (ANC) considered to avoid significant impact on characteristic biota are laid out in the site's FCT (these are the same numerical values as used to protect high ecological status under the WFD in the UK). As a guide, pH 5.5-7.0 for oligotrophic lakes and 7.0-8.0 for mesotrophic lakes. Although, pH naturally fluctuates throughout the year, e.g. snow melt may lead to pulses of acid water, and increased plant biomass in summer may result in large fluctuations in pH, including daytime increases in pH values. Therefore pH is not used as a monitoring target, however its importance in affecting many in lake processes means that the pH of a water body should not be artificially altered.	Aquilina R, Ewald N, & Biggs J. 2015.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Evidence indicates a significant increase of 0.86 pH units between 1979 and 2014 at Hatchet Pond (H3110)	
Structure and function (including its typical species) (h3130 and H3110)	**Water quality - algae**	Restore chlorophyll a concentrations to WFD high ecological status; blooms of blue-green or green algae should not occur in low nutrient waters.	Chlorophyll is the pigment used for photosynthesis by plants, and the concentration of chlorophyll in the water column during the growing season therefore provides a good measure of the abundance of phytoplankton. Phytoplankton is an important driver of structure and function in lakes and high phytoplankton levels (algal blooms) are usually associated with nutrient enrichment. Dense growths of tufted algae may grow on hard substrates where other plants have difficulty establishing, such as on boulders or cobbles. On the whole this is not a cause for concern. However, formation of floating algal rafts or macrophytes being overgrown with filamentous algae is a cause for concern. UKTAG Lake Assessment Methods: Phytoplankton. Chlorophyll a and Percentage Nuisance Cyanobacteria. Available online at: http://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Biological%20Method%20Statements/lake%20phytoplankton.pdf There is evidence of abundance of algae in some sections of Hatchet Pond (H3110). Between 2009 and 2014 chlorophyll a concentration has been generally high for an oligotrophic site, prior to 2009 the concentrations were lower	Burgess, A, Goldsmith, B and Goodrich, S., 2014
Structure and function (including its typical species) (h3130 and h3110)	**Water quality - dissolved oxygen**	Maintain adequate dissolved oxygen (DO) levels for health of characteristic fauna; DO>7mg/l for salmonid waters and >6mg/l for cyprinid waters throughout the year.	As for species in terrestrial environments, dissolved oxygen (DO) is required for respiration by aquatic organisms. Anthropogenic activities leading to phytoplankton blooms and increased loadings of organic matter to lakes can cause decreases in the concentration of dissolved oxygen available to support the species present. Mean dissolved oxygen refers to DO being measured at 0.5m intervals throughout the entire water column where the water column is not stratified and measurements taken at 0.5 m intervals below the thermocline only where stratification occurs.	Burgess, A, Goldsmith, B and Goodrich, S., 2014

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			The dissolved oxygen profile for Hatchet Pond (H3110) in 2011 was 8.93 mg/l which is adequate for cyprinid waters.	
Structure and function (including its typical species) H3130 and h3110	**Water quality - nitrogen**	Maintain a stable nitrogen concentration which is typically within 1-2mg/l	There is an increasing understanding that some standing waters are sensitive to nitrogen (N) enrichment and eutrophication may be driven by increases in N, but site-specific information is usually required to determine whether N or P is more important. Where P levels are significantly above their target values and there is evidence that the lake is N limited (for example by N levels falling to negligible levels in summer), N targets should be set in addition to P targets. We recommend that such targets should preferably be developed using site-specific information, but should be based around the threshold of 1-2mg/l identified by James et al. (2005). In this situation N targets should be used in combination with P targets to drive a management strategy for the lake that reduces all nutrient inputs. In 2014, total nitrogen in Hatchet Pond (H3110) was below the threshold at 0.66 mg/l	Aquilina R, Ewald N, & Biggs J. 2015.
Structure and function (including its typical species) (H3130 and H3110)	**Water quality - other pollutants**	Maintain Good chemical status (i.e. compliance with relevant Environmental Quality Standards).	A wide range of pollutants may impact on habitat integrity depending on local circumstance. Good chemical status includes a list of EQSs for individual pollutants that are designed to protect aquatic biota with high levels of precaution.	
Structure and function (including its typical species) (H3130 and H3110)	**Water quality - phosphate**	**For H3130:** Maintain stable nutrient levels appropriate for lake type. The maximum annual mean concentration of TP is typically 10 µg P l-1 for oligotrophic lakes and 20 µg P l-1 for shallow (<3m) mesotrophic lakes. These should be met unless site specific targets are available. **For H3110:** Restore stable	If palaeolimnological techniques or hindcast modelling have been employed to reconstruct natural background phosphorus concentrations for a particular lake, these can be used to set targets, although it may be necessary to accept a small deviation from these background conditions. Alternatively, historical water chemistry data may exist for individual lakes. Where existing, site-specific water column TP concentrations are consistently lower than the standard appropriate for the habitat type, a lower target should be applied to prevent deterioration from current status.	Aquilina R, Ewald N, & Biggs J. 2015.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		nutrient levels appropriate for lake type. The site specific maximum annual mean concentration of TP is 17 µg P l-1 for Hatchet Pond.	Increased loadings of P to a water body are likely to lead to higher algal biomass in the water column, which in turn can have significant impacts on the standing water ecosystem through, for example, competition with vascular plants for nutrients and light, changes in pH, oxygen depletion and production of toxins. Decreasing dissolved oxygen and increasing ammonia levels are associated with death and decay of algal blooms, as is a release of toxins from toxin-producing species The water quality of Hatchet Pond (H3110) is deteriorating based on long-term increases in diatom reconstructed phosphorus concentrations, changes in Soluble Reactive Phosphorus 1979 - 1983 and, more recently (post 2008), on measured total phosphorus values. These changes indicate the early stages of eutrophication. Hatchet Pond is located within a largely semi-natural habitat with no obvious sources of nutrient contribution. Nutrients and sediment sources are direct or indirect inputs to the lake from recreation.	
Structure and function (including its typical species) (H3130 and H3110	**Water transparency**	For H3130: Maintain the clarity of water at or to at least a depth of 3.5 metres For H3110: Restore the clarity of water at or to at least a depth of 3.5 metres	Water clarity or transparency is the major determinant of the depth of colonisation by macrophytes, therefore, it should not be reduced. This should allow plant colonization to at least 3.5m, but if maximum depth of colonization has previously been recorded at greater water depths this should be maintained. Increased nutrient loads leading to increased algal growth will reduce water transparency, disturbance of the sediment by water sports and bottom feeding fish such as Common carp *Cyprinus carpio* and Common Bream *Abramis brama* also increase turbidity and reduce water transparency. Increased sediment loads to a lake would also have this effect. Hatchet Pond (H3110) suffers from high turbidity which has restricted the growth of characteristic species to very shallow water. Sources of the turbidity are likely to be:	Aquilina R, Ewald N, & Biggs J. 2015.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			• Bottom-feeding fish such as Common carp *Cyprinus carpio*, Common Bream *Abramis brama* and, to a lesser extent, Tench *Tinca tinca* which disturb plants and sediment leading to the loss of vascular plants. Re-suspension of pond substrate will cause previously bound phosphates to be re-dissolved in the water column. • Disturbance and re-suspension of sediments by dog activity in proximity to the car park • Erosion and sediment run off from the car park and tracks adjacent to the lake	
Supporting processes (on which the feature relies) (H3130 and H3110)	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for these features of the site on the Air Pollution Information System (www.apis.ac.uk).	This habitat type is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated with it. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. As part of the preparation of local plans by NFNPA and NFDC a detailed examination of potential in-combination air quality	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). Natural England 2014,

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			effects on New Forest SAC / SPA, and other nearby European sites has been carried out. Third party consultants have carried out an air quality assessment and linked ecological assessment which together constitute the HRA of air quality effects for both the New Forest National Park and New Forest District Local Plans. At the time of writing, these documents had not yet been finalised although draft results and conclusions are presented within them.	
Supporting processes (on which the feature relies) (h3110 only)	**Hydrology**	At a site, unit and/or catchment level as necessary, maintain natural hydrological processes to provide the conditions necessary to sustain the feature within the site	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. Hydrology influences lake ecosystem functioning in two ways: determining residence time (flushing) and water level fluctuations. Flushing of lakes is important for dilution and removal of nutrients and phytoplankton, and for reduction in sedimentation. The timing of different flushing rates within the year influences the biology of the lake. For example, reduced flushing in summer would encourage bloom conditions. Modifications of inflows and outlets or changes in hydrology, e.g. from flood control regimes, abstraction and gravel removal can lead to unnatural changes in lake levels. Although Hatchet Pond is artificial in origin, the water levels are not managed artificially and fluctuate naturally.	
Version Control Advice last updated: n/a				
Variations from national feature-framework of integrity-guidance: n/a				

Table 2: Supplementary Advice for Qualifying Features: H4010. Northern Atlantic wet heaths with *Erica tetralix*; Wet heathland with cross-leaved heath

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Maintain the total current extent of the H4010 feature at c2100 hectares. Restore the total extent of the H4010 feature which remains within woodland plantation inclosures. The actual area of the feature is unknown	See the notes for this attribute in Table 1 above. New Forest heathland comprises extensive dry and wet heaths and associated valley mires, streams, ponds, temporary pools, dry and wet grasslands. Together with woodlands, these habitats are on an extensive scale and form a dynamic mosaic fluctuating naturally over time. More than 3000ha of former heathland (wet and dry) is estimated to be located within the woodland plantation inclosures, Those planted with conifer will readily restore to heathland.	New Forest LIFE Partnership, 2001. Sanderson N.A. 2007.
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the H4010 feature, including where applicable its component vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature. The creation or upgrading of tracks to facilitate visitor access across wet heathland may lead to the process of fragmentation, which in turn can have a number of effects, i.e. subdivision of habitat into smaller patches, isolation of habitat patches, increased edge effects. New access routes will in most cases cause direct habitat loss and damage	Sharp et al, 2008

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			through impaired function of ecosystem processes, drainage, compaction, trampling etc.	
Structure and function (including its typical species)	**Vegetation community transitions**	Maintain areas of transition between the H4010 feature and communities which form other heathland-associated habitats, including dry heath, various woodland types, *Molinia* grasslands, fen and acid grassland.	Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna. This is an important attribute as many characteristic heathland species utilise the transitions between vegetation types or use different vegetation types during different stages of their life cycle. Within the New Forest, wet heath forms a complex mosaic with other heathland, grassland, freshwater and woodland habitats. The transitions to dry heath and wetter mire habitat are particularly well-developed and remain relatively unmodified, The New Forest is unique in supporting a very wide band of intermediate vegetation (commonly called humid heath) which occupies the zone between the dry heath communities and wet heath.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the H4010 feature are broadly referable to and characterised by the following National Vegetation Classification type: M16a *Erica tetralix – Sphagnum compactum* wet heath (typical community) M16b *Erica tetralix – Sphagnum compactum wet heath (Succisa pratensis – Carex panicea* sub-community.	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations). The vegetation composition of the New Forest wet heaths is very diverse largely due to the long history of grazing by commoners' livestock and traditional management practices. Grazing pressure is not uniform and this provides a range of niches for organisms adapted to the extensive grazing	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			regime. Continuation of traditional grazing and management including rotational burning is fundamental to maintaining the characteristic vegetation composition of the New Forest wet heath.	
Structure and function (including its typical species)	**Cover of dwarf shrubs**	For H4010 wet heath maintain an overall cover of dwarf shrub species at between 25-90%	Variations in the structure of the heathland vegetation (vegetation height, amount of canopy closure, and patch structure) is needed to maintain high niche diversity and hence high species richness of characteristic heathland plants and animals. Many species also utilise the transitions between vegetation types or use different vegetation types during different stages of their life cycle. The structural character of the heathland feature is strongly influenced by the growing habits of its dominant species which in most cases will be ericoids (i.e. plants that look like heathers, including members of the Ericaceae and Empetraceae families). The main dwarf shrub species are heather *Calluna vulgaris*, and cross-leaved heath *Erica tetralix* but is too wet to support bell heather *Erica cinera* Care will be needed to consider whether a failure to meet the target is due to inappropriate management or whether the habitat has a naturally low cover of ericoid shrubs.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Heather age structure**	Maintain a diverse age structure amongst the ericaceous shrubs typically found on the site.	Each phase of growth associated with the characteristic heathers which dominate this feature also represents different microclimatic conditions and microhabitats which may provide shelter or food to other organisms. Therefore, it is important to maintain a mosaic of heather in different phases of growth. Typically this age structure will consist of between 10-40% cover of (pseudo) pioneer heathers; 20-80% cover of building/mature heathers; <30% cover of degenerate heathers and less than <10% cover of dead heathers No one growth form should be dominant, but it is accepted that on a site on	New Forest LIFE Partnership, 2001.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			the scale of the New Forest the mosaic of growth phases should be considered at a landscape scale to maximise available niches. What is important is that there is structural diversity in the heath communities across the SAC as a whole. To maintain a diverse age structure, grazing with commoners stock provides a differential grazing pressure across the heathland landscape supplemented where necessary with controlled burning, cutting and harvesting.	
Structure and function (including its typical species)	**Tree cover**	Restore the open character of the H4010 feature, with a typically scattered and low cover of trees and scrub <10% cover; including *Alnus glutinous, Betula spp., Ilex, Pinus spp, Prunus spinose, Quercus spp, Rubus fruticosus, Sarothamnus scoparius and Salix spp, (excluding S. repens.* Extent of *Myrica gale* should not be included within this target; this species should not exceed 30% cover.	Scrub (mainly trees or tree saplings above 1 m in height) and isolated trees are usually very important in providing warmth, shelter, cover, foodplants, perches, territorial markers and sources of prey for typical heathland invertebrates and vertebrates. But overall cover of scrub and trees across this habitat feature should be maintained or restored to a fairly sparse level, with a structurally complex edge and with characteristic heathland vegetation as ground cover. If scrub is locally important for any associated species with their own specific conservation objectives, then a higher level of cover will be acceptable. The area of scrub/tree cover should be stable or not increasing as a whole The retention of small clumps of trees to provide cover for grazing animals is a traditional feature of the New Forest and some single trees form important landscape features. Open heath should also have occasional scattered trees to provide song posts and nesting sites for characteristic birds such as tree pipit *Anthus trivialis*.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature **Structural** The constant and preferential plants of the NVC community type which forms a key component of a SAC habitat that is present • M16a *Erica tetralix – Sphagnum compactum* wet	Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; • **Structural** species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat)	New Forest LIFE Partnership, 2001. Natural England. (Various) Definitions of Favourable Condition for designated features of interest for the New Forest SSSI. Available from Natural England.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		heath (typical community) • M16b *Erica tetralix – Sphagnum compactum* wet heath (*Succisa pratensis – Carex panicea* sub-community. **Influential** Grazing herbivores **Site Distinctive** • Heathland reptile assemblage including Smooth Snake *Coronela austriaca,* Sand Lizard *Lacerta angilis,* Adder *Vipera berus,* Grass snake *Natrix natrix,* Common Lizard *Lacerta vivipara,* Slow-worm *Anguis fragilis* • Heathland vascular plant assemblage including Marsh gentian *Gentiana pneumonanthe,* Yellow Centaury *Cicendia filiformis,* Brown beaked sedge *Rhynchospora fusca,* Marsh clubmoss *Lycopodiella inundata,* pillwort *Pilularia globulifera* • Heathland invertebrate assemblage including, Silver-studded blue *Plebejus argus* Southern damselfly *Coenagrion mercurale* • Breeding bird assemblage	The vegetation composition of the New Forest wet heaths is very diverse largely due to the long history of grazing by commoners livestock. Grazing pressure is not uniform and this provides a range of niches for organisms adapted to the extensive grazing regime. Continuation of traditional grazing based on the existence of Rights of Common is fundamental to maintaining the characteristic vegetation composition of the New Forest wet heath. • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		including lapwing *Vanellus vanellus*, curlew *Numenius arquata* and snipe *Gallinago gallinago*		
Structure and function (including its typical species)	**Undesirable species**	Restore the frequency/cover of the following undesirable species to within acceptable levels and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread; *Betula spp., Pinus spp., Cirsium arvense, Digitalis purpurea, Epilobium spp. (exc. E palustre), Ranunculus repens, Senecio jacobaea, Rumex obtusifolius, Urtica dioica. Rhododendron ponticum*	Undesirable non-woody and woody vascular plants species may require active management to avert an unwanted succession to a different and less desirable state. Often they may be indicative of a negative trend relating to another aspect of a site's structure and function. These species will vary depending on the nature of the particular feature, and in some cases these species may be natural/acceptable components or even dominants. The main threats are: *Rhododendron ponticum* is a highly invasive shrub introduced from Asia. It casts dense shade excluding heathland vegetation and is of little interest for wildlife. It is abundant in private grounds throughout the New Forest providing a constant seed source. Scots pine *Pinus sylvestris* was introduced in the 18th century becomes quickly dominant on heathland habitat creating dense woodland conditions. The retention of small clumps of trees to provide cover for grazing animals is a traditional feature of the New Forest and some single trees form important landscape features. Two native species of birch, *Betula pendula* and *Betula pubescens* can be invasive and are associated with succession towards woodland.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Functional connectivity with wider landscape**	Restore the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape in order to meet the conservation objectives. These connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. The site includes 14 additional parcels of land which were originally unenclosed and likely to have had Rights of Common and management similar to the New Forest. The majority were grazed by New Forest stock up	New Forest LIFE Partnership, 2001.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			until the perambulation was fenced in 1963. Both the core site and these sites would benefit from greater connectivity either by way of habitat connections or by incorporation into the forests management regime. Stream and river catchments extend beyond the boundary of the site and water quality and availability can be impacted by changes anywhere within the catchment. Changes to land use outside of the site can affect the supporting hydrological regime within the site and have significant implications for the assemblage of characteristic plants and animals present.	
Structure and function (including its typical species)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of natural habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this particular SAC to climate change has been assessed by Natural England as being *moderate*, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means the site is considered to be vulnerable overall but a medium priority for further assessment and action. Individual species may be more or less vulnerable than their supporting habitat itself. In many cases, change will be inevitable so appropriate monitoring would be required. Restoration of a natural hydrological regime provides the best defence against climate change, maximising the ability of these ecosystems to adapt	Natural England 2015 Climate Change Theme Plan and National Biodiversity Climate Change Vulnerability Assessments (NBCCVAs) Mainstone C, Hall R & Diack I., 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			to changing conditions.	
Supporting processes (on which the feature relies)	**Conservation measures**	Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Grazing is of fundamental importance to the management of the New Forest in particular the persistence of commoning where stock, mostly cattle and ponies which are free to roam over extensive areas of the unenclosed habitats of the New Forest. Together with annual burning and cutting programmes ensuring that the wet heath has an extensive structural diversity supporting a range flora and fauna.	Natural England, 2014 New Forest LIFE Partnership, 2001.
Supporting processes (on which the feature relies)	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the H4010 habitat. Restore the properties of the underlying soil types where conifer plantation is being felled and restored to H4010 habitat	Soil is the foundation of basic ecosystem function and a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature. This Annex 1 habitat has essentially raw soils with little humus and low nutrient status. Apart from a few of the strata, the series of geological deposits produce base poor, acidic soils. Trampling from human activities can cause soil compaction, changes to soil hydrology and with heavy use, erosion and compacted bare ground. This leads to reductions in soil invertebrates and changes in plant communities. The effects are most acute near to car parks, access points from the urban fringe and in and around campsites.	Sharp et al, 2008
Supporting processes (on which the	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the	See notes for this attribute in Table 1 above.	More information about site-relevant Critical Loads and

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
feature relies)		site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).		Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). Natural England 2014,
Supporting processes (on which the feature relies)	**Hydrology**	At a site, unit and/or catchment level as necessary, restore the natural hydrological regime to provide the conditions necessary to sustain the H4010 feature within the site	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. From the mid-19th Century until the 1980's, many New Forest rivers and streams were widened, deepened and straightened to drain adjacent wetlands with the aim of providing better conditions for growing timber and grazing. Drainage channels were cut into mires and wet heath modifying the natural hydrology and hydrochemistry which affects both the character and extent of the natural mosaic of wet heath, mire, runnels and pools. Restoration of natural hydrological function is critical to achieving the conservation objectives for this feature.	Thomas, J.S., Diack, I. and Mainstone, C. 2016
Supporting processes (on which the feature relies)	**Water quality / quantity**	Where the feature is dependent on surface water and/or groundwater, restore water quality and quantity to a standard which provides the necessary conditions to support the feature	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.	
Version Control Advice last updated: **18 March 2019** following stakeholder feedback – Target for **Extent of feature within the site** attribute amended to include areas of H4010 within woodland plantation; additional attribute **Water quality / quantity** added after initial omission from draft version.				
Variations from national feature-framework of integrity-guidance: n/a				

Table 3: Supplementary Advice for Qualifying Features: H4030. European dry heaths

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Maintain the total current extent of the H4030 feature at c7600 hectares. Restore the total extent of the H4030 feature which remains within woodland plantation inclosures. The actual area of the feature is unknown	See the notes for this attribute in Table 1 above. New Forest heathland comprises extensive dry and wet heaths and associated valley mires, streams, ponds, temporary pools, dry and wet grasslands. Together with woodlands, these habitats are on an extensive scale and form a dynamic mosaic fluctuating naturally over time. More than 3000ha of former heathland (wet and dry) is estimated to be located within the woodland plantation inclosures, Those planted with conifer will readily restore to heathland.	New Forest LIFE Partnership, 2001. Sanderson N.A., 2007
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the H4030 European Dry Heath feature, including where applicable its component vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature. The creation or upgrading of tracks to facilitate visitor access across dry heathland may lead to the process of fragmentation, which in turn can have a number of effects, i.e. subdivision of habitat into smaller patches, isolation of habitat patches, increased edge effects. New access routes will in most cases cause direct habitat loss and damage through impaired function of ecosystem processes, drainage, compaction, trampling etc.	Sharp et al, 2008

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types: H2 Heather *Calluna vulgaris* - Dwarf Gorse *Ulex minor* heath H3 Dwarf Gorse *Ulex minor* – Bristle Bent *Agrostis curtisii* heath	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations). The vegetation composition of the New Forest dry heath is very diverse largely due to the long history of grazing by commoners' livestock and traditional management practices. Grazing pressure is not uniform and this provides a range of niches for organisms adapted to the extensive grazing regime. Lichens are a significant component of the dry heathland habitat and there are a number of lichen rich hard-grazed heaths with prostrate heather which are a unique feature of the New Forest. These provide ideal conditions for a diverse range of lichen species and are often associated with larger cattle herds. Continuation of traditional grazing and management including rotational burning on the more humid heath is fundamental to maintaining the characteristic vegetation composition of the New Forest wet heath.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments Sanderson N.A., 2015
Structure and function (including its typical species)	**Vegetation community transitions**	Maintain areas of transition between this feature and communities which form other heathland-associated habitats, including wet heath, various woodland types, *Molinia* grasslands, fen and acid grasslands, ponds and streams	Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna. This is an important attribute as many characteristic heathland species utilise the transitions between vegetation types or use different vegetation types during different stages of their life cycle.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Within the New Forest, dry heath forms a complex mosaic with other heathland, grassland, freshwater and woodland habitats. The transitions from dry heath trough wet heath to mire habitat are particularly well-developed and remain relatively unmodified, The New Forest is unique in supporting a very wide band of intermediate vegetation (commonly called humid heath) which occupies the zone between the dry heath communities and wet heath.	
Structure and function (including its typical species)	**Vegetation structure: cover of dwarf shrubs**	For H4030 dry heath maintain an overall cover of dwarf shrub species at between 25-90%	Variations in the structure of the heathland vegetation (vegetation height, amount of canopy closure, and patch structure) is needed to maintain high niche diversity and hence high species richness of characteristic heathland plants and animals. Many species also utilise the transitions between vegetation types or use different vegetation types during different stages of their life cycle. The structural character of the heathland feature is strongly influenced by the growing habits of its dominant species which in most cases will be ericoids (i.e. plants that look like heathers, including members of the *Ericaceae* and *Empetraceae* families). Dwarf shrub species are heather *Calluna vulgaris*, bell heather *Erica cinera*, cross-leaved heath *Erica tetralix*, dwarf gorse *Ulex minor* and bilberry *Vaccinium myrtillus* Care will be needed to consider whether a failure to meet the target is due to inappropriate management or whether the habitat has a naturally low cover of ericoid shrubs.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Bracken cover**	Maintain a low cover of dense bracken, typically at <5% Up to 90% cover with little bracken litter is acceptable in identified species-rich bracken stands	The spread of bracken *Pteridium aquilinum* is a problem on many lowland heathlands. The unpalatable nature and density of bracken as a tall-herb fern, and its decomposing litter, can smother and shade out smaller and more characteristic heathland vegetation. Usually active management of bracken is required to reduce or contain its cover across this habitat feature. However bracken is an important component of the heathland ecosystem providing cover for invertebrates and reptiles and in reducing grazing pressure and climatic exposure for grazing-sensitive plants. Some bracken stands are of the of high conservation importance as they support a high plant diversity similar to the upland NVC community *Pteridium aquilinum – Galium saxatile* species rich bracken islands; these areas are habitat for wild gladioli *Gladiolus illyricus.*	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments Cox, J., 2013.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Cover of gorse**	Maintain a total cover of gorse at <25% of the H4030 feature	Gorse as a component of heathland is a very valuable wildlife habitat, and often a marker of relict heath and common. Both dense and spiny, it provides good, protected cover for many wildlife species: birds, mammals and reptiles; breeding habitat for rare or declining bird species including Dartford Warbler *Sylvia undata*, and excellent winter roosting. The flowers, borne at a time of year when other sources of pollen or nectar are in short supply, are particularly good for insects and other invertebrate pollinators. However gorse may cause problems if unchecked by dominating an area, eliminating other typical heathland species. Mature stands en masse may also be serious fire hazards. Judgement will be needed when assessing this objective as levels of gorse cover will vary widely across the SAC at any one time; the key issue is that levels of gorse cover should be appropriate to ensure maintenance of habitat quality. There should be no indication of declining condition of the associated habitat due to increasing dominance of gorse. This target does not apply to the more extensive continuous blocks of gorse which should be assessed separately for their suitability for Dartford warbler.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Tree cover**	Restore the open character of the feature, with a typically scattered and low cover of trees and scrub -<10% cover including *Alnus glutinous, Betula spp., Ilex, Pinus spp, Prunus spinose, Quercus spp, Rubus fruticosus, Sarothamnus scoparius and Salix spp, (excluding S. repens*. Extent of *Myrica gale* should not be included within this target; this species should not exceed 30% cover.	Scrub (mainly trees or tree saplings above 1 m in height) and isolated trees are usually very important in providing warmth, shelter, cover, foodplants, perches, territorial markers and sources of prey for typical heathland invertebrates and vertebrates. But overall cover of scrub and trees across this habitat feature should be maintained or restored to a fairly sparse level, with a structurally complex edge and with characteristic heathland vegetation as ground cover. If scrub is locally important for any associated species with their own specific conservation objectives, then a higher level of cover will be acceptable. The area of scrub/tree cover should be stable or not increasing as a whole The retention of small clumps of trees to provide cover for grazing animals is a traditional feature of the New Forest and some single trees form important landscape features. Open heath should also have occasional scattered trees to provide song posts and nesting sites for characteristic birds such as tree pipit.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical	**Heather age structure**	Maintain a diverse age structure amongst the ericacerous shrubs typically found on the site	Each phase of growth associated with the characteristic heathers which dominate this feature also represents different microclimatic conditions and microhabitats which may provide shelter or food to other organisms. Therefore, it is important to maintain a mosaic of heather in different phases	This attribute will be periodically monitored as part of Natural England's

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
species)			of growth. Typically this age structure will consist of between 10-40% cover of (pseudo) pioneer heathers; 20-80% cover of building/mature heathers; <30% cover of degenerate heathers and less than <10% cover of dead heathers. No one growth form should be dominant, but it is accepted that on a site on the scale of the New Forest it is not essential for all growth stages to be represented in any one area. What is important is that there is structural diversity in the heath communities across the SAC as a whole. To maintain a diverse age structure, grazing with commoners stock provides a differential grazing pressure across the heathland landscape supplemented where necessary with controlled burning, cutting and harvesting.	SSSI Condition Assessments
Structure and function (including its typical species)	**Undesirable species**	Restore the frequency/cover of the following undesirable species to within acceptable levels and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread including *Betula* spp ., *Pinus* spp *Cirsium arvense*, *Digitalis purpurea*, *Epilobium* spp. (exc *E palustre*), *Ranunulans repens, Senecio jacobaea, Rumex obtusifolius, Urtica diocia Rhododendron ponticum*.	Undesirable non-woody and woody vascular plants species may require active management to avert an unwanted succession to a different and less desirable state. Often they may be indicative of a negative trend relating to another aspect of a site's structure and function. These species will vary depending on the nature of the particular feature, and in some cases these species may be natural/acceptable components or even dominants. The main threats are: *Rhododendron ponticum* is a highly invasive shrub introduced from Asia. It casts dense shade excluding heathland vegetation and is of little interest for wildlife. It is abundant in private grounds throughout the New Forest providing a constant seed source. Scots pine *Pinus sylvestris* was introduced in the 18th century becomes quickly dominant on heathland habitat creating dense woodland conditions. The retention of small clumps of trees to provide cover for grazing animals is a traditional feature of the New Forest and some single trees form important landscape features. Two native species of birch, *Betula pendula* and *Betula pubescens* can be invasive and are associated with succession towards woodland.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature **Structural** The constant and preferential plants of H2 Heather *Calluna vulgaris* - Dwarf Gorse *Ulex minor* heath and H3 Dwarf Gorse *Ulex minor* – Bristle Bent *Agrostis curtisi*i heath vegetation types **Influential** Grazing herbivores **Site Distinctive** Heathland reptile assemblage including Smooth Snake *Coronella austriaca,* Sand Lizard L*acerta angilis*, Adder *Vipera berus*, Grass snake *Natrix natrix*, Common Lizard *Lacerta vivipara*, Slow-worm *Anguis fragilis* Heathland vascular plant assemblage including Wild Gladioli *Gladiolus illyricus*, Yellow Centaury *Cicendia filiformis,* Mossy Stonecrop *Crassula tillaea,* Coral necklace *Illecebrum verticillatum*, Pale heath violet *Viola lacteal* Heathland lichen and bryophyte assemblage including *Cladonia strepsilis, Pycnothelia, papillaria Hypnum imponens* and *Dicranum*	Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; • **Structural** species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat). The vegetation composition of the New Forest dry heath is very diverse largely due to the long history of grazing by commoners livestock. Grazing pressure is not uniform and this provides a range of niches for organisms adapted to the extensive grazing regime. Continuation of traditional grazing based on the existence of Rights of Common is fundamental to maintaining the characteristic vegetation composition of the New Forest dry heath. • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available.	Definitions of Favourable Condition for designated features of interest for the New Forest SSSI

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		spurium Heathland invertebrates including Long-spined ant *Temnothorax interruptus,* Silver-studded blue *Plebejus argus,* New Forest shieldbug *Eysarcoris aeneus*		
Structure and function (including its typical species)	**Functional connectivity with wider landscape**	Restore the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	See the notes for this attribute in Table 2 above.	New Forest LIFE Partnership, 2001.
Structure and function (including its typical species)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	See the notes for this attribute in Table 1 above.	Natural England 2015
Structure and function (including its typical species)	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the H4030 habitat. Restore the properties of the underlying soil types where conifer plantation is being felled and restored to H4030 habitat	Soil is the foundation of basic ecosystem function and a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature. This Annex 1 habitat has essentially raw soils with little humus and low nutrient status. Apart from a few of the strata, the series of geological deposits produce base poor, acidic soils. Trampling from human activities can cause soil compaction, changes to soil hydrology and with heavy use, erosion and compacted bare ground. This leads to reductions in soil invertebrates and changes in plant communities. The effects are most acute near to car parks, access points from the urban fringe and in and around campsites.	Sharp et al, 2008
Supporting processes (on which the feature relies)	**Conservation measures**	Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within,	New Forest LIFE Partnership, 2001. Natural England,

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		to restore the structure, functions and supporting processes associated with the feature	where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Grazing is of fundamental importance to the management of the New Forest in particular the persistence of commoning where stock, mostly cattle and ponies which are free to roam over extensive areas of the unenclosed habitats of the New Forest. Together with annual burning and cutting programmes ensuring that the wet heath has an extensive structural diversity supporting a range flora and fauna.	2014
Supporting processes (on which the feature relies)	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See the notes for this attribute in Table 1 above.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). Natural England, 2014
Supporting processes (on which the feature relies)	Water quality / quantity	Where the feature is dependent on surface water and/or groundwater, restore water quality and quantity to a standard which provides the necessary conditions to support the feature	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC	
Version Control Advice last updated: **18 March 2019** following stakeholder feedback – Target for **Extent of feature within the site** attribute amended to include areas of H4030 within woodland plantation; additional attribute **Water quality / quantity** added after initial omission from draft version.				
Variations from national feature-framework of integrity guidance: N/A				

Table 4: Supplementary Advice for Qualifying Features: H6410. *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae); Purple moor-grass meadows

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Restore the total extent of the H6410 feature to c1263 hectares.	See the notes for this attribute in Table 1 above. The New Forest wet grassland (locally known as 'wet lawns') are a distinctive feature and form part of a mosaic together with extensive dry and wet heaths and associated valley mires, streams, ponds, temporary pools, dry grasslands and woodlands. These habitats are on an extensive scale and form a dynamic mosaic fluctuating naturally over time. Approximately 200ha of former wet grassland is estimated to be located within the plantation inclosures and many have been drained and planted with trees, but still have restoration potential.	New Forest LIFE Partnership, 2001. Sanderson N.A., 2007
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the H6410 feature, including where applicable its component vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature. This feature is confined to seasonally wet soils and widely distributed across the site. It can be found on flushed soils on slopes and on the flood plains of streams and rivers. The creation or upgrading of tracks to facilitate visitor access across wet grassland may lead to the process of fragmentation, which in turn can	Sanderson, N.A., 1998 Sharp et al, 2008.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			have a number of effects, i.e. subdivision of habitat into smaller patches, isolation of habitat patches, increased edge effects and drainage	
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the H6410 feature are referable to and characterised by the following National Vegetation Classification types: M24c *Molinia caerulea – Cirsium dissectum* Fen Meadow – *Juncus acutiflorus – Erica tetralix* sub community M25b*Molinia caerulea – Potentilla erecta* mire – *Anthoxanthum odoratum* sub community	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations). The wet grasslands of the New Forest (locally known as wet lawns) are a complex mosaic of plant communities and not well defined in the NVC. They are preferentially grazed with very tight swards which maintains an abundance and diversity of plant species.	Sanderson, N.A., 1998
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Restore the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature : **Structural** Constant and preferential plant species of the M24c *Molinia caerulea – Cirsium dissectum* Fen Meadow – *Juncus acutiflorus – Erica tetralix* sub community and M25b *Molinia caerulea – Potentilla erecta* mire – *Anthoxanthum odoratum* sub community **Influential** Grazing herbivores	Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; • **Structural** species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) The vegetation composition of the New Forest wet grasslands is very diverse largely due to the long history of grazing by commoners livestock. The wet grasslands are productive and therefore preferentially grazed by livestock and support a suite of species adapted to the long history of grazing pressure together with specialists of bare poached ground which are now rare beyond the New Forest.	New Forest LIFE Partnership, 2001

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Site-Distinctive Wet grassland vascular plant assemblage, including slender marsh bedstraw *Galium constrictum*, star sedge *Carex, echinata*, creeping willow, *Salix repens*, chamomile *Chamemaelum nobile*, Pennyroyal *Mentha pulegium*, Lesser water-plantain *Baldellia ranunculoides* Wet grassland invertebrates, including Beaulieu dung beetle *Aphodius niger*	Continuation of traditional grazing based on the existence of Rights of Common is fundamental to maintaining the characteristic vegetation composition of the New Forest H6410 wet grassland. Wet grassland habitats on private land adjacent to the core New Forest will have been much more lightly grazed in the past and have more structural diversity providing contrasting habitat for a different range of species. • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. .	
Structure and function (including its typical species)	**Vegetation: undesirable species**	Restore the frequency/cover of the following undesirable species to within acceptable levels and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread.	Undesirable non-woody and woody vascular plants species may require active management to avert an unwanted succession to a different and less desirable state. Often they may be indicative of a negative trend relating to another aspect of a site's structure and function. These species will vary depending on the nature of the particular feature, and in some cases these species may be natural/acceptable components or even dominants. Although scrub provides structural diversity, its expansion can reduce the extent of the habitat and threaten botanical richness. There is a need across the site for restoration of wet grassland from scrub and secondary woodland. Undesirable species may include: creeping thistle *Cirsium arvense*, common foxglove *Digitalis purpurea*, willowherbs *Epilobium* spp. (exc *E palustre*), creeping buttercup *Ranunulans repens*, ragwort *Senecio jacobaea*, broad-leaved dock *Rumex obtusifolius*, common nettle *Urtica dioica*, hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, crab apple *Malus sylvestris*, scots pine *Pinus sylvestris* and birch *Betula spp.*	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Vegetation community transitions**	Maintain the pattern of natural vegetation zonations/transitions between the H6410 feature and wet and dry heath, various woodland types, fen and acid grassland.	Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna. Within the New Forest, wet grassland forms a complex mosaic with other heathland, grassland, freshwater and woodland habitats. The transitions to wetter and dryer habitats remain relatively unmodified. Ephemeral ponds are typically found within wet lawns and make a significant contribution to the ecological character of the grasslands and support nationally rare species such as slender marsh bedstraw *Galium constrictum.*	
Structure and function (including its typical species)	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the habitat. For this feature, soil P index should typically be 0 (<9 mg l -1)	Soil is the foundation of basic ecosystem function and a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature. This Annex 1 habitat is confined to clays and soils affected by high ground water levels occurring on valley slopes and flood plains where the soils are more enriched. Trampling from human activities can cause soil compaction, changes to soil hydrology and with heavy use, erosion and compacted bare ground. This leads to reductions in soil invertebrates and changes in plant communities. The effects are most acute near to car parks, access points from the urban fringe and in and around campsites.	Sharp et al, 2008
Structure and function (including its typical	**Water quality**	Where the feature is dependent on surface water and/or groundwater, restore water quality and quantity to a standard	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely	Thomas, J.S., Diack, I. and Mainstone, C., 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
species)		which provides the necessary conditions to support the feature	affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC. From the mid-19th Century until the 1980's, many New Forest rivers and streams were widened, deepened and straightened to drain adjacent wet grassland with the aim of providing better conditions for grazing. Drainage channels were also cut into the grasslands modifying the natural hydrology and hydrochemistry affecting both the character and natural communities of the feature. Restoration of natural hydrological function is critical to achieving the conservation objectives for this feature.	
Structure and function (including its typical species)	**Hydrology: Water table**	Restore a hydrological regime that provides a sub-surface water table during the summer (range -2 to -48 cm below ground level) and a winter water table ± at the surface. Inundation should be occasional in winter	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and as precise tolerances are not known, further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. From the mid-19th Century until the 1980's, many New Forest rivers and streams were widened, deepened and straightened to drain adjacent wet grassland with the aim of providing better conditions for grazing. Floodplain grasslands adjacent to overdeepened channels are deprived of the natural irrigation and nutrient input from seasonal floodwaters. Drainage channels were also cut into the grasslands modifying the natural hydrology and hydrochemistry. Restoration of natural hydrological function is critical to achieving the conservation objectives for this feature.	Thomas, J.S., Diack, I. and Mainstone, C., 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Supporting off-site habitat**	Maintain the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature.	The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary. Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species. This supporting habitat may be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.	
Structure and function (including its typical species)	**Maintaining integrity of hydrological catchment**	Restore the full range of hydrological/hydrogeological aspects of a site's catchment that contribute to its functioning and the maintenance of the feature	The movement, quality and distribution of water within a site's wider catchment and outside of the site's boundary will affect its ability to support this wetland habitat feature. Catchment size will vary. A site's water table and other hydrological aspects may be affected by changes in the use of the land surface, water abstraction, flood alleviation, development and mineral extraction in the wider catchment. From the mid-19th Century until the 1980's, many New Forest rivers and streams were widened, deepened and straightened to drain adjacent wet grassland with the aim of providing better conditions for grazing. Drainage channels were also cut into the grasslands modifying the natural hydrology and hydrochemistry affecting both the character and natural communities of the feature. Many of the streams and river catchments extend beyond the boundary of the site and modifications both within and outside of the boundary can have an impact on the quality and availability of water within the SAC. Artificial drainage, new infrastructure such as bridges and change of land use can all affect the hydrological regime and have significant implications for the assemblage of characteristic plants and animals present.	Mainstone C, Hall R. & Diack I., 2016
Structure and function (including its typical species)	**Functional connectivity with wider landscape**	Maintain the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	See the notes for this attribute in table 1 above.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	See the notes for this attribute in table 1 above.	Natural England 2015 Mainstone C, Hall R & Diack I., 2016
Supporting processes (on which the feature relies)	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See the notes for this attribute in table 1 above.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk) Natural England 2014,
Supporting processes (on which the feature relies)	**Conservation measures**	Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Conservation measures for this feature typically include grazing, cutting, scrub management, weed control, recreation/visitor management. Also covered is maintenance of surface drainage features such as drains, grips, gutters and foot drains. Retention of suitable land use infrastructure/patterns to enable site management e.g. pastoral livestock farming Grazing is of fundamental importance to the management of the New Forest in particular the persistence of commoning where stock, mostly cattle and ponies which are free to roam over extensive areas of the unenclosed habitats of the New Forest.	Natural England 2014, New Forest LIFE Partnership, 2001.
Version Control Advice last updated: **18 March 2019** following stakeholder feedback – **Extent of feature within site –** target extent increased				
Variations from national feature-framework of integrity-guidance: n/a				

Table 5: Supplementary Advice for Qualifying Features: H7140. Transition mires and quaking bogs; 'Very wet mires often identified by an unstable `quaking` surface'

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Restore the total extent of the H7140 feature to c9ha hectares.	See the notes for this attribute in Table 1 above. New Forest mires form an integral part of the heathland complex which comprises extensive dry and wet heaths and associated valley mires, streams, ponds, temporary pools, dry and wet grasslands. Together with woodlands, these habitats are on an extensive scale and form a dynamic mosaic fluctuating naturally over time. In the past the New Forest resource of this habitat was significantly under-appreciated and was not, therefore, identified as a primary reason for the SAC designation. Recent work has shown that the valley mire systems of the New Forest support some of the finest transition mires in England and estimated that the SAC supports around 40% of the national resource. Large valley mire complexes are also located within the woodland inclosures. Many of these mires have been drained and planted with conifers but where they are partially intact, there is the potential for restoration. Restoration may lead to the development of M9 plant communities in situations where there is seepage of base-rich water, usually from Headon Beds.	New Forest LIFE Partnership, 2001. Thomas, J.S., Diack, I. and Mainstone, C., 2016 Sanderson N.A., 2007
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the H7140 feature, including where applicable its component vegetation types, across the site	Distribution includes the spatial pattern or arrangement of this habitat feature, and its component vegetation types, across the site. Changes in distribution may affect the nature and range of the vegetation communities present, the operation of the physical, chemical, and biological processes in the system and the resiliency of the site and its features to changes or impacts. Within the New Forest found within valley mires in mildly base-enriched, very swampy areas in places such as Wilverley, Holmsley and Burley Common Moor in the south-west of the Forest s and in the east of the forest near Fort Bog.	New Forest LIFE Partnership, 2001.
Structure and function (including its	**Vegetation community composition**	Ensure the component vegetation communities of the H7140 feature are referable to	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-	Tratt, R., Parnell, M., Eades, P. & Shaw, S.C., 2014

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
typical species)		and characterised by the following National Vegetation Classification type: M9 *Calliergon cuspidatum – Carex rostrate* *M14: Schoenus nigricans–Narthecium ossifragum mire* *M29: Potamogeton polygonifolius–Hypericum elodes soakway* *M21: Erica tetralix–Sphagnum papillosum mire*	status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This is a variable community, characterised by *Calliergon cuspidatum* and *Carex rostrate* with various brown and base tolerant mosses. *Sphagna*, apart from more base demanding species, are rare and in the New Forest communities *Schoenus* is absent.	
Structure and function (including its typical species)	**Key structural, influential or site distinctive species: flora and fauna**	Restore the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat; **Structural** The constant and preferential plants of M9, M14, M29 and M21 vegetation types **Influential** Grazing herbivores **Distinctive** Mire vascular plants: Bog sedge *Carex limosa,* Slender sedge *Carex lasiocarpa,* Slender cotton grass *Eriophorum gracile,* Great sundew *Drosera anglica,* Lesser bladderwort *utricularia minor*	See the notes for this attribute above.	Sanderson, N.A., 1998 Falk, S., 2010

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Mire bryophytes: *Sphagnum contortum, sphagnum teres, Sphagnum subsecundum* Mire Invertebrates: Six-spotted cranefly *Idiocera sexguttata*		
Structure and function (including its typical species)	**Invasive, non-native and/or introduced species**	Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the feature	Invasive or introduced non-native species can be a serious potential threat to the structure and function of these habitats, because they are able to exclude, damage or suppress the growth of their associated typical species, reduce structural diversity of the habitat and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides). In 2009/ 2010 a study in the New Forest showed that *Crassula. helmsii*, was distributed in a distinct pattern associated with public access. It is likely that introduction of other non-native species will show a similar pattern and is likely to be through the accidental or deliberate release by people or where vehicles and/ or equipment have been used which are likely to have come from an infected site.	Ewald, N.C., 2014
Structure and function (including its typical species)	**Presence/ cover of woody species**	Restore a low cover (<10% of the area) of scrub or trees within stands of H7140 feature Extent of *Myrica gale* should not be included within this target; this species should not exceed 30% cover.	Native trees and shrubs occur naturally on bog and fen surfaces but an abundance of scrub and trees on bogs and fens is sometimes regarded as detrimental because they are indicators and perpetrators of drying out and may cause damage to vegetation structure through shading effects. Birch, pine, willow and rhododendron (an invasive non-native species) are the main species of concern. The seeds of most invasive woody species are wind dispersed, so trees are able to establish on raised bog and fen surfaces. The retention of clumps of trees to provide cover for grazing animals is a traditional feature of the New Forest however these should not be allowed to develop in or adjacent to mire habitats. H7140 mires are often associated with mire woodland, its spread, usually related to drainage or low grazing pressure, can threaten the extent of these mires.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Exposed substrate**	Maintain a low cover of exposed substrate of between 5-10% across the H7140 feature.	For this wetland habitat type, maintaining some continuous extent of exposed, open ground surface is required to support the establishment and supply of those component species which often rely on wet and sparsely-vegetated conditions.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Hydrology**	At a site, unit and/or catchment level (as necessary), restore natural hydrological processes to provide the conditions necessary to sustain the feature within the site	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present, particularly to habitats such as H7140 mires that are highly sensitive to change. Therefore maintaining or restoring natural hydrological function is critical to achieving the conservation objectives for this feature From the mid-19th Century until the 1980's, drainage channels were cut into many New Forest mires with the aim of providing better conditions for growing timber and grazing. This modified the natural hydrology and hydrochemistry affecting both the character and natural communities of the feature. Restoration of natural hydrological function in mires that have been drained or modified in other ways may lead to the development of H7140 features in situations where there is seepage of base-rich water, usually from Headon Beds.	Thomas, J.S., Diack, I. and Mainstone, C., 2016
Structure and function (including its typical species)	**Water chemistry**	Restore the surface water and groundwater supporting the hydrology of the H7140 feature to a low nutrient status.	UKTAG (2012) provides threshold values for nitrate concentration in groundwaters for different wetland types. The threshold values will mainly be used in the characterisation of GWDTE status for the WFD, primarily as a risk screening tool, to assess if sites are 'at risk' or 'not at risk' from groundwater mediated nutrient pressure. Due to the complex cycling of nutrients within many GWDTE, these threshold values are less well suited for application within sites but rather just to groundwater that is directly feeding the site. In the New Forest H7140 mires develop where low-nutrient, mildly base-rich water is at the surface or slightly above the surface for the whole year. It is very sensitive to changes in water regime and	Thomas, J.S., Diack, I. and Mainstone, C., 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			chemistry/nutrient status. Maintenance or restoration of natural hydrological function is critical to achieving the conservation objectives for this feature. From the mid-19th Century until the 1980's, drainage channels were cut into many New Forest mires with the aim of providing better conditions for grazing. This modified the natural hydrology and hydrochemistry affecting both the character and natural communities of the feature.	
Structure and function (including its typical species)	**Hydrology**	Restore a high piezometric head and permanently high water table (allowing for natural seasonal fluctuations) on groundwater dependent sites.	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. Some examples of H7140 may be wholly or partly groundwater dependent. Others have a greater dependence on surface water or rain water inputs. It is critically important to understand the ecohydrological context of all sites. In the New Forest H7140 mires develop where low-nutrient, mildly base-rich water is at the surface or slightly above the surface for the whole year. It is very sensitive to changes in water regime. Maintenance or restoration of natural hydrological function is critical to achieving the conservation objectives for this feature.	Mainstone C, Hall R & Diack I., 2016
Structure and function (including its typical species)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of natural habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary.	Natural England, 2015 Mainstone C, Hall R & Diack I., 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this particular SAC to climate change has been assessed by Natural England as being moderate, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means the site is considered to be vulnerable overall but a medium priority for further assessment and action. Individual species may be more or less vulnerable than their supporting habitat itself. In many cases, change will be inevitable so appropriate monitoring would be required. A natural hydrological regime provides the best defence against climate change, maximising the ability of these ecosystems to adapt to changing conditions.	
Structure and function (including its typical species)	**Supporting off-site habitat**	Maintain the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature	The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary. Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species. This supporting habitat may be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.	
Supporting processes (on which the feature relies)	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See the notes for this attribute in Table 1 above.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). Natural England 2014

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature relies)	**Conservation measures**	Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the H7140 feature	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. This habitat in most cases requires ongoing cutting or grazing maintain its open character. In the New Forest H7140 mires develop where low-nutrient, mildly base-rich water is at the surface or slightly above the surface for the whole year. It is very sensitive to changes in water regime and chemistry/nutrient status. Maintenance or restoration of natural hydrological function is critical to achieving the conservation objectives for this feature. Grazing is of fundamental importance to the management of the New Forest in particular the persistence of commoning where stock, mostly cattle and ponies which are free to roam over extensive areas of the unenclosed habitats of the New Forest.	New Forest LIFE Partnership, 2001
Version Control Advice last updated: n/a				
Variations from national feature-framework of integrity-guidance: n/a				

Table 6: Supplementary Advice for Qualifying Features: H7150. Depressions on peat substrates of the *Rhynchosporion*

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Restore the total extent of the H7150 feature at c210 hectares.	See the notes for this attribute in Table 1 above. The *Rhynchosoporion* is a vegetation alliance closely associated with bog pools and runnels on intact bogs (valley, raised and blanket bogs) and transition mire and quaking bog. JNCC guidance also includes within the definition vegetation on seepage areas on humid and wet heath. This Annex 1 feature is difficult to map due to both the small size of individual patches and the transitory nature of elements of the habitat (e.g. when on disturbed shallow peat/sand). As a result, the extent, or even presence, on protected sites is rarely known and detailed survey will be necessary on smaller sites. In the New Forest, The habitats associated with the *Rhynchosoporion* form an integral part of the heathland complex and together with grassland, woodland, pond and stream habitats are on an extensive scale and form a dynamic mosaic fluctuating naturally over time. Large valley mire complexes and wet heathlands are also located within the woodland inclosures. Many of these habitats have been drained and planted with conifers but where they are partially intact, there is the potential for restoration. Restoration may lead to the development of The *Rhynchosoporion* habitat where the reintroduction of grazing creates bare peat.	New Forest LIFE Partnership, 2001. Sanderson N.A., 2007
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Restore the distribution and configuration of the H7150 feature, including where applicable its component vegetation types, across the site	Distribution includes the spatial pattern or arrangement of this habitat feature, and its component vegetation types, across the site. Changes in distribution may affect the nature and range of the vegetation communities present, the operation of the physical, chemical, and biological processes in the system and the resiliency of the site and its features to changes or impacts.	New Forest LIFE Partnership, 2001.
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the H7150 feature are referable to and characterised by the following National Vegetation Classification type • M16c: Cross-leaved Heath - *Sphagnum compactum* wet	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		heath -White Beak-sedge-Oblong-leaved Sundew sub-community (*Erica tetralix-Sphagnum compactum* wet heath - *Rhynchospora alba-Drosera intermedia* sub-community) • M21: *Erica tetralix–Sphagnum papillosum* mire • M1: *Sphagnum auriculatum* Bog pool community		
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Restore the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature : **Structural** Constant and preferential plant species of the • M16c: Cross-leaved Heath - Sphagnum compactum wet heath -White Beak-sedge-Oblong-leaved Sundew sub-community (*Erica tetralix-Sphagnum compactum wet heath - Rhynchospora alba-Drosera intermedia* sub-community) • M21: *Erica tetralix–Sphagnum papillosum* mire • M1: *Sphagnum auriculatum* Bog pool community **Influential** Grazing herbivores	Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; • **Structura**l species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Site-distinctive Marsh clubmoss *Lycopodiella inundata,* Bog orchid *Hammarbya paludosa*		
Structure and function (including its typical species)	**Invasive, non-native and/or introduced species**	Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the feature	Invasive or introduced non-native species can be a serious potential threat to the structure and function of these habitats, because they are able to exclude, damage or suppress the growth of their associated typical species, reduce structural diversity of the habitat and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides). In 2009/ 2010 a study in the New Forest showed that *Crassula helmsii*, was distributed in a distinct pattern associated with public access. It is likely that introduction of other non-native species will show a similar pattern and is likely to be through the accidental or deliberate release by people or where vehicles and/ or equipment have been used which are likely to have come from an infected site.	Ewald, N.C., 2014
Structure and function (including its typical species)	**Presence/ cover of woody species**	Restore a very low cover (<1% of the area) of scrub or trees within stands of H7140.	Native trees and shrubs occur naturally on bog and fen surfaces but an abundance of scrub and trees on bogs and fens is sometimes regarded as detrimental because they are indicators and perpetrators of drying out and may cause damage to vegetation structure through shading effects. Birch, pine, willow and rhododendron (an invasive non-native species) are the main species of concern. The seeds of most invasive woody species are wind dispersed, so trees are able to establish on raised bog and fen surfaces. The retention of clumps of trees to provide cover for grazing animals is a traditional feature of the New Forest however these should not be allowed to develop in *Rhyncosporion* habitats.	
Structure and function (including its typical species)	**Exposed substrate**	Maintain a low cover of exposed substrate of between 5-10% across the feature.	For this wetland habitat type, maintaining some continuous extent of exposed, open ground surface is required to support the establishment and supply of those component species which often rely on wet and sparsely-vegetated conditions. High grazing pressure results in the poaching of wet heath and mire surfaces creating patches of bare peat which is a key feature of this habitat. Depressions on peat substrates of the *Rhynchosporion* often develop in areas	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			that are artificially disturbed, such as along peaty footpaths and trackways which can be damaged by the creation of permanent paths using imported gravels. Excessive recreation can also cause erosion and compaction of the peaty soil leading to reductions in soil invertebrates and changes in plant communities.	
Structure and function (including its typical species)	**Hydrology**	At a site, unit and/or catchment level (as necessary), restore natural hydrological processes to provide the conditions necessary to sustain the feature within the site	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. The hydrological status of H7150 is largely dependent on the overall hydrological integrity of the larger peatland in which it is found and is highly sensitive to change. Therefore maintaining or restoring natural hydrological function of the wider peatland is critical to achieving the conservation objectives for this feature. From the mid-19th Century until the 1980's, drainage channels were cut into many New Forest mires and wet heaths with the aim of providing better conditions for growing timber and for grazing . This modified the natural hydrology and hydrochemistry affecting both the character and natural communities of the feature. Restoration of natural hydrological function in mires that have been drained or modified in other ways may lead to the development H7150 in associations with bog pools and runnels in valley mires but also in the slightly drier conditions which occur in the transition zone between wet heath and mire.	Thomas, J.S., Diack, I. and Mainstone, C., 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Water chemistry**	Restore the surface water and groundwater supporting the hydrology of the feature to a low nutrient status.	UKTAG (2012) provides threshold values for nitrate concentration in groundwaters for different wetland types. The threshold values will mainly be used in the characterisation of GWDTE status for the WFD, primarily as a risk screening tool, to assess if sites are 'at risk' or 'not at risk' from groundwater mediated nutrient pressure. Due to the complex cycling of nutrients within many GWDTE, these threshold values are less well suited for application within sites but rather just to groundwater that is directly feeding the site. Depressions on peat substrates of the *Rhynchosporion* occurs within the context of high quality, intact mire and wet heath complexes. From the mid-19th Century until the 1980's, drainage channels were cut into many New Forest mires and wet heaths with the aim of providing better conditions growing timber and for grazing. This modified the natural hydrology and hydrochemistry affecting both the character and natural communities of the feature. Restoration of natural hydrological function in mires that have been drained or modified in other ways may lead to the development H7150 in associations with bog pools and runnels in valley mires but also in the slightly drier conditions which occur in the transition zone between wet heath and mire.	Thomas, J.S., Diack, I. and Mainstone, C, 2016
Structure and function (including its typical species)	**Hydrology**	Restore a high piezometric head and permanently high water table (allowing for natural seasonal fluctuations) on groundwater dependent sites.	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. Some examples of H7150 may be wholly or partly groundwater dependent. Others have a greater dependence on surface water or rain water inputs. It is critically important to understand the ecohydrological context of all sites. From the mid-19th Century until the 1980's, drainage channels were cut into many New Forest mires and wet heaths with the aim of providing better conditions growing timber and for grazing. This modified the natural hydrology and hydrochemistry affecting both the character and natural communities of	Mainstone C, Hall R & Diack I., 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			the feature. Restoration of natural hydrological function is critical to achieving the conservation objectives for this feature.	
Structure and function (including its typical species)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	See the notes for this attribute in Table 1 above.	Natural England, 2015 Mainstone C, Hall R & Diack I., 2016
Structure and function (including its typical species)	**Supporting off-site habitat**	Maintain the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature	The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary. Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species. This supporting habitat may be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.	
supporting processes (on which the feature relies)	**Air quality**	Restore as necessary, the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See the notes for this attribute in Table 1 above.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). Natural England, 2014
Supporting processes (on which the feature relies)	**Conservation measures**	Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement	Natural England, 2014

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		associated with the feature	for the underpinning SSSI and/or management agreements. This habitat in most cases requires ongoing cutting or grazing maintain its open character. Maintenance or restoration of natural hydrological function is critical to achieving the conservation objectives for this feature. A high level of grazing is of fundamental importance to the management of this feature in particular the persistence of commoning where stock, mostly cattle and ponies which are free to roam over extensive areas of the unenclosed habitats of the New Forest, ensuring that mires and wet heath have an extensive structural diversity and sufficient bare peat to maintain this feature.	
Version Control Advice last updated: n/a				
Variations from national feature-framework of integrity-guidance: n/a				

Table 7: Supplementary Advice for Qualifying Features: H7230. Alkaline fens; Calcium-rich spring water-fed fens

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Restore the total extent of the H7230 feature.	See the notes for this attribute above. In the New Forest, Alkaline fens form an integral part of the heathland complex and together with grassland, woodland, pond and stream habitats are on an extensive scale and form a dynamic mosaic fluctuating naturally over time. Alkaline fens are not widespread in the site but the New Forest examples are extremely rich, support rare species and demonstrate very good transitions with other wetland types. Whilst the current area of the feature has not been measured, it is likely that its extent has declined over time.	
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the H7230 feature, including where applicable its component vegetation types, across the site	Distribution includes the spatial pattern or arrangement of this habitat feature, and its component vegetation types, across the site. Changes in distribution may affect the nature and range of the vegetation communities present, the operation of the physical, chemical, and biological processes in the system and the resiliency of the site and its features to changes or impacts. Most occur on small valley side seepage step mires scattered across the south of the SAC. They also occur in association with wet grasslands and valley mires.	New Forest LIFE Partnership, 2001
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification type: *Eleocharis quinquefolia-Drepanocladus revolvens* mire' a lowland form of NVC Community: M10a: *Carex dioica-Pinguicula vulgaris mire - Carex viridula oedocarpa-Juncus bulbosus*	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. For this fetaure this may typically be the M9, M10 & M13 types	New Forest LIFE Partnership, 2001.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		sub-community *Eleocharis spp-Campylium stellatum* mire - *Narthecium ossifragum -Drosera rotundifolia* sub-community', which incorporates the NVC community: M14 *Schoenus nigricans -Narthecium ossifragum* mire.		
Structure and function (including its typical species)	**Invasive, non-native and/or introduced species**	Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the feature	Invasive or introduced non-native species can be a serious potential threat to the structure and function of these habitats, because they are able to exclude, damage or suppress the growth of their associated typical species, reduce structural diversity of the habitat and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides). In 2009/ 2010 a study in the New Forest showed that *Crassula helmsii*, was distributed in a distinct pattern associated with public access. It is likely that introduction of other non-native species will show a similar pattern and is likely to be through the accidental or deliberate release by people or where vehicles and/ or equipment have been used which are likely to have come from an infected site.	Ewald, N.C., 2014
Structure and function (including its typical species)	**Presence/ cover of woody species**	Maintain a low cover of woody species of not more than 10% scrub/tree cover. No woody species in flushes or springs; low *Salix* spp acceptable more than 5m from edge of spring/flush feature.	Native trees and shrubs occur naturally on bog and fen surfaces but an abundance of scrub and trees on bogs and fens is sometimes regarded as detrimental because they are indicators and perpetrators of drying out and may cause damage to vegetation structure through shading effects. Birch, pine, willow and rhododendron (an invasive non-native species) are the main species of concern. The seeds of most invasive woody species are wind dispersed, so trees are able to establish on raised bog and fen surfaces. The retention of clumps of trees to provide cover for grazing animals is a traditional feature of the New Forest however these should not be allowed to develop in or adjacent to alkaline fen and associated wet habitats.	
Structure and function	**Browsing and grazing by**	Maintain appropriate levels of grazing,	The New Forest flora and fauna have adapted to the long tradition of extensive grazing management associated with commoning and associated	New Forest LIFE Partnership, 2001.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(including its typical species)	**herbivores**		common rights. These habitat features are often preferentially grazed which encourages a diversity of species. Removal or a significant long term reduction in grazing pressure would cause rapid changes in the plant and animal communities and the overall impact would be a rapid expansion to dominance of the more aggressive and competitive species.	
Structure and function (including its typical species)	**Exposed substrate**	Maintain the exposure of the substrate to appropriate levels, which will typically be between 5-25% across feature.	For this wetland habitat type, maintaining some continuous extent of exposed, open ground surface is required to support the establishment and supply of those component species which often rely on wet and sparsely-vegetated conditions. The open nature and sometimes skeletal nature of the substrate supporting these features requires a higher upper threshold than for some other wetlands. Grazing pressure results in the poaching of habitat surface creating patches of bare ground.	
Structure and function (including its typical species)	**Integrity of tufa features**	Ensure that no more than 1% of the vegetation in which tufa is visible is showing signs of damage or disturbance	Tufa is a fragile soft porous rock composed of calcium carbonate which is deposited as lime-rich subterranean water issues out from springs and chemically interacts with the air. It is easily damaged or disturbed.	
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature : **Structural** Constant and preferential plant species of the: *Eleocharis quinquefolia-Drepanocladus revolvens* mire' a lowland form of NVC Community: M10a: *Carex dioica-Pinguicula vulgaris*	See the notes for this attribute above.	New Forest LIFE Partnership, 2001.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		mire - *Carex viridula oedocarpa-Juncus bulbosus* sub-community *Eleocharis spp-Campylium stellatum* mire - *Narthecium ossifragum -Drosera rotundifolia* sub-community', which incorporates the NVC community: M14 *Schoenus nigricans -Narthecium ossifragum* mire. **Influential** Grazing herbivores **Site-Distinctive** Common butterwort *Pinguicula vulgaris,* Broad leaved cottongrass *Eriophorum latifolium,* Narrow Mushroom-Headed Liverwort *Preissia quadrata*		
Structure and function (including its typical species)	**Hydrology**	At a site, unit and/or catchment level (as necessary), restore natural hydrological processes to provide the conditions necessary to sustain the feature within the site, including a high piezometric head and permanently high water table (allowing for natural seasonal fluctuations).	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. H7230. Alkaline fens are highly sensitive to change. Maintaining or restoring areas with natural hydrological function is critical to achieving the conservation objectives for this feature From the mid-19th Century until the 1980's, drainage channels were cut into many New Forest mires and wet heaths with the aim of providing better conditions for growing timber and for grazing . This modified the natural hydrology and hydrochemistry affecting both the character and natural communities of the feature.	Thomas, J.S., Diack, I. and Mainstone, C., 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Water chemistry**	Maintain the low nutrient status of water irrigating the feature, ensuring it is rich in base ions, particularly calcium.	UKTAG (2012) provides threshold values for nitrate concentration in groundwaters for different wetland types. The threshold values will mainly be used in the characterisation of GWDTE status for the WFD, primarily as a risk screening tool, to assess if sites are 'at risk' or 'not at risk' from groundwater mediated nutrient pressure. Due to the complex cycling of nutrients within many GWDTE, these threshold values are less well suited for application within sites but rather just to groundwater that is directly feeding the site. Drainage and other modifications such as recreational and access infrastructure modify the natural hydrology and hydrochemistry which affects both the character and natural communities of the feature. Maintaining or restoring natural hydrological function is critical to achieving the conservation objectives for this feature.	Thomas, J.S., Diack, I. and Mainstone, C., 2016
Structure and function (including its typical species)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	See the notes for this attribute above.	Natural England, 2015 Mainstone C, Hall R & Diack I., 2016
Structure and function (including its typical species)	**Functional connectivity with wider landscape**	Maintain the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	See the notes for this attribute above.	
supporting processes (on which the feature relies)	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values	See the notes for this attribute above.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).		site' tool on the Air Pollution Information System (www.apis.ac.uk). Natural England, 2014
Supporting processes (on which the feature relies)	**Conservation measures**	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain the structure, functions and supporting processes associated with the feature	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. In the New Forest H7230. Alkaline fens form part of the valley mire complex on low-nutrient, base-rich flushes often associated with lime rich marl. It is very sensitive to changes in water regime and chemistry/nutrient status. Maintenance or restoration of natural hydrological function is critical to achieving the conservation objectives for this feature. Grazing is of fundamental importance to the management of the New Forest in particular the persistence of commoning where stock, mostly cattle and ponies which are free to roam over extensive areas of the unenclosed habitats of the New Forest.	New Forest LIFE Partnership, 2001.
Version Control Advice last updated: n/a				
Variations from national feature-framework of integrity-guidance: n/a				

Table 8: Supplementary Advice for Qualifying Features: H91D0. Bog woodland *

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Maintain the total extent of the H91D0 feature at c.33 hectares.	There should be no measurable reduction (excluding any trivial loss) in the extent of this feature. Area measurements given may be approximate depending on the nature, age and accuracy of data collection. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. H91D0. Bog woodland in the New Forest forms part of a complex mosaic of habitats including extensive dry and wet heaths and associated valley mires, streams, ponds, temporary pools, dry and wet grasslands and woodlands Together these habitats are on an extensive scale and form a dynamic mosaic fluctuating naturally over time. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis.	New Forest LIFE Partnership, 2001.
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Within the New Forest, this feature is quite widespread within the valley mires.	
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types: • W4b: Downy Birch-Purple Moor-grass woodland - Soft-rush sub community (*Betula pubescens-Molinia caerulea woodland - Juncus effusus* sub-community)	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations). The community occurs on peat typically along the central zone of the larger valley mires.	
Structure and function (including its typical species)	**Vegetation structure - canopy cover**	Maintain an appropriate tree canopy cover across the feature, which will typically be between 30-90% of the site	Canopy cover is the overall proportion of vegetative cover consisting of any woody layer ranging from established regeneration to mature and veteran stages. Woodland canopy density and structure is important because it affects ecosystem function and in particular microclimate, litterfall, soil moisture, nutrient turnover and shading; this in turn influences the composition of plants and animals in lower vegetation layers and soil. Canopy dominated by Betula pubescens with varying amounts of *Salix cinerea* and occasional *Alnus glutinosa* over an open bog habitat. Open canopies with just scattered trees will have less of a woodland character and reduced diversity of woodland-dependent species (although they may be still be important as a form of woodland-pasture). Completely closed canopies across the whole woodland are not ideal either however, as they cast heavier shade and support fewer species and have little space where tree regeneration could occur.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Vegetation structure - open space**	Maintain areas of permanent/temporary open space within the woodland feature, typically to cover approximately 50% of area due to permanently wet soils and slow tree growth	Woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. Having some open, sunlit and largely tree-less areas as part of the woodland community is often important to facilitate natural tree and shrub regeneration and also to provide supporting habitat for specialist woodland invertebrates, birds, vascular and lower plants. Such open space can be permanent or temporary and may consist of managed grazed areas or naturally-produced gaps caused by disturbance events such as windthrow/fire/tree falling over/snow damage. The trees are likely to be widely spaced due to difficulties establishing on the wet surface.	
Structure and function (including its typical species)	**Vegetation structure - old growth**	Maintain the extent and continuity of undisturbed, mature/old growth stands (typically comprising at least 10% of the feature at any one time) and the assemblages of veteran and ancient trees (typically 5-10 trees per hectare).	Good woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. For this habitat type, old or over-mature elements of the woodland are particularly characteristic and important features, and their continuity should be a priority. Bog woodland occurs in long term stable combinations with valley mires, some in the New Forest such as Church Moor are ancient.	
Structure and function (including its typical species)	**Vegetation structure - age class distribution**	Maintain at least 3 age classes (pole stage/ medium/ mature) spread across the average life expectancy of the commonest trees.	A distribution of size and age classes of site-native tree and shrub species that indicate the bog woodland will continue in perpetuity, and will provide a variety of the woodland habitats and niches expected for this type of woodland at the site in question.	
Structure and function (including its typical species)	**Adaptation and resilience**	Maintain the resilience of the feature by ensuring a diversity (at least 2 species) of site-native trees including Downy Birch *Betula pubescens* and Alder *Alnus glutinosa* across the site.	This recognises the increasing likelihood of natural habitat features needing to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect	Mainstone C, Hall R & Diack I., 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. A natural hydrological regime provides the best defence against climate change, maximising the ability of these ecosystems to adapt to changing conditions.	
Structure and function (including its typical species)	**Browsing and grazing by herbivores**	Maintain browsing at a (low) level that maintains a well-developed understorey with no obvious browse line, & lush ground vegetation with some grazing sensitive species evident (bramble, ivy etc.), and tree seedlings and sapling common in gaps.	In the New Forest, this habitat is strongly influenced by the variable grazing pressure of New Forest ponies and cattle. As these habitats typically occur along the central axis of valley mires, grazing prevents the expansion and dominance of molinia, birch and willow at the expense of species rich mire whilst maintaining the ancient stand,	New Forest LIFE Partnership, 2001.
Structure and function (including its typical species)	**Regeneration potential**	Maintain the potential for sufficient natural regeneration of desirable trees and shrubs; typically tree seedlings of desirable species (measured by seedlings and <1.3m saplings - above grazing and browsing height) should be visible in sufficient numbers in gaps, at the wood edge and/or as regrowth as appropriate	The regeneration potential of the woodland feature must be maintained if the wood is to be sustained and survive, both in terms of quantity of regeneration and in terms of appropriate species. This will Include regeneration of the trees from saplings or suckers, regrowth from coppice stools or pollards. Browsing and grazing levels must permit regeneration at least in intervals of 5 years every 20. The density of regeneration considered sufficient is less in wood pasture sites than in high forest. Regeneration from pollarding of veteran trees should be included where this is happening.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Tree and shrub species composition**	Maintain a canopy and under-storey of which 95% is composed of site native trees and shrubs *Betula pubescens, Salix cinerea, Alnus glutinosa*	Native trees and shrubs in general support a greater diversity of associated species than non-native species, especially amongst groups of invertebrates which depend directly on trees for food and shelter. There are many plants and animals which use or co-exist with non-native trees, but many rare and threatened woodland species are specialists adapted to one or a few native trees or shrub species (birches and willows are examples of trees that host many specialist insect species).	
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Restore the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature; **Structural** The constant and preferential plants of W4b: Downy Birch-Purple Moor-grass woodland - Soft-rush sub community (B*etula pubescens-Molinia caerulea woodland - Juncus effusus* sub-community) **Influential** Grazing Livestock including New Forest Ponies, cattle and deer **Site-distinctive** White sedge *Carex curta*	Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; • **Structural** species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available.	New Forest LIFE Partnership, 2001.
Structure and function (including its typical	**Invasive, non-native and/or introduced species**	Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the	Invasive or introduced non-native species are a serious potential threat to the biodiversity of native and ancient woods, because they are able to exclude, damage or suppress the growth of native tree, shrub and ground species (and their associated typical species),	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
species)		feature	reduce structural diversity and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides). Such species can include Japanese knotweed, giant hogweed and Himalayan balsam, for example. Similarly, this would include pheasants, rabbits and non-native invertebrate 'pest' species. Scots pine is not native to the New Forest and is highly invasive.	
Structure and function (including its typical species)	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the habitat.	Soil is the foundation of basic ecosystem function and a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature. Apart from a few of the strata, the series of geological deposits of the New Forest produce base poor, acidic soils.	
Supporting processes (on which the feature relies)	**Functional connectivity with wider landscape**	Maintain the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	See the notes for this attribute above.	
Supporting processes (on which the feature relies)	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See the notes for this attribute above. A restore target has been included here as the Critical Loads and levels are currently being exceeded as present and present a risk to this feature.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). Natural England, 2014
Supporting processes	**Hydrology**	At a site, unit and/or catchment level as necessary, restore	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives	Thomas, J.S., Diack, I. and Mainstone, C., 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(on which the feature relies)		natural hydrological processes to provide the conditions necessary to sustain the feature within the site	for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. Bog woodlands rely on hydrological processes (especially permanent wetness) for their ecological functioning. From the mid-19th Century until the 1980's, drainage channels were cut into many New Forest mires with the aim of providing better conditions for growing timber and grazing. This modified the natural hydrology and hydrochemistry affecting both the character and natural communities of the feature. Bog woodland is highly sensitive to hydrological change which can lead to a loss of characteristic species. Maintaining or restoring natural hydrological function of the wider peatland is critical to achieving the conservation objectives for this feature.	
Supporting processes (on which the feature relies)	**Illumination**	Ensure artificial light is maintained to a level which is unlikely to affect natural phenological cycles and processes to the detriment of the feature and its typical species at this site.	Woodland biodiversity has naturally evolved with natural patterns of light and darkness, so disturbance or modification of those patterns can influence numerous aspects of plant and animal behaviour. For example, light pollution (from direct glare, chronically increased illumination and/or temporary, unexpected fluctuations in lighting) can affect animal navigation, competitive interactions, predator-prey relations, and animal physiology. Flowering and development of trees and plants can also be modified by un-natural illumination which can disrupt natural seasonal responses.	
Version Control Advice last updated: n/a				
Variations from national feature-framework of integrity-guidance: n/a				

Table 9: Supplementary Advice for Qualifying Features: H91E0. Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae); Alder woodland on floodplains*

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Maintain the total extent of the H91E0 feature at c212ha. Restore the total extent of the H91E0 feature which remains within woodland plantation inclosures. The actual area of the feature is unknown	See the notes for this attribute above in Table 9. Alluvial woodland within the New Forest forms part of a complex mosaic of habitats including extensive dry and wet heaths and associated valley mires, streams, ponds, temporary pools, dry and wet grasslands and woodlands Together these habitats are on an extensive scale and form a dynamic mosaic fluctuating naturally over time. Stands of alluvial woodland were also located within the plantation inclosures. Many of these habitats have been degraded by forestry operations such as drainage and planting of trees but where they are partially intact, there is the potential for restoration.	New Forest LIFE Partnership, 2001. This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature. Within the New Forest SAC, old growth riverine woodland is	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			distributed on alluvial mineral soils along the various watercourses.	
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types: • W7: Alder-Ash-Yellow Pimpernel woodland (*Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland) • W8: Ash-Maple-Dogs Mercury Woodland (*Fraxinus excelsior-Acer campestre-Mercurialis* Woodland)	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations). New Forest Riverine Woodland comprises those woodland stands with occasional to abundant *Alnus glutinosa* and frequent *Fraxinus excelsior* on wet mineral or peaty soils along water courses. Woodland stands on flood plains which, where not damaged by over deepening of drainage channels, flood seasonally as water levels rise along meandering natural flood channels containing debris dams. Species intolerant of such conditions are rare (e.g. beech) or confined to slightly raised areas, and rich alluvial soils with higher base status produce a very rich woodland flora, though modified by grazing animals. These woodlands form part of a dynamic mosaic with open habitats such as *molinia* meadows and their structure and function are best maintained with extensive grazing by livestock to maintain their distinctiveness and species richness. Where car parks and other access points are located in close proximity to stretches of riverine woodland, considerable recreational pressure is exerted locally resulting in eroded banks, excessive bare ground and impoverished vegetation. Areas of particular concern are Balmer Lawn, Ivy Wood, Ober	Natural England, 2014

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Corner, Puttles Bridge, Wooton Bridge and Millyford Bridge.	
Structure and function (including its typical species)	**Vegetation structure - canopy cover**	Maintain an appropriate tree canopy cover across the feature, which will typically be between 30-90% of the site	Canopy cover is the overall proportion of vegetative cover consisting of any woody layer ranging from established regeneration to mature and veteran stages. Woodland canopy density and structure is important because it affects ecosystem function and in particular microclimate, litterfall, soil moisture, nutrient turnover and shading; this in turn influences the composition of plants and animals in lower vegetation layers and soil. Open canopies with just scattered trees will have less of a woodland character and reduced diversity of woodland-dependent species (although they may be still be important as a form of woodland-pasture). Completely closed canopies across the whole woodland are not ideal either however, as they cast heavier shade and support fewer species associated with edges, glades and open grown trees, and have little space where tree regeneration could occur. This occurs within plantation inclosures where planted trees create heavy shade. In general, the woodland canopy of this feature should provide a core of woodland interior conditions with some open and edge habitat as well.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation structure - open space**	Maintain areas of permanent/temporary open space within the woodland feature, typically to cover approximately 10% of area	Woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. Having some open, sunlit and largely tree-less areas as part of the woodland community is often important to facilitate natural tree and shrub regeneration and also to provide supporting habitat for specialist woodland invertebrates, birds, vascular and lower plants. Such open space can be permanent or temporary and may consist of managed grazed areas, glades, or naturally-produced gaps caused by disturbance events such as windthrow/fire/tree falling over/snow damage.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its	**Vegetation structure - old growth**	Maintain the extent and continuity of undisturbed, mature/old growth stands	Good woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem	This attribute will be periodically monitored as part of Natural England's SSSI Condition

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
typical species)		(typically comprising at least 20% of the feature at any one time) and the assemblages of veteran and ancient trees (typically >10 trees per hectare).	functioning. For this habitat type, old or over-mature elements of the woodland are particularly characteristic and important features, and their continuity should be a priority.	Assessments
Structure and function (including its typical species)	**Vegetation structure - dead wood**	Maintain the continuity and abundance of frequent standing or fallen dead and decaying wood, including >10 standing dead trees per hectare	Woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. Dead and actively decaying wood, either as part of a standing tree or as a fallen tree on the woodland floor, is an important component of woodland ecosystems, and supports a range of specialist invertebrates, fungi, lichens and bryophytes, and associated hole-nesting birds and roosting bats, all of which may be very typical of the feature. The New Forest has a plentiful supply of deadwood which supports a rich diversity of invertebrate fauna and creates natural debris dams in the streams which form part of natural hydrological process.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation structure - age class distribution**	Maintain at least 3 age classes (pole stage/ medium/ mature) spread across the average life expectancy of the commonest trees.	A distribution of size and age classes of the major site-native tree and shrub species that indicate the woodland will continue in perpetuity, and will provide a variety of the woodland habitats and niches expected for this type of woodland at the site in question.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation structure - shrub layer**	Maintain an understorey of shrubs covering 10 - 60% of the stand area (this will vary with light levels and site objectives)	Woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. This is richer in W8 stands than the W7 stands where the shrub layer can be quite poor with *salix spp* holly *Ilex aquifolium* on the drier areas.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation structure - woodland edge**	Maintain a graduated woodland edge into adjacent semi-natural open habitats, other woodland/wood-pasture types or scrub.	Woodland edge is defined as being the transitional zone between the forest feature and adjacent but different habitat types - the best woodland edges will have a varied structure in terms of height and cover. Many typical forest species make regular use of the edge habitats for feeding due to higher herb	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			layer productivity and larger invertebrate populations. Grasslands / arable fields managed with high doses of agro-chemicals could potentially not allow this gradation of woodland edge and could have other impacts on the integrity of the site (pollution/ nutrient enrichment etc.).	
Structure and function (including its typical species)	**Adaptation and resilience**	Maintain the resilience of the feature by ensuring a diversity (at least 3 species) of site-native trees across the site including Alder *Alnus glutinosa,* Pedunculate Oak *Quercus rober* Ash *Fraxinus excelsior, Salix* spp.	This recognises the increasing likelihood of natural habitat features needing to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. Restoration of a natural hydrological regime provides the best defence against climate change, maximising the ability of these ecosystems to adapt to changing conditions.	Mainstone C, Hall R & Diack I., 2016
Structure and function (including its typical species)	**Browsing and grazing by herbivores**	Restore browsing at a low level that allows well developed understorey with no obvious browse line, & lush ground vegetation with some grazing sensitive species evident (bramble, ivy etc.), and tree seedlings and sapling common in gaps.	Herbivores, especially deer, ponies, cattle and pigs are an integral part of New Forest woodland ecosystems. They are important in influencing woodland regeneration, composition and structure and therefore in shaping woodland wildlife communities. In general, both grazing and browsing is desirable to promote both a diverse woodland structure and seedling establishment. The open aspect of the New Forest woodlands, long continuity of tree cover and the presence of high numbers of ancient trees has resulted in the development of exceptionally rich habitats, particularly for saproxylic invertebrates, epiphytic lichens and bryophytes, fungi and breeding birds. Short periods with lower levels of grazing can allow fresh natural regeneration of trees,	Natural England, 2014

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			but a long-term absence of herbivores can result in excessively dense thickets of young trees which shade out ground flora and lower plant species. However, heavy grazing, particularly by deer prevents woodland regeneration, reduces flowering and decreases the overall availability of nectar sources for woodland invertebrates. . It can cause excessive trampling and/or poaching damage, canopy fragmentation, heavy browsing and barkstripping.	
Structure and function (including its typical species)	**Regeneration potential**	Restore the potential for sufficient natural regeneration of desirable trees and shrubs; typically tree seedlings of desirable species (measured by seedlings and <1.3m saplings - above grazing and browsing height) should be visible in sufficient numbers in gaps, at the wood edge and/or as regrowth as appropriate ;	The regeneration potential of the woodland feature must be maintained if the wood is to be sustained and survive, both in terms of quantity of regeneration and in terms of appropriate species. This will Include regeneration of the trees and shrubs from saplings or suckers, regrowth from coppice stools or pollards, and where appropriate planting. The key aspect is that there should be sufficient regeneration to maintain canopy cover in the long term, so sporadic regeneration may be adequate. The density of regeneration considered sufficient is less in wood pasture sites than in high forest. Regeneration from pollarding of veteran trees should be included where this is happening. Regeneration from non-site native species should not be included.	Natural England. Definitions of Favourable Condition for designated features of interest for the New Forest SSSI This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Tree and shrub species composition**	Maintain a canopy and under-storey of which 95% is composed of site native trees and shrubs	Native trees and shrubs in general support a greater diversity of associated species than non-native species, especially amongst groups of invertebrates which depend directly on trees for food and shelter. There are many plants and animals which use or co-exist with non-native trees, but many rare and threatened woodland species are specialists adapted to one or a few native trees or shrub species (birches, willows and oaks, are examples of trees that host many specialist insect species).	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical	**Key structural, influential and/or**	Restore the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat	Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include;	New Forest LIFE Partnership, 2001.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
species)	**distinctive species**	**Structural** The constant and preferential plants of • W8: Ash-Maple-Dogs Mercury Woodland (*Fraxinus excelsior-Acer campestre-Mercurialis* Woodland) • W7: Alder-Ash-Yellow Pimpernel woodland (*Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland) **Influential** Grazing herbivores **Site-distinctive** Veilwort *Pallavicinia lyellii*	• **Structural** species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). The W8 stands within the New Forest are likely to be amongst the richest lowland woods in Britain. • **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat). The vegetation composition of the New Forest is very diverse largely due to the long history of grazing by commoners livestock. Grazing pressure is not uniform and this provides a range of niches for organisms adapted to the extensive grazing regime. Continuation of traditional grazing based on the existence of Rights of Common is fundamental to maintaining the characteristic vegetation composition of the New Forest alluvial woodland. • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available.	
Structure and function	**Invasive, non-native and/or**	Ensure invasive and introduced non-native species are either	Invasive or introduced non-native species are a serious potential threat to the biodiversity of native and ancient woods,	This attribute will be periodically monitored as part of Natural

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(including its typical species)	**introduced species**	rare or absent, but if present are causing minimal damage to the feature	because they are able to exclude, damage or suppress the growth of native tree, shrub and ground species (and their associated typical species), reduce structural diversity and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides). Such species can include Rhododendrons, snowberry, Japanese knotweed, giant hogweed and Himalayan balsam, for example. Similarly, this would include pheasants, rabbits and non-native invertebrate 'pest' species. The feature is prone to invasion by Sycamore *Acer pseudoplatanus* which should be controlled to cover values of below 1% or eradicated.	England's SSSI Condition Assessments
Structure and function (including its typical species)	**Soils, substrate and nutrient cycling**	Restore the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the habitat.	Soil is the foundation of basic ecosystem function and a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature. Where car parks and other access points are located in close proximity to stretches of riverine woodland, considerable recreational pressure is exerted locally resulting in eroded banks, excessive bare ground, compacted soils and impoverished vegetation. Trampling from human activities can cause soil compaction, changes to soil hydrology and with heavy use, bank erosion and compacted bare ground. This leads to reductions in soil invertebrates and changes in plant communities. The effects are most acute near to car parks located in close proximity to stretches of riverine woodland.	Natural England, 2014

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature relies)	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See the notes for this attribute above.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). Natural England, 2014
Supporting processes (on which the feature relies)	**Water quality/ quantity**	Where the feature is dependent on surface water and/or groundwater, restore water quality and quantity to a standard which provides the necessary conditions to support the feature.	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC. H91E0. Alluvial woodlands are associated with small streams and dependent on seasonal inundation of the floodplain. From the mid-19th Century until the 1980's, many New Forest rivers and streams were widened, deepened and straightened with the aim of providing better conditions for grazing and for growing timber, modifying the natural hydrology and hydrochemistry affecting both the character and natural communities of the feature. Maintenance or restoration of natural hydrological function is critical to achieving the conservation objectives for this feature.	Thomas, J.S., Diack, I. and Mainstone, C., 2016
Supporting processes (on which the feature relies)	**Functional connectivity with wider landscape**	Maintain the overall extent, quality and function of any supporting features within the local landscape which provide a	See the notes for this attribute above.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		critical functional connection with the site		
Supporting processes (on which the feature relies)	**Hydrology**	At a site, unit and/or catchment level (as necessary), restore natural hydrological processes to provide the conditions necessary to sustain the feature within the site	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. Alluvial forests can be dynamic in nature, being part of successional habitats and transitions to drier woodlands. Hydrological processes (including periodic inundation) are critical to how they function and must not be negatively impacted. **H91E0.** Alluvial woodlands are associated with small streams and dependent on seasonal inundation of the floodplain. From the mid-19th Century until the 1980's, many New Forest rivers and streams were widened, deepened and straightened with the aim of providing better conditions for grazing and for growing timber, modifying the natural hydrology and hydrochemistry affecting both the character and natural communities of the feature. Maintenance or restoration of natural hydrological function is critical to achieving the conservation objectives for this feature.	Thomas, J.S., Diack, I. and Mainstone, C., 2016
Supporting processes (on which the feature relies)	**Illumination**	Ensure artificial light is maintained to a level which is unlikely to affect natural phenological cycles and processes to the detriment of the feature and its typical species at this site.	Woodland biodiversity has naturally evolved with natural patterns of light and darkness, so disturbance or modification of those patterns can influence numerous aspects of plant and animal behaviour. For example, light pollution (from direct glare, chronically increased illumination and/or temporary, unexpected fluctuations in lighting) can affect animal navigation, competitive interactions, predator-prey relations, and animal physiology. Flowering and development of trees and plants can also be modified by un-natural illumination which can disrupt natural seasonal responses.	
Version Control Advice last updated: **18 March 2019** following stakeholder feedback – Target for **Extent of feature within the site** attribute amended to include where restoration may be possible.				
Variations from national feature-framework of integrity-guidance: n/a				

Table 10. Supplementary Advice for Qualifying Features: H9120. Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae or Ilici-Fagenion*) Beech forests on acid soils; H9130. *Asperulo-Fagetum* beech forests Beech forests on neutral to rich soils; and H9190. Old acidophilous oak woods with *Quercus robur* on sandy plains

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	**For H9120, H9130, H9190 feature:** Restore the total current extent of the features to c2920 hectares comprising: H9120 Atlantic acidophilous beech – c2000ha H9130 *Asperulo-fagetum* beech woods – c400ha H9190 Old acidophilous oak – 120ha Restore the total extent broadleaf plantation on former pasture woodland to H9120, H9130 and H9190 features. The actual area of the restorable features is unknown.	There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations Approximately 400 ha of pasture woodland is enclosed within forestry plantation with the consequent loss of traditional grazing management. Much of it still retains the characteristics of pasture woodland and could be restored. Within forestry plantation inclosures are broadleaf plantations on former pasture woodland which given sufficient time and opened up to grazing by commoners livestock could develop back into Annex 1 woodland habitats. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England	New Forest LIFE Partnership, 2001.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			will advise on this on a case-by-case basis. For this feature, this attribute includes the extent of semi-natural wood-pasture mosaic area; tree'd area; the number of veteran trees (except through natural causes), including dead and living trees. Tree roots (particularly of veteran trees) may extend a considerable distance beyond the boundary of the site. New Forest woodland together with its heathland, valley mires, streams, ponds, temporary pools, dry and wet grasslands are on an extensive scale and form a dynamic mosaic fluctuating naturally over time A reduction of woodland/wood-pasture area - whether at the edge or in the middle of a site will reduce the core area where wood-pasture conditions are found - these support significant assemblages of species dependent on woodland conditions (e.g. lichens and bryophytes - being one example) Loss of any woodland area which fragments a site into different parts may interrupt the movement of species between the remaining parts of the woodland, especially those with limited powers of dispersal.	
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	**For H9120, H9130, H9190 feature:** Maintain the distribution and configuration of the features, including where applicable their component vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			smaller and more isolated populations which are more vulnerable to extinction. These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature. In addition to the core and most extensive part of the SAC, the site also includes additional parcels of land containing woodland referable to H9120, H9130 and H9190 features at Whiteparish Common, Loosehanger Wood, Langley Wood and Franchises Wood in the north.	
Structure and function (including its typical species)	**Adaptation and resilience**	**For H9120, H9130, H9190 feature:** Maintain the resilience of the feature by ensuring a diversity (at least 2 species) of site-native trees (e.g. oak *Quercus spp,* downy birch *Betula pendula*)and holly *Ilex aquifolium*) across the site. **H9130** Maintain a diversity (at least 3 species on more base rich sites) of site-native trees (e.g. beech *Fagus sylvatica*, ash *Fraxinus excelsior*, whitebeam *Sorbus aria*, yew, *Taxus baccata*, holly *Ilex aquifolium*) across the site.	This recognises the increasing likelihood of natural habitat features needing to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being	NATURAL ENGLAND, 2015

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			moderate], taking into account the sensitivity, fragmentation, topography and management of its habitats. This means that this site is considered to be vulnerable overall but are a lower priority for further assessment and action. Individual species may be more or less vulnerable than their supporting habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable. In many cases, change will be inevitable so further site assessment and appropriate monitoring is recommended.	
Structure and function (including its typical species)	**Browsing and grazing by herbivores**	**For H9120, H9130, H9190 feature**: Restore browsing/grazing (e.g. by livestock) to sufficient levels to allow tree seedlings and saplings the opportunity to exceed browse height, and which maintain the characteristic structure of the woodland features in areas already grazed and restore the characteristic structure of the woodland features in areas not currently grazed.	Herbivores, especially deer, ponies, cattle and pigs are an integral part of woodland ecosystems. They are important in influencing woodland regeneration and have long played an important role in defining the structure and nature of the New Forest pasture woodlands, developing and maintaining a high forest tree canopy interspersed with glades in a mosaic of other woodland and heathland habitats and therefore in shaping distinctive wildlife communities. The open aspect of the New Forest woodlands, long continuity of tree cover and the presence of high numbers of ancient trees has resulted in the development of exceptionally rich habitats, particularly for saproxylic invertebrates, epiphytic lichens and bryophytes, fungi and breeding birds In general, both grazing and browsing is desirable to promote both a diverse woodland structure and seedling establishment. Short periods with low levels or no grazing at all can allow fresh natural regeneration of trees, but a long-term absence of herbivores can result in excessively dense thickets of young trees which shade out ground flora and lower plant species, loss of open ground and changes in light condition and micro-climate. Features such lichens and bryophytes, respond	New Forest LIFE Partnership, 2001. This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			negatively to such change and the system becomes poorer over time for nature conservation. However, heavy grazing particularly by deer prevents woodland regeneration, reduces flowering and decreases the overall availability of nectar sources for woodland invertebrates and can cause excessive trampling and/or poaching damage, canopy fragmentation, heavy browsing and bark stripping. New Forest pasture woodland is dependent upon extensive grazing management to maintain its special interest. There are areas of former pasture woodland within the SAC, reliance upon deer grazing alone will not maintain the interest.	
Structure and function (including its typical species)	**Invasive, non-native and/or introduced species**	**For H9120, H9130, H9190 feature:** Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the features	Invasive or introduced non-native species are a serious potential threat to the biodiversity of native and ancient woods, because they are able to exclude, damage or suppress the growth of native tree, shrub and ground species (and their associated typical species), reduce structural diversity and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides). Such species can include Rhododendrons, *Gaultheria shallon*, Sycamore, Turkey Oak, Sweet Chestnut, Red Oak, Scots pine and other non-native conifer species, for example are well established in the New Forest. Low levels of long established non-native trees such as horse chestnut, sweet chestnut and walnut which may be of high value for epiphytic lichens and bryophytes may be acceptable in certain locations Similarly, this would include pheasants, rabbits and non-native invertebrate 'pest' species.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Key structural, influential and distinctive species**	**For H9120, H9130, H9190 feature:** Restore the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat features; **Structural** Constant and preferential plant species of the vegetation types at this SAC **H9120** W14: Beech - Bramble Woodland (*Fagus sylvatica - Rubus fruticosus* Woodland W15: Beech - Wavy hair-grass woodland (*Fagus sylvatica - Deschampsia flexuosa* woodland). **H9130** W14: Beech - Bramble Woodland (*Fagus sylvatica - Rubus fruticosus* Woodland W8b Ash – Field Maple (*Fraxinus excelsior – Acer campestre – Mercurialis perennis*) woodland Wood Anemone *nemorosa* sub-community **H9190** W16 Oak species -Birch species -Wavy Hair-grass woodland (*Quercus spp. -Betula spp-*	The New Forest woodlands are examples of old growth the woodlands that have had very little management and a long history of grazing. They support an outstanding diversity of species and the forestry inclosures have enormous potential to do the same in the long term. Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; • **Structural** species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available.	New Forest LIFE Partnership, 2001. Definitions of Favourable Condition for designated features of interest for the New Forest SSSI

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Deschampsia flexuosa woodland) W11 Oak-Birch-Oxalis woodland (*Quercus petraea-Betula pubescens-Oxalis* woodland) W10a Pedunculate Oak-Bracken-Bramble woodland (*Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland - Typical sub-community) **Influential** Grazing herbivores **Site-distinctive** Outstanding assemblage of rare and scarce woodland vascular plants including Bastard balm *Melittis melissopylum,* Angular soloman's seal *Polygonatum odoratum* and Narrow-leaved lungwort *Pulmonaria longifolia* Outstanding assemblage of rare and scarce woodland bryophytes Outstanding assemblage of rare and scarce woodland lichens including *Megalaria laureri (syn Catillaria laureri)*, *Parmelinopsis minarum (syn Parmelia minarum)* Outstanding assemblage of rare and scarce woodland Fungi including Bearded tooth fungus, *Hericium erinaceus*		

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Maternity colonies of Bechstein's Bat		
Structure and function (including its typical species)	**Regeneration potential**	**For H9120, H9130, H9190 feature:** Maintain the potential for sufficient natural regeneration of desirable trees and shrubs; typically tree seedlings of desirable species (measured by seedlings and <1.3m saplings - above grazing and browsing height) should be visible in sufficient numbers in gaps, at the wood edge and/or as regrowth as appropriate	The regeneration potential of the woodland feature must be maintained if the wood is to be sustained and survive, both in terms of quantity of regeneration and in terms of appropriate species. This will Include regeneration of the trees and shrubs from saplings or suckers, regrowth from coppice stools or pollards. The key aspect is that there should be sufficient regeneration to maintain canopy cover in the long term, so sporadic regeneration may be adequate The density of regeneration considered sufficient is less in wood pasture sites than in high forest. Regeneration from pollarding of veteran trees should be included where this is happening. The presence of fallen timber and patches of bramble can be a critical factor in promoting regeneration in the protection it provides from grazing animals. Natural woodland edge fluctuations are an important aspect of the Forest ecology providing it has limited impact on adjacent heaths and grasslands where birch can colonise rapidly. Lack of regeneration is a particular issue in campsites located within the SAC due to soil compaction.	Natural England. Definitions of Favourable Condition for designated features of interest for the New Forest SSSI
Structure and function (including its typical species)	**Root zones of ancient trees**	**For H9120, H9130, H9190 feature:** Restore the soil structure within and around the root zones of the mature and ancient tree cohort to an un-compacted condition	The management of land within and around forest habitats which are characterised by ancient trees can be crucial to their individual welfare and long-term continuity, and the landscape they are part of can be just as or even more important. The condition of the soil surrounding such trees will affect their roots, associated mycorrhizal fungi and growth. Plants have difficulty in compacted soil because the mineral grains are pressed together, leaving little	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			space for air and water which are essential for root growth. This is a particular issue in campsites located within the SAC where tree surveys undertaken on behalf of the Forestry Commission in 2017 indicated that mature and veteran trees were suffering from soil compaction at the roots and displaying signs of dieback. Compaction of soil around the roots of trees also occurs in more than 30 car parks located within woodland. Unless carefully managed, activities such as construction, forestry management and trampling by grazing livestock and human feet during recreational activity may also contribute to excessive soil compaction around ancient trees.	
Structure and function (including its typical species)	**Soils, substrate and nutrient cycling**	**For H9120, H9130, H9190 feature:** Restore the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the habitats.	Soil is the foundation of basic ecosystem function and a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature. Activities such as construction, vehicle use, forestry management and trampling by human feet during recreational activity all contribute to excessive soil compaction, changes to soil hydrology and with heavy use, erosion and compacted bare ground. This leads to reductions in soil invertebrates and changes in plant communities. The effects are most acute near to car parks, access points from the urban fringe and in and around	Cox. J., 2010

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			campsites leading to dramatically impoverished ground vegetation. In 2010 a survey concluded that Hollands Wood Campsite had 7.37 ha of bare ground (33.5% of the camp site)	
Structure and function (including its typical species)	**Supporting off-site habitat**	**H9130 only** Maintain the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature	The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary. Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species. This supporting habitat may be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or to prevent/ reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.	
Structure and function (including its typical species)	**Tree and shrub species composition**	**For H9120, H9130, H9190 feature:** Restore a canopy and under-storey of which 95% is composed of site native trees and shrubs	The composition of native trees and shrubs in the pasture woodlands has evolved in response to a long history of stock grazing and timber exploitation. The re-introduction or artificial bolstering of species characteristic of other ancient woodlands in southern England is considered inappropriate Native trees and shrubs in general support a greater diversity of associated species than non-native species, especially amongst groups of invertebrates which depend directly on trees for food and shelter. There are many plants and animals which use or co-exist with non-native trees, but many rare and threatened woodland species are specialists adapted to one or a few native trees or shrub species (birches, willows and oaks, are examples of trees that host many specialist insect species). The composition of the shrub layer of the oak and beech woods is not typical of the woodland type as a result of the long-term grazing and browsing pressure	Natural England. Definitions of Favourable Condition for designated features of interest for the New Forest SSSI This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			and timber exploitation. Species normally prominent such as hazel can be very rare or absent. This is a typical feature of the site and is not necessarily negative. Holly is a characteristic of some of the woodland types but it can form dense impenetrable thickets, cast dense shade and alter the ground flora. Heavy shading of the lower parts of trees can also have detrimental impacts on epiphytic lichens and bryophytes, rotational Holly pollarding should be undertaken in woodlands supporting important lichen communities.	
Structure and function (including its typical species)	**Vegetation community composition**	**For H9120, H9130, H9190 feature:** Ensure the component vegetation communities of the features are broadly referable to and characterised by the following National Vegetation Classification types. **H9120** W14: Beech - Bramble Woodland (*Fagus sylvatica - Rubus fruticosus* Woodland W15: Beech - Wavy hair-grass woodland (*Fagus sylvatica - Deschampsia flexuosa* woodland). **H9130** W14: Beech - Bramble Woodland (*Fagus sylvatica - Rubus fruticosus* Woodland W8b Ash – Field Maple	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. These woodlands form part of a dynamic mosaic with open habitats such as *molinia* meadows and heathland, their structure and function are best maintained with extensive grazing by livestock to maintain their distinctiveness and outstanding species richness. The bryophyte flora (mosses and liverworts) is the richest in lowland Britain, the species of interest all highly dependent upon livestock grazing to suppress competitive vegetation growth.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		(*Fraxinus excelsior – Acer campestre – Mercurialis perennis*) woodland Wood Anemone *nemorosa* sub-community **H9190** W16 Oak species -Birch species -Wavy Hair-grass woodland (*Quercus spp. -Betula spp-Deschampsia flexuosa* woodland) W11 Oak-Birch-Oxalis woodland (*Quercus petraea-Betula pubescens-Oxalis* woodland) W10a Pedunculate Oak-Bracken-Bramble woodland (*Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland - Typical sub-community)		
Structure and function (including its typical species)	**Vegetation structure - age class distribution**	**H9120 / H9130,** Maintain at least 3 age classes (pole stage/ medium/ mature) spread across the average life expectancy of the commonest trees. **H9190:** Maintain at least 4 age classes (pole stage/ medium/ mature/over mature or veteran) spread across the average life expectancy of the commonest trees.	Woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. There is great structural diversity evident in the New Forest woodlands, with a complete range of tree age classes from saplings to mature, senile and dead standing and fallen trees, together with a wide range of tree densities from closed high canopy forest to open stands with extensive heathland glades, to a more open parkland-like structure A distribution of size and age classes of the major site-native tree and shrub species that indicate the woodland will continue in perpetuity, and will provide a	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			variety of the woodland habitats and niches expected for this type of woodland at the site in question. .	
Structure and function (including its typical species)	**Vegetation structure - ancient/veteran trees**	**H9120 / H9190 / H9130** Maintain at least a third of ancient/veteran trees in open locations or with open halo around them, with younger cohorts of successor trees (<100 years; 100-200 years) each present over 10% of the site.	Good woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. There is great structural diversity evident in the New Forest woodlands, with a complete range of tree age classes from saplings to mature, senile and dead standing and fallen trees, together with a wide range of tree densities from closed high canopy forest to open stands with extensive heathland glades, to a more open parkland. For this Annex I habitat type, individual trees of great age and/or size (veteran or ancient trees) are particularly characteristic and important features, and their continuity should be a priority. Protecting their root systems and the forest soils around them will also be important. Veteran trees are potentially dangerous when in the immediate vicinity of recreational facilities such as car parks and camp sites. This has led to a significant reduction in veteran tress and dead standing wood and a decline in the nature conservation value of woodland near to recreational facilities.	New Forest LIFE Partnership, 2001.
Structure and function (including its typical species)	**Vegetation structure - canopy cover**	**For H9120 / H9130 / H9190 (wood pasture with old trees)** Maintain a canopy of open grown native trees with free crowns over between 20-80% of the site as appropriate.	Canopy cover is the overall proportion of vegetative cover consisting of any woody layer ranging from established regeneration to mature and veteran stages. Woodland canopy density and structure is important because it affects ecosystem function and in particular microclimate, litterfall, soil moisture, nutrient turnover and shading; this in turn influences the composition of plants and animals in lower vegetation layers and soil. Heavy shading of the lower parts of trees can also have detrimental impacts on epiphytic lichens and bryophytes. A total of 350 lichen species have been recorded from the pasture woodlands, of which around	New Forest LIFE Partnership, 2001. This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			a third are of conservation concern. Open canopies with just scattered trees will have less of a woodland character and reduced diversity of woodland-dependent species although they are important features of woodpasture as trees growing in a wooded situation (i.e. not open grown) may not develop into veterans of equal value to open grown individuals.. Completely closed canopies across the whole woodland are not ideal either however, as they cast heavier shade and support fewer species associated with edges, glades and open grown trees, and have little space where tree regeneration could occur. This frequently occurs within plantation inclosures where planted trees create heavy shade. In general, the woodland canopy of this feature should provide a core of woodland interior conditions with some open and edge habitat as well. Measures of the value of tree cohort continuity should take into account species, distribution across the site and situation (open-grown versus shaded) as well as total tree numbers. Cohort continuity is an important measure of the condition of the veteran tree resource and its potential to retain its value in the long-term.	
Structure and function (including its typical species)	**Vegetation structure - dead wood**	**For H9120, H9130, H9190 feature:** Maintain the continuity and abundance of frequent standing or fallen dead and decaying wood Restore the continuity and abundance of standing or fallen dead and decaying wood in campsites within woodland, typically between 30 - 50 m^3 per hectare of standing or fallen	Woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. Dead and actively decaying wood, either as part of a standing tree or as a fallen tree on the woodland floor, is an important component of woodland ecosystems, and supports a range of specialist invertebrates, fungi, lichens and bryophytes, and associated hole-nesting birds and roosting bats, all of which may be very typical of the feature. Some 276 invertebrate species of conservation concern	New Forest LIFE Partnership, 2001. This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		timber or 3-5 fallen trees >30cm per hectare, and >10 standing dead trees per hectare in campsites located within woodland	are recorded from the wealth of habitats present in the New Forest pasture woodlands. Of these a large number are saproxylic species for which a plentiful supply of fallen and standing deadwood (often associated with living trees), of all sizes and stages of decay is essential.	
Structure and function (including its typical species)	**Vegetation structure - open space**	**For H9120, H9130, H9190 feature:** Restore areas of permanent/temporary open space within the woodland features, typically to cover approximately 10% - 40% of area	Woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. Having some open, sunlit and largely tree-less areas as part of the woodland community is often important to facilitate natural tree and shrub regeneration and also to provide supporting habitat for specialist woodland invertebrates, birds, vascular and lower plants. Such open space can be permanent or temporary and may consist of managed grazed areas, linear rides and glades, or naturally-produced gaps caused by disturbance events such as windthrow/fire/tree falling over/snow damage. Open space is more important in some woodland types than others and will be less critical where there is a mosaic of open habitats nearby	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation structure - shrub layer(for woodland pasture sites with many old trees)**	**H9130 / H9120:** Maintain or restore an understorey of shrubs and trees covering 15 - 30% of the site (this will vary with light levels and levels of grazing). **H9190:** Maintain or restore an understorey of scrub or young growth covering 10 - 25% of the site (this will vary with light levels and site objectives).	Woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. There is more opportunity for growth of scrub or young tree growth in wood-pasture sites because of higher light levels (although this will be limited by the presence of grazing animals) in particular holly which can form dense impenetrable thickets, cast dense shade and alter the ground flora. Heavy shading of the lower parts of trees can also have detrimental impacts on epiphytic lichens and bryophytes. Rotational Holly pollarding	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			should be undertaken in woodlands supporting important lichen communities. A lower level of shrub cover than that normally associated with woodland is acceptable in wood pasture.	
Structure and function (including its typical species)	**Vegetation structure - Woodland edge (graduated edge; buffered; mosaics with other habitats)**	**For H9120, H9130, H9190 feature:** Maintain a graduated woodland edge into adjacent semi-natural open habitats, other woodland/wood-pasture types or scrub.	Woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. Woodland edge is defined as being the transitional zone between the forest feature and adjacent but different habitat types - the best woodland edges will have a varied structure in terms of height and cover. Many typical forest species make regular use of the edge habitats for feeding due to higher herb layer productivity and larger invertebrate populations.	
Structure and function (including its typical species) (all types including wood pasture with many old trees)	**Vegetation structure - old growth**	**For H9120, H9130, H9190 feature:** Maintain the extent and continuity of undisturbed, mature/old growth stands (typically comprising at least 20% of the feature at any one time) and the assemblages of veteran and ancient trees (typically >10 trees per hectare).	Good woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. The New Forest pasture woodlands have not escaped management interventions in the past but have remained relatively undisturbed for the past 500 years and are rich in old-growth dependent species. The old or over-mature elements of the woodlands are particularly characteristic and important features and their continuity should be a priority.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Supporting processes (on which the feature relies)	**Air quality**	**For H9120, H9130, H9190 feature:** Restore as necessary, the concentrations and deposition of air pollutants to at or below the	This habitat type is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		site-relevant Critical Load or Level values given for these features of the site on the Air Pollution Information System (www.apis.ac.uk).	with it. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. As part of the preparation of local plans by NFNPA and NFDC a detailed examination of potential in-combination air quality effects on New Forest SAC / SPA, and other nearby European sites has been carried out. Third party consultants have carried out an air quality assessment and linked ecological assessment which together constitute the HRA of air quality effects for both the New Forest National Park and New Forest District Local Plans. At the time of writing, these documents had not yet been finalised although draft results and conclusions are presented within them.	Information System (www.apis.ac.uk). Natural England, 2014
Supporting processes (on which the feature relies)	**Functional connectivity with wider landscape**	**H9190 only** Maintain the overall extent, quality and function of any	This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape in order to meet the conservation objectives. These connections may take the form of	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		supporting features within the local landscape which provide a critical functional connection with the site	landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial. Where there is a lack of detailed knowledge of the connectivity requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case basis. Stream and river catchments extend beyond the boundary of the site and water quality and availability can be impacted by changes anywhere within the catchment. Changes outside of the site can affect the hydrological regime within the site and have significant implications for the assemblage of characteristic plants and animals present. Off-site land use change driven by the planning process or caused by other activities such as agriculture, recreational demands, or infrastructure provision need to take account of this connectivity and not be to the detriment of the ongoing structure and function of the habitats on-site. Consideration needs to be given to both direct and in-direct impacts on the SAC features.	
Supporting processes (on which the feature relies)	**Hydrology**	**For H9120, H9130, H9190 feature:** At a site, unit and/or catchment level as necessary, restore natural hydrological processes to provide the conditions necessary	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency,	Thomas, J.S., Diack, I. and Mainstone, C., 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		to sustain the features within the site	magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. From the mid-19th Century until the 1980's, many New Forest rivers and streams were widened, deepened and straightened with the aim of providing better conditions for grazing and for growing timber within the plantation inclosures, modifying the natural hydrology and hydrochemistry affecting both the character and natural communities of the feature. Maintenance or restoration of natural hydrological function is required to achieving the conservation objectives for this feature. Disruption/ damage to hydrological processes could be caused by activities at some distance from the site boundary. E.g. through extraction of ground or surface waters; diverting or damming river channels; pollution of water source; channel alignment that disrupts natural geomorphological processes; tunnelling etc.	
Supporting processes (on which the feature relies)	**Illumination**	**For H9120, H9130, H9190 feature:** Ensure artificial light is maintained to a level which is unlikely to affect natural phenological cycles and processes to the detriment of the feature and its typical species at this site.	Woodland biodiversity has naturally evolved with natural patterns of light and darkness, so disturbance or modification of those patterns can influence numerous aspects of plant and animal behaviour. For example, light pollution (from direct glare, chronically increased illumination and/or temporary, unexpected fluctuations in lighting) can affect animal navigation, competitive interactions, predator-prey relations, and animal physiology. Flowering and development of trees and plants can also be modified by un-natural illumination which can disrupt natural seasonal responses.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature relies)	**Conservation measures**	**For H9120, H9130, H9190 feature**: Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the features	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Grazing is of fundamental importance to the management of the New Forest in particular the persistence of commoning where stock, mostly cattle and ponies which are free to roam over extensive areas of the unenclosed habitats of the New Forest. Maintenance or restoration of natural hydrological function is required to achieving the conservation objectives for this feature	New Forest LIFE Partnership, 2001. Natural England, 2014
Version Control Advice last updated: **18 March 2019** following stakeholder feedback – Target for **Extent of feature within the site** attribute amended to include where restoration may be possible.				
Variations from national feature-framework of integrity-guidance: n/a				

Table 11: Supplementary Advice for Qualifying Features: S1044. *Coenagrion mercuriale*; Southern damselfly

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	**Population abundance**	Maintain the presence of the Southern Damselfly population at all currently known sites for the species,	This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period. The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment. Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean counts or breeding surveys. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection.	Footprint Ecology, 2016. Rushbrook, B. J., Bignell, S. A., Selby, T. S., Kernohan, R.A. & Whitfield, D.G, 2014.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are the best available.	
Supporting habitat: extent and distribution	**Distribution of supporting habitat**	Maintain the distribution and continuity of the feature and its supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. Within the New Forest, the core populations are found on Beaulieu Heath, Setley Plain and Mill Lawn Brook with a number of smaller populations at other locations. The Southern Damselfly is a poor disperser and susceptible to habitat fragmentation/loss. Studies have shown relatively little movement between many of the patches suitable habitat connected by the same stream (providing a corridor for movement); where movement was observed it was between adjacent sites.	Thompson, D.J., & Watts, P.C.; 2006. Thompson, D.J., Purse, B.V. & Rouquette, J.R.; 2003
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Restore the total extent of the habitats which support the feature Streams / wet heath / mire habitats: 22.74ha	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data. Due to the specific requirements of this species there will only be small areas of the wider wet heath / mire communities that suitable for southern damselfly. Most sites have their origins in springs that emerge from the Headon Beds.	Footprint Ecology, 2016. Rushbrook, B. J., Bignell, S. A., Selby, T. S., Kernohan, R.A. & Whitfield, D.G.; 2014.
Supporting habitat:	**Flow: base-rich runnels**	Restore open, unshaded, shallow lengths of watercourse/mire with	The southern damselfly requires base-rich, shallow streams with a constant slow-to-moderate permanent flow and relatively	Thomas, J.S., Diack, I. and Mainstone, C.; 2016.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
structure/ function	**and heathland seepages/ streams**	permanent discernible flow (approx. 10 cm s-1).	high water temperature. From the mid-19th Century until the 1980's, many New Forest streams were widened, deepened and straightened to drain adjacent wetlands with the aim of providing better conditions for growing timber and for grazing. Drainage channels were also cut into mires modifying the natural hydrology. The original damage is the cause of ongoing habitat deterioration including increased tree and scrub on mires and flood plain, headward erosion of channels in mires and over-incision in streams leading to higher flow rates	
Supporting habitat: structure/ function	**Substrate: Base-rich runnels and heathland seepages/ streams**	Restore not less than 50% cover of peat or other organic substrate in watercourse/mire.	The preferred supporting habitat substrate is an inorganic substrate overlaid with shallow organic peat or silt. From the mid-19th Century until the 1980's, many New Forest streams were widened, deepened and straightened to drain adjacent wetlands with the aim of providing better conditions for growing timber and for grazing. Drainage channels were also cut into mires modifying the natural hydrology, hydrochemistry, removing organic peat and silt and exposing underlying gravels.	Thomas, J.S., Diack, I. and Mainstone, C.; 2016
Supporting habitat: structure/ function	**Trophic conditions :Base-rich runnels and heathland seepages/ streams**	Maintain water courses in a dystrophic to mesotrophic condition as indicated by a lack of algae (except brown flocculent algae), bacterial film or invasive tall emergents such as *Juncus effusus, J. acutiflorus* and *Phragmites* spp.	A wide range of pH is found in watercourses on southern damselfly sites, although the majority of sites fall within the range 7.0–7.5. These conditions ensure sufficient oxygen for larval and egg development and no eutrophication and encroachment of invasive emergents and algae. Southern damselfly larvae require shallow, well oxygenated, base-rich water with a constant slow-to-moderate flow and within the New Forest this is typified by heathland mires, runnels and streams supplied by base rich waters permeating through calcareous formations, such as the Headon beds. The mires and network of streams within the New Forest are relatively unaffected by cultivation and development and are of	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			high ecological value.	
Supporting habitat: structure/ function	**Vegetation composition: scrub cover**	Restore only small areas of tall scrub or trees within 20 metres of watercourse or mire but not on intervening habitat between two areas of population.	Some scattered trees and scrub associated with base-rich runnels and heathland seepages/streams can provide areas for roosting, maturation, feeding, displaying and basking.	
Supporting habitat: structure/function	**Vegetation composition: Base-rich runnels and heathland seepages/ streams**	Restore stream lengths with cover of submerged and semi-emergent, herbaceous macrophytes including some cover of *Hypericum elodes, Potamogeton polygonifolius, or Ranunculus flammula*, with some *Carex spp*. or *Juncus spp*	The southern damselfly usually emerges from the water as final instar larvae by ascending emergent vegetation, rather than by walking onto shore. Tall rushes and sedges are known to have been used there is no consistent trend in the plant species used for emergence, but rigid stems that do not bend in the wind are likely to be selected to minimise the risk of damage to the damselfly's wings or abdomen during expansion and drying. The damselfly's wings and abdomen were less likely to be damaged if they did not touch surrounding vegetation during expansion and drying. The eggs are laid into water plant tissue and plant species used as oviposition substrates may include fool's watercress (*Apium nodiflorum*), marsh St John's wort (*Hypericum elodes*), bog pondweed (*Potamogeton polygonifolius*) and jointed rush (*Juncus articulatus*).	Thompson, D.J., Purse, B.V. & Rouquette, J.R.; 2003
Supporting processes (on which the feature and/or its supporting habitat relies)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of supporting habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far	Natural England, 2015 Mainstone C, Hall R & Diack I.; 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			as practicable, in order to ensure the feature's long-term viability. The overall vulnerability to climate change of the habitats supporting this feature has been assessed by Natural England as being moderate, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means the site is considered to be vulnerable overall but a medium priority for further assessment and action. Within the New Forest, the Southern Damselfly is at the northern edge of its range and is unlikely to be affected by any increases in temperature; the primary impact of climate change on this species will be through changes to hydrology of a site. Restoration of a natural hydrological regime provides the best defence against climate change, maximising the ability of the species to adapt to changing conditions	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Air quality**	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See the notes for this attribute above.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). Natural England, 2014
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. The Southern Damselfly has very particular habitat requirements for a mid-successional management dependent habitat. It is important to ensure that sites holding Southern Damselfly populations are managed according to these	British Dragonfly Society, 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			requirements, as well as potentially suitable adjacent land. Due to their limited dispersal ability, only small areas of the watercourse should be managed in any one year. Heavy grazing is of fundamental importance to the management of the species in the New Forest creating poached conditions on the edge of a watercourse and flushes, and maintaining a suitable sward height and preventing vegetation from encroaching on the watercourse. Grazing together with traditional heathland burning management prevents scrub encroachment. Maintenance or restoration of natural hydrological function is critical to achieving the conservation objectives for this feature. and for potentially suitable areas close to existing populations.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water quantity/ quality**	Where the feature or its supporting habitat is dependent on surface water and/or groundwater restore water quality and quantity to a standard which provides the necessary conditions to support the feature	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed to reflect the ecological needs of the species feature. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC. From the mid-19th Century until the 1980's, many New Forest streams were widened, deepened and straightened to drain adjacent wetlands with the aim of providing better conditions for growing timber and for grazing. Drainage channels were cut into mires and wet heath modifying the natural hydrology and hydrochemistry which affects both the character and extent of the natural mosaic of wet heath, mire, runnels and pools.	Thomas, J.S., Diack, I. and Mainstone, C., 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Restoration of natural hydrological function is critical to achieving the conservation objectives for this species.	
Version Control Advice last updated: n/a				
Variations from national feature-framework of integrity-guidance: Attributes relating to chalk streams / rivers removed as not relevant to this site				

Table 12: Supplementary Advice for Qualifying Features: S1083. *Lucanus cervus*; Stag beetle

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Grazing is of fundamental importance to the management of the New Forest in particular the persistence of commoning where stock, mostly cattle and ponies which are free to roam over extensive areas of the unenclosed habitats of the New Forest.	New Forest LIFE Partnership, 2001.
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Maintain the total extent of the habitat which support the feature at: c8,000ha of decaying-wood rich woodland	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data.	
Supporting habitat: extent and distribution	**Distribution of supporting habitat**	Maintain the distribution and continuity of the feature and its supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			its interior. These conditions may not be suitable for this feature and this may affect its viability.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of supporting habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability to climate change of the habitats supporting this feature has been assessed by Natural England as being moderate, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means the site is considered to be vulnerable overall but a medium priority for further assessment and action.	Natural England, 2015
Supporting habitat: structure/ function	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal:bacterial ratio, within typical values for the supporting habitat	Soil supports basic ecosystem function and is a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with the supporting habitat of this Annex II feature.	
Supporting processes (on which the feature and/or	**Air quality**	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant Critical	See the notes for this attribute above.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
its supporting habitat relies)		Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).		Pollution Information System (www.apis.ac.uk). Natural England, 2014
Supporting habitat: structure/ function	**Decaying-wood habitat**	Maintain an abundance and constant supply of broadleaved stumps and roots in a state of decay.	Female stag beetles lay their eggs near the rotting wood and roots of broadleaved trees which are in contact with the soil so that the wood remains moist and is able to rot. Once they have mated, the females lay small, round eggs below ground in rotting wood, particularly log piles, rotting tree stumps and old fence posts. These larvae feed on the decaying wood around them for at least three years after which they will begin to pupate into adults.	
Supporting habitat: structure/ function	**Woodland habitat mosaic**	Maintain a well-structured woodland habitat, with sheltered, sunlit glades and rides containing stumps and other suitable decaying wood	During their short adult lives the male stag beetles will spend their days sunning themselves in an attempt to gather strength for the evening's activities of flying in search of a mate.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Natural processes**	Maintain the continuity of natural processes of timber decay and nutrient recycling within the site to provide plentiful decaying stumps and roots	These natural processes of decomposition and decay are important in providing optimal conditions for beetle to lay eggs and survive as larvae There is great structural diversity evident in the New Forest woodlands, with a complete range of tree age classes from saplings to mature, senile and dead standing and fallen trees	
Population (of the feature)	**Population abundance**	Maintain or restore the presence of the stag beetle population across its full range within the SAC, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a	PERCY, C., BASSFORD, G. & KEEBLE, V.; 2000.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			considerable period. The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. There are currently no reliable means of estimating stag beetle population size other than the collation of records of direct observation of adults during the peak period of mating activity. This means that estimates inevitably include a large degree of uncertainty and will tend to vary according to recording effort. Populations are thought to vary significantly in size from year to year according to natural population cycles, and the availability and abundance of suitable larval habitat. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size and range of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration.	
Version Control Advice last updated: n/a				
Variations from national feature-framework of integrity-guidance: n/a				

Table 13: Supplementary Advice for Qualifying Features: S1166. *Triturus cristatus*; Great crested newt

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Grazing is of fundamental importance to the management of the New Forest in particular the persistence of commoning where stock, mostly cattle and ponies which are free to roam over extensive areas of the unenclosed habitats of the New Forest. Together with annual burning and cutting programmes ensuring that the ponds and surrounding habitats have an extensive structural diversity supporting a range flora and fauna.	Ewald N, Dunn F, Williams P and Biggs J.; 2014
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Maintain the total extent of Permanent and temporary ponds and associated terrestrial habitats which support the feature	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data.	
Supporting habitat: extent and distribution	**Distribution of supporting habitat**	Maintain the distribution and continuity of the feature and its supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may have a greater amount of open edge habitat which will differ in the amount of light,	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for this feature and this may affect its viability.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of supporting habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this particular SAC to climate change has been assessed by Natural England as being *moderate*, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means the site is considered to be vulnerable overall but a medium priority for further assessment and action. Individual species may be more or less vulnerable than their supporting habitat itself. In many cases, change will be inevitable so appropriate monitoring would be required Restoration of a natural hydrological regime provides the best defence against climate change, maximising the ability of these ecosystems to adapt to changing conditions	Natural England, 2015 Mainstone C, Hall R & Diack I.; 2016
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water quantity/ quality**	Restore pond water quality and quantity to a standard which provides the necessary conditions to support the feature.	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type.	Aquilina R, Ewald N, Biggs J.; 2015

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed to reflect the ecological needs of the species feature. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC As the clarity and chemical status of water bodies supporting GCNs can be subjective, the presence of an abundant and diverse community of freshwater invertebrates can be indicative of suitable water quality standards. Invertebrate groups present should include groups such as mayfly larvae and water shrimps. This will ensure ponds support a healthy (mainly invertebrate) fauna to provide food for developing GCN larvae and adults. The water quality of Hatchet Pond (H3110) is known to be deteriorating based on long-term increases in diatom reconstructed phosphorus concentrations, changes in Soluble Reactive Phosphorus 1979 - 1983 and, more recently (post 2008), on measured total phosphorus values. These changes indicate the early stages of eutrophication. Ponds are at risk from inputs and runoff from land adjacent to the SAC .	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Air quality**	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See notes for this attribute above. The supporting habitat of this feature is considered sensitive to changes in air quality.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). Natural England, 2014
Supporting habitat:	**Overall Habitat**	For this SAC, maintain an overall Great Crested Newt Habitat	The Habitat Suitability Index provides a measure of evaluating habitat quality and quantity for Great Crested Newts. The	Ewald N, Dunn F, Williams P and Biggs J 2014

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
structure/ function	**Suitability Index score**	Suitability Index score of no less than 0.8.	Index score lies between 0 and 1, with 1 representing optimal GCN habitat. In general, the higher the index score the more likely the site is to support great crested newts. The HSI methodology is documented in ARG-UK Advice Note 5 (May 2010). The HSI should not be used as a substitute for more detailed surveys and consideration of other attributes where necessary. Over 84% of ponds surveyed in 2014 were surrounded by extensive habitat suitable for great crested newts.	
Supporting habitat: structure/ function	**Presence of ponds**	Maintain the number and surface area of ponds present within the site at current levels	Ponds to include breeding ponds as well as non-breeding ponds, since the latter may be used for foraging or sustaining prey populations. The surface area of a pond is taken from when water reaches its highest level (excluding flooding events), which will usually be in the spring. Detailed survey of extent of ponds has not yet been undertaken.	
Supporting habitat: structure/ function	**Permanence of ponds**	Maintain the permanence of water within ponds present within the site	Ponds to include breeding ponds as well as non-breeding ponds, since the latter may be used for foraging or sustaining prey populations. Ponds should have a high degree of permanence (they never or rarely dry out other than though natural drought) and this may be adversely affected by changes in the supply or flow of water (from either surface water and/or groundwater sources] to the ponds. Great crested newt may use larger temporary ponds which are unsuitable for fish, provided that they contain water over the breeding / tadpole season (February - mid-August) for at least one in every three years.	
Supporting habitat: structure/ function	**Cover of macrophytes**	Maintain a high cover of macrophytes, typically between 50-80%,, within ponds supporting Great crested newt	Marginal and emergent vegetation are important components of a great crested newt pond as they provide excellent egg-laying sites. Good plants for this purpose include water forget-me-not *Myosotis scorpioides*, flote/sweet grass *Glyceria fluitans* and great hairy willowherb *Epilobium hirsutum*. They are, however, an integral part of the natural successional change of a waterbody and whilst it is preferable to have a good range and area of marginal plants, they should not extend across the	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			entire water surface. In most circumstances it will be desirable to retain a fringe of marginal and emergent vegetation around at least half of a pond's edge. Where the marginal vegetation is particularly invasive, and provides no specific benefit to crested newts, it may be decided that its complete removal is necessary.	
Supporting habitat: structure/ function	**Supporting terrestrial habitat**	Maintain the quality of terrestrial habitat likely to be utilised by Great Crested Newts, with no fragmentation of habitat by significant barriers to newt dispersal.	Great crested newts need both aquatic and terrestrial habitat. Good quality terrestrial habitat, particularly within 500m of the breeding ponds, provides important sheltering, dispersing and foraging conditions and can include all semi-natural habitat along with meadows, rough tussocky grassland, scrub, woodland, as well as 'brownfield' land or low-intensity farmland. Good quality terrestrial habitat for newts has structural diversity which can be provided by features such as hedges, ditches, stone walls, old farm buildings, loose stone/rocks, rabbit burrows and small mammal holes. Good habitat provides a range of invertebrates, such as earthworms, insects, spiders and slugs, on which newts are known to feed. Fragmentation refers to significant barriers to newt movement such as walls and buildings, but not footpaths or tracks. Newts disperse over land to forage for food, and move between ponds. The distances moved during dispersal vary widely according to habitat quality and availability. At most sites, the majority of adults probably stay within around 250m of the breeding pond but may well travel further if there are areas of high quality foraging and refuge habitat extending beyond this range.	
Supporting habitat: structure/function	**Shading of ponds**	Ensure pond perimeters are generally free of shade (typically no more than 60% cover of the shoreline)	Shading from trees and/or buildings (not including emergent pond vegetation) can negatively affect the abundance of marginal vegetation in ponds, water temperature and the rate of hatching and development of great crested newt eggs and larvae.	
Supporting habitat: structure/function	**Presence of fish and wildfowl**	Ensure fish and wildfowl are absent in all ponds except Hatchet Pond	At high densities waterfowl (i.e. most water birds such as ducks, geese and swans but excluding moorhen) can remove all aquatic vegetation, adversely affect water quality and create turbid pond water conditions. Some may also actively hunt	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			adult GCNs and their larvae. Similarly fish can be significant predators of GCN larvae. The presence of waterfowl and fish can reduce habitat suitability. These should be wholly absent form sites which support fewer than 5 ponds.	
Population (of the feature)	**Population abundance**	Maintain the abundance of the Great Crested Newt population at current levels.	This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period. The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment. Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean counts or breeding surveys. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are the best available. Estimating the average size of the GCN population will normally be based on the peak count of adults undertaken in the known peak season for the area, and in-year weather conditions; likely to be Mid-April to Mid May in central areas. The peak count is derived by summing the counts across the site on 'best' night for each season. Considerable natural between-year variation in population counts is frequent.	
Population (of the feature)	**Population viability**	Maintain the presence of great crested newt eggs in all core breeding ponds at/to a level which is likely to maintain the abundance of the population at or above its target level.	A "breeding pond" is defined as a pond in which egg-laying and successful metamorphosis (e.g. the pond doesn't dry up too soon) is likely to occur at least once every three years. The optimum time to survey for eggs is mid-March to mid-May. Presence of eggs can be recorded by day or night visits and surveys should be combined with visits for the adult component.	
Population (of the feature)	**Supporting meta-populations**	Maintain the connectivity of the SAC's Great crested newt population to associated meta-populations (either within or outside of the site boundary)	Great crested newts often exist in metapopulations. A metapopulation is a group of associated populations made up of newts which breed in, and live around, a cluster of ponds. There will be some interchange of newts between these populations, even though most adults consistently return to the same pond to breed, and so it will be important to avoid the isolation of these populations from each other. A metapopulation associated with a SAC may occur outside of the designated site boundary. The connectivity of the wider local landscape to the SAC may therefore be important as this may help to ensure the survival of the overall population even if sub-populations are temporarily affected by, for example, pond desiccation or fish introductions.	
Version Control Advice last updated: n/a				
Variations from national feature-framework of integrity-guidance: n/a				

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EC Directive 79/409 on the Conservation of Wild Birds:
Special Protection Area

THE NEW FOREST (HAMPSHIRE)

The site qualifies under Article 4.1 by regularly supporting in summer over 300 pairs of nightjar Caprimulgus europaeus (at least 15% of the British breeding population); 51-54 pairs of woodlarks Lullula arborea (about 24% of British); 454 pairs of Dartford warbler Sylvia undata (75% of British); and 2 pairs of Honey Buzzard (7% of British, confidential record). Notable also are up to 10 pairs of kingfisher Alcedo atthis.

In winter the site qualifies under Article 4.1 by regularly supporting about 15 hen harriers Circus cyaneus (2% of the British wintering population).

The New Forest also qualifies under Article 4.2 by supporting, in summer, up to 25 pairs of hobby Falco subbuteo (3% of the British breeding population) and in excess of 350 pairs of wood warbler Phylloscopus trochilus (at least 3% of British - the population size fluctuates and much larger numbers are present in some years). Notable also are breeding populations of of lapwing Vanellus vanellus (about 350 pairs); redshank Tringa totanus (120 pairs); curlew Numenius arquata (120 pairs); snipe Gallinago gallinago (160 pairs); stonechat Saxicola torquata (up to 430 pairs); and redstart Phoenicurus phoenicurus (400+ pairs).

In addition to its importance for the individual species listed above, the site is of exceptional scientific interest for its assemblage of lowland heathland breeding birds. These include nightjar, woodlark, Dartford warbler and stonechat.

Updated SPA Citation
Dr Greg Mudge and Helen Riley
February 1992

European Site Conservation Objectives for New Forest Special Protection Area Site Code: UK9011031

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- **The extent and distribution of the habitats of the qualifying features**
- **The structure and function of the habitats of the qualifying features**
- **The supporting processes on which the habitats of the qualifying features rely**
- **The population of each of the qualifying features, and,**
- **The distribution of the qualifying features within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

A072 *Pernis apivorus*; European honey-buzzard (Breeding)
A082 *Circus cyaneus*; Hen harrier (Non-breeding)
A099 *Falco subbuteo*; Eurasian hobby (Breeding)
A224 *Caprimulgus europaeus*; European nightjar (Breeding)
A246 *Lullula arborea*; Woodlark (Breeding)
A302 *Sylvia undata*; Dartford warbler (Breeding)
A314 *Phylloscopus sibilatrix*; Wood warbler (Breeding)

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 (as amended) ('the Habitats Regulations'). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives, and the accompanying Supplementary Advice (where this is available), will also provide a framework to inform the management of the European Site and the prevention of deterioration of habitats and significant disturbance of its qualifying features

These Conservation Objectives are set for each bird feature for a Special Protection Area (SPA).

Where these objectives are being met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 21 February 2019 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

European Site Conservation Objectives: Supplementary advice on conserving and restoring site features

New Forest Special Protection Area (SPA)
Site code: UK9011031

The New Forest Landscape: Photo by Bryan White

Date of Publication: 19 March 2019

About this document

This document provides Natural England's supplementary advice for the European Site Conservation Objectives relating to New Forest SPA. This advice should therefore be read together with the SPA's Conservation Objectives.

Where this site overlaps with other European Sites, you should also refer to the separate European Site Conservation Objectives and Supplementary Advice (where available) provided for those sites

This advice replaces a draft version dated 8 February 2019 following the receipt of comments from the site's stakeholders.

You should use the Conservation Objectives, this Supplementary Advice and any case-specific advice given by Natural England when developing, proposing or assessing an activity, plan or project that may affect this site.

This Supplementary Advice to the Conservation Objectives presents attributes which are ecological characteristics of the designated species and habitats within a site. The listed attributes are considered to be those that best describe the site's ecological integrity and which, if safeguarded, will enable achievement of the Conservation Objectives. Each attribute has a target which is either quantified or qualitative depending on the available evidence. The target identifies as far as possible the desired state to be achieved for the attribute.

The tables provided below bring together the findings of the best available scientific evidence relating to the site's qualifying features, which may be updated or supplemented in further publications from Natural England and other sources. The local evidence used in preparing this supplementary advice has been cited. The references to the national evidence used are available on request. Where evidence and references have not been indicated, Natural England has applied ecological knowledge and expert judgement. You may decide to use other additional sources of information.

In many cases, the attribute targets shown in the tables indicate whether the current objective is to 'maintain' or 'restore' the attribute. This is based on the best available information, including that gathered during monitoring of the feature's current condition. As new information on feature condition becomes available, this will be added so that the advice remains up to date.

The targets given for each attribute do not represent thresholds to assess the significance of any given impact in Habitats Regulations Assessments. You will need to assess this on a case-by-case basis using the most current information available.

Some, but not all, of these attributes can also be used for regular monitoring of the actual condition of the designated features. The attributes selected for monitoring the features, and the standards used to assess their condition, are listed in separate monitoring documents, which will be available from Natural England.

These tables do not give advice about SSSI features or other legally protected species which may also be present within the European Site.

If you have any comments or queries about this Supplementary Advice document please contact your local Natural England adviser or email HDIRConservationObjectivesNE@naturalengland.org.uk

About this site

European Site information

Name of European Site	New Forest Special Protection Area (SPA)
Location	Hampshire, Wiltshire
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	September 1993
Qualifying Features	See section below
Designation Area	27,997.59ha
Designation Changes	N/A
Feature Condition Status	Details of the feature condition assessments made at this site can be found using Natural England's Designated Sites System
Names of component Sites of Special Scientific Interest (SSSIs)	New Forest SSSI
Relationship with other European or International Site designations	The boundary of the New Forest SPA overlaps with The New Forest SAC and River Avon SAC

Site background and geography

The New Forest SPA falls within the New Forest National Character Area (NCA Profile 131) and the New Forest National Park. It comprises the largest area of 'unsown' vegetation in lowland England and includes the representation on a large scale of habitats formerly common but now fragmented and rare in lowland western Europe. The intimate mosaic of habitats owes much to the local geology and traditional commoning grazing system, a situation which is uncommon in lowland England.

The New Forest sits in the centre of a dip in the surrounding chalk known as the Hampshire Basin and comprises a series of eroded terraces of soft sedimentary clays and sands capped with flint gravel, brick earth and other superficial deposits. The Soils are mainly acid, poor in nutrients, susceptible to leaching and only slowly permeable with locally enriched areas. This great variation in its soils is reflected in the New Forest's distinctive vegetation.

The habitats include lowland heath, valley and seepage step mire, or fen, ancient pasture woodland, including riparian and bog woodland and a range of acid to neutral grasslands. Nowhere else do these habitats occur in combination and on so large a scale.

The site supports an exceptionally rich bird fauna including internationally important breeding populations and wintering populations of bird species associated with these habitats.

With substantial development close by the Forest and within easy reach of two major urban areas it is estimated by the National Park Authority that the New Forest receives over 15 million day visits a year. The New Forest SPA has permissive public access and there are a wide range of activities including

traditional countryside pursuits and sports events permitted by the landowners. Within the SPA are ten campsites providing 3,300 pitches and three golf courses.

A small part of the site, Kingston Great Common, is declared as a National Nature Reserve managed by Natural England.

References:

RJS Associates, 2018. New Forest National Park Recreation & Leisure Visits https://www.newforestnpa.gov.uk/app/uploads/2019/01/New-Forest-National-Park-recreation-leisure-visits-RJS-Associates.pdf

About the qualifying features of the SPA

The following section gives you additional, site-specific information about this SPA's qualifying features. These are the individual species of wild birds listed on Annex I of the European Wild Birds Directive, and/or the individual regularly-occurring migratory species, and/or the assemblages (groups of different species occurring together) of wild birds for which the SPA was classified for.

Qualifying individual species listed in Annex I of the Wild Birds Directive

During the breeding season the SPA regularly supports:

- **A302 Dartford Warbler *(Sylvia undata)*** - 538 pairs representing at least 33.6% of the breeding population in Great Britain at the time of SPA classification
- **A072 Honey Buzzard *(Pernis apivorus)***, 2 pairs representing at least 10.0% of the breeding population in Great Britain at the time of SPA classification
- **A224 Nightjar *(Caprimulgus europaeus)*,** 300 pairs representing at least 8.8% of the breeding population in Great Britain at the time of SPA classification
- **A246 Woodlark *(Lullula arborea*),** 177 pairs representing at least 12.3% of the breeding population in Great Britain at the time of SPA classification

During the non-breeding season the SPA regularly supports:

- **A082 Hen Harrier *(Circus cyaneus)*** 15 individuals representing at least 2.0% of the wintering population in Great Britain at the time of SPA classification

Qualifying individual species not listed in Annex I of the Wild Birds Directive

During the breeding season the SPA regularly supports:

- **A099 Hobby *(Falco Subbuteo)*** – up to 25 pairs representing around 3% of the British breeding population at the time of SPA classification
- **A314 Wood Warbler *(Phylloscopus trochilus)*** – in excess of 350 pairs representing at least 3% of the British breeding population at the time of SPA classification.

Within this SPA the principal habitats supporting these qualifying species are as follows:

Dartford Warbler	Mature Lowland heathland, generally with abundant stands of mature gorse, clear-felled coniferous plantation woodland being restored to heathland
Honey Buzzard	Woodland
Hobby	Lowland heathland / Woodland
Hen Harrier	Lowland heathland
Woodlark	Lowland heathland, clear-felled coniferous plantation woodland being restored to heathland, grassland and lichen heath
Wood Warbler	Broad-leaved woodland
Nightjar	Lowland heathland, woodland edge, coppiced woodland and clear-felled coniferous plantation woodland being restored to heathland

Site-specific seasonality of SPA features

The table below highlights in grey those months in which significant numbers of each mobile qualifying feature are most likely to be present at the SPA during a typical calendar year. This table is provided as a general guide only.

Unless otherwise indicated, the months shown below are primarily based on information relating to the general months of occurrence of the feature in the UK. Where site-based evidence is available and has been used to indicate below that significant numbers of the feature are typically present at this SPA outside of the general period, the site-specific references have been added to indicate this.

Applicants considering projects and plans scheduled in the periods highlighted in grey would benefit from early consultation with Natural England given the greater scope for there to be likely significant effects that require consideration of mitigation to minimise impacts to qualifying bird features during the principal periods of site usage by those features. The months which are *not* highlighted in grey are not ones in which the features are necessarily absent, rather that features may be present in less significant numbers in typical years. Furthermore, in any given year, features may occur in significant numbers in months in which typically they do not. Thus, applicants should not conclude that projects or plans scheduled in months not highlighted in grey cannot have a significant effect on the features. There may be a lower likelihood of significant effects in those months which nonetheless will also require prior consideration.

Any assessment of potential impacts on the features must be based on up-to-date count data and take account of population trends evident from these data and any other available information.

Feature	Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Site-specific references where available
Dartford Warbler	Breeding													
Hen Harrier	Non-breeding													
Hobby	Breeding													
Nightjar	Breeding													
Woodlark	Breeding													
Wood Warbler	Breeding													
Honey buzzard	Breeding													

Guide to terms:
Breeding – present on a site during the normal breeding period for that species
Non-breeding - present on a site outside of the normal breeding period for that species (includes passage and winter periods).
Summer – the period generally from April to July inclusive
Passage - the periods during the autumn and spring when migratory birds are moving between breeding areas and wintering areas. These periods are not strictly defined but generally include the months of July – October inclusive (autumn passage) and March – April inclusive (spring passage).
Winter - the period generally from November to February inclusive.

Table 1: Supplementary Advice for Qualifying Features: A072. *Pernis apivorus*; European honey-buzzard (Breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Breeding population (within the SPA)	**Population abundance**	Maintain the size of the breeding Honey Buzzard population at a level which is consistently above 2 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	This will sustain the site's population and ensures it contributes to a viable local, national and bio-geographic population. Due to the mobility of birds and the dynamic nature of population change, the target-value given for the abundance of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period. The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current abundance of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is classified, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account. Maintaining or restoring bird abundance depends on the suitability of the site. However, factors affecting suitability can also determine other demographic rates of birds using the site including survival (dependent on factors such as body condition which influences the ability to breed or make foraging and / or migration movements) and breeding productivity. Adverse anthropogenic impacts on either of these rates may precede changes in population abundance (e.g. by changing proportions of birds of different ages) but eventually may negatively affect abundance. These rates can be measured/estimated to inform judgements of likely impacts on abundance targets. Unless otherwise stated, the population size will be that measured using standard methods such as peak mean counts or breeding surveys. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection. Whilst we will endeavour to keep these values as up to date as possible,	Wiseman, E. J. 2012. 'Honey Buzzards in Southern England' *British Birds*, 105, no. 1, 23–28

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			local Natural England staff can advise on whether the figures stated are the best available.	
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting breeding habitat**	Maintain the extent, distribution and availability of suitable breeding habitat which supports the Honey Buzzard for all necessary stages of its breeding cycle (courtship, nesting, feeding):	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target will apply to any supporting habitat which is known to occur outside the site boundary. Within the SPA there are 4430ha of grazed pasture woodland and 8140ha of enclosed woodland which is not subject to livestock grazing and is a mixture of broadleaves and conifer plantation including 400ha of old growth woodland.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Supporting habitat (both within and outside the SPA): function supporting process	**Food availability within supporting habitat**	Maintain the distribution, abundance and availability of key prey items preferred by breeding Honey Buzzard, particularly wasps, bees, lepidoptera and small vertebrates.	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population. The main food both in summer and winter is nests, larvae, pupae and adults of social wasps, bees, bumble bees and hornets. Food is located by following flying insects to the nest and, once located, the bird will start to dig the nest out with its feet. It also hunts on foot to catch ground insects and small vertebrates. Honey buzzards will also take other food, including other insects, amphibians, reptiles, small mammals, nestlings and eggs of birds, worms, fruit and berries.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Adaptation and resilience**	Maintain the ability of the feature's supporting habitats to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of natural habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this particular SPA to climate change has been assessed by Natural England as being low, taking into account the sensitivity, fragmentation, topography and management of its supporting habitats, This means that is considered to be vulnerable overall but are a lower priority for further assessment and action. Individual species may be more or less vulnerable than their supporting habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable.	SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360].
Supporting habitat (both within and outside the SPA): function/ supporting process	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	The structure and function of the habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of nesting, feeding or roosting habitats. Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. The critical load for nitrogen deposition is currently being exceeded at this SPA (December 2018). As part of the preparation of local plans by NFNPA and NFDC a detailed examination of potential in-combination air quality effects on New Forest SAC / SPA, and other nearby European sites has	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			been carried out. Third party consultants have carried out an air quality assessment and linked ecological assessment which together constitute the HRA of air quality effects for both the New Forest National Park and New Forest District Local Plans. At the time of writing, these documents had not yet been finalised although draft results and conclusions are presented within them; the draft reports and conclusions can be found at the internet address in the next column.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Connectivity with supporting habitats**	Maintain the safe passage of Honey Buzzards moving between nesting, feeding and/or roosting areas during the breeding season	The ability of the feature to safely and successfully move to and from nesting, feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Conservation measures**	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to maintain the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096
Supporting habitat (both within and outside the SPA): function/	**Water quality/ quantity**	Where the supporting habitats of the SPA feature are dependent on surface water, maintain water quality and quantity at a standard which provides the necessary	For many SPA features which are dependent on wetland habitats supported by surface water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing, feeding and roosting habitats. Typically, meeting the surface water and groundwater	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
supporting process		conditions to support the feature.	environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the SPA Conservation Objectives but in some cases more stringent standards may be needed to support the SPA feature. Further site-specific investigations may be required to establish appropriate standards for the SPA. Amphibians form part of their diet.	
Supporting habitat (both within and outside the SPA): structure	**Landscape**	Maintain areas of mature woodland within the SPA and the wider local landscape.	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its nesting, roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within nesting, feeding or roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat. The home range of breeding Honey buzzards can extend to several kilometres from its nesting area.	
Supporting habitat (within the SPA): disturbance	**Minimising disturbance caused by human activity**	Restrict the frequency, duration and/or intensity of disturbance within nesting, roosting, foraging, feeding, moulting and/or loafing birds so that the feature is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, and presence of people, animals and structures. Evidence gathered since the 1990s has demonstrated that Honey-buzzards are as sensitive to disturbance as other raptors. Avoidance of disturbance during nesting is crucial.	Wiseman, E. J. – 'Honey Buzzards in Southern England' (British Birds, 105, no. 1, 23–28, 2012) Roberts S. & Law C., *Honey Buzzards in Britain*, 2014, British Birds 107, 668-691 NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (within the SPA): predation	**Predation**	Restrict predation and disturbance of breeding Honey Buzzard caused by native and non-native predators.	This will ensure that breeding productivity (number of chicks per pair) and survival are sustained at rates that maintain or restore the abundance of the feature. Impacts to breeding productivity can result directly from predation of eggs, chicks, juveniles and adults, and also from significant disturbance. The presence of predators can influence bird behaviours, such as abandonment of nest sites or reduction of effective feeding. In the New Forest numbers of Goshawk, are increasing which may increase the likelihood of chick predation although there is no evidence to suggest this is currently an issue. Unpublished data provided by Hampshire ornithological Society indicates that numbers of birds and breeding success has changed little over the past ten years Where evidence suggests predator management is required, measures can include their exclusion through fencing and scaring or by direct control. Any such measures must consider the legal protection of some predators, as well as the likely effects of such control on other qualifying features.	Roberts S. & Law C., *Honey Buzzards in Britain*, 2014, British Birds **107**, 668-691
Supporting habitat (within the SPA): structure	**Vegetation characteristics**	Maintain a mixture of open areas, such as glades and wide rides, and stands of mature trees within woodlands in known nesting areas.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/rearing/concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 2: Supplementary Advice for Qualifying Features: A082. *Circus cyaneus*; Hen harrier (Non-breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Non-breeding population (within the SPA)	**Population abundance**	Restore the size of the non-breeding hen harrier population to a level which is above 15 wintering birds, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	See general explanatory Notes for this attribute above in Table 1. It is hard to provide a reliable estimate of non-breeding hen harriers within the SPA due to problems of limited site monitoring and movements between roosts but anecdotal evidence suggests that the numbers are well below this baseline. The best estimate is from a survey in 2011/2012 which recorded a maxima of 2, the survey was limited in its coverage and is likely to have been an underestimation. The causes for the decline in numbers is unknown but is likely to be a combination of localised disturbance and a more widespread decline in the bird pool. Based on wing-tagging and tracking data, few English bred hen harriers winter in the southern counties and numbers are likely to be bolstered by an influx of birds from the Fenno-Scandia area	NATURAL ENGLAND. National Hen harrier tracking data.
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting non-breeding habitat**	Maintain the extent and distribution of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding)	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target may apply to supporting habitat which also lies outside the site boundary There are over 20 known roost sites within the SPA predominantly in the North West and South of the site. It would appear that some of the roost sites have not been used for many years but there has been limited site monitoring to support this perception. Birds have been recorded at historic sites after an apparent absence of over ten years. Likely changes in site suitability mean that there is probably a high turnover of birds across roost sites over any period of time	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Supporting habitat (both within and outside the SPA):	**Adaptation and resilience**	Maintain the ability of the feature's supporting habitats to adapt or evolve to wider environmental change, either within or external to the site	See the notes for this attribute above in Table 1.	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
function/ supporting process				Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360].
Supporting habitat (both within and outside the SPA): function/ supporting process	**Connectivity with supporting habitats**	Maintain the safe passage of hen harrier moving between feeding and roosting areas	The ability of the feature to safely and successfully move to and from nesting, feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant. During winter, Hen Harriers can gather and form communal roosts at night. Within the New Forest roosts are generally found in extensive areas of dry heathland and hold between 1 and 8 birds	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Conservation measures**	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to maintain the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Within the New Forest the hen harrier roosts in mature dry heath habitat where the heathland is managed in blocks of 1 to 4 ha on a 20 to 30+ year rotation. It is important that sufficient deep heather remains in roosting sites but management will be required to prevent heather stands becoming degenerate which do not provide enough cover for roosting birds. Management should make provision for future mature heather stands in the vicinity of a roosting site.	NATURAL ENGLAND, 2015. New Forest Site Improvement Plan. At: http://publications.naturalengland.org.uk/publication/5174614971908096

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Maintain the distribution, abundance and availability of key prey items at preferred prey sizes (pipits to gamebirds; voles to young rabbit size).	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population. Small passerines are the principal prey of roosting Hen Harrier in the New Forest, the prey species reflects the position of each roost. Roosts in more extensive heathlands in the south showed greater dependence on the heathland community of insectivorous passerines, whereas those roosting in the north depended on a mixture of farmland- and heathland-feeding passerines, spending much time feeding on the adjacent farmland.	Clarke, 1997 *et al*. A comparison of the feeding ecology of wintering Hen Harriers *Circus cyaneus* centred on two heathland areas in England. *Ibis* 139:4-18
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water quality/ quantity**	Where the supporting habitats of the SPA feature are dependent on surface water ensure water quality and quantity is maintained to a standard which provides the necessary conditions to support the feature	For many SPA features which are dependent on wetland habitats supported by surface water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing, feeding and roosting habitats. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the SPA Conservation Objectives but in some cases more stringent standards may be needed to support the SPA feature. Further site-specific investigations may be required to establish appropriate standards for the SPA.	
Supporting habitat (both within and outside the SPA): function/sup porting process	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See the notes for this attribute in table 1 above	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). NATURAL ENGLAND, 2015. New Forest SITE

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096
Supporting habitat (within the SPA): minimising disturbance	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance affecting nesting, roosting, foraging, feeding, moulting and/or loafing birds so that the non-breeding Hen harrier feature is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, and presence of people, animals and structures. Low flying helicopters in areas known to support roost sites can disturb hen harriers before, during and after roosting." Anecdotal evidence has also indicated that recreational use around less remote roost sites may also occasionally be presenting a problem.	
Supporting habitat (within the SPA): structure	**Vegetation characteristics**	Maintain an optimal mix of vegetation (flat or gently sloping areas with wet rush, heather, cotton-grass or other wetland vegetation) in areas used for roosting by Hen harriers.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/ rearing/ concealment/ roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Version Control Advice last updated: **17 March 2019** following stakeholder feedback. Explanatory notes for **Minimising disturbance caused by human activity** updated to clarify potential sources of disturbance.				
Variations from national feature-framework of integrity-guidance: N/A				

Table 3: Supplementary Advice for Qualifying Features: A099. *Falco subbuteo*; Eurasian hobby (Breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Breeding population (within the SPA)	**Population abundance**	Restore the size of the breeding Hobby population to a level which is consistently above 25 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	See general explanatory Notes for this attribute above in Table 1. Data from Hampshire Ornithological Society Reports - for New Forest within SPA 2017 4prs bred successfully and several pairs failed 2016 4prs bred and 2 failed 2013 8prs bred 2011 6prs bred Prey availability is likely to be the main factor influencing the breeding population. National declines in key prey items is reflected in the New Forest. Competition for nesting sites flowing from a steady increase in goshawk numbers may also be a factor.	
Supporting habitat (both within and outside the SPA): disturbance	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance affecting nesting, roosting, foraging, feeding, moulting and/or loafing birds so that the breeding Hobby population is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, and presence of people, animals and structures.	
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting breeding habitat**	Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding)	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target will apply to any supporting habitat which is known to occur outside the site boundary [give details if relevant].	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Maintain the distribution, abundance and availability of key prey items preferred by breeding Hobby (e.g. small birds, moths, flying ants, beetles, dragonflies).	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population. Hobbies in the New Forest have been observed to take young house martins and swallows to feed their young. The other main prey items for hobby are dragonflies, day-flying moths and beetles.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Water quality/ quantity**	Where the supporting habitats of the SPA feature are dependent on surface water, restore water quality and quantity at a standard which provides the necessary conditions to support the feature.	For many SPA features which are dependent on wetland habitats supported by surface water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing, feeding and roosting habitats. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the SPA Conservation Objectives but in some cases more stringent standards may be needed to support the SPA feature. Further site-specific investigations may be required to establish appropriate standards for the SPA. Many of the freshwater and wetland habitats of the New Forest have been subject to past drainage damage and the effects of this are still evident across much of the area. The continuation of a programme of restorations is required to prevent further reductions in *odonata spp* which are a key food source for hobbies. A greater abundance of *odonata spp* in late summer may help post fledging survival rates	Thomas, J.S., Diack, I. And Mainstone, C. (2016). An assessment of evidence supporting a programme of wetland restoration projects in the New Forest Site of Special Scientific Interest. Natural England Research Reports, Number 066
Supporting habitat (both within and outside the SPA): function/supporting process	**Conservation measures**	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to maintain the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. [Adviser to list current or desired conservation and management measures (in general terms)] Hobbies breed in open lowland areas with mature trees, either in groves, in clumps, in lines or at woodland edges; areas that support good numbers of large flying insects. Their favoured habitats include heaths, open woodland, and mixed farmland with woods and grassland. Hobbies breed in nests built by other species, particularly those of crows built in the previous or current spring but also nests of buzzards as well as squirrel dreys.	
Supporting habitat (both within and outside the SPA): structure	**Landscape**	Maintain a high proportion of open and un-obstructed terrain whilst retaining mature trees in woodland, small clumps and as isolated individuals.	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its nesting, roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within nesting, feeding or roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Supporting habitat (within the SPA): function/ supporting process	**Air quality**	Maintain the concentrations and deposition of air pollutants at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See the notes for this attribute above in Table 1.	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). IPENS SITE IMPROVEMENT PLAN
Supporting habitat (within the	**Predation**	Reduce the predation and disturbance of breeding Hobby caused by native and non-native	This will ensure that breeding productivity (number of chicks per pair) and survival are sustained at rates that maintain or restore the abundance of the feature. Impacts to breeding productivity can result directly from	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
SPA): predation		predators.	predation of eggs, chicks, juveniles and adults, and also from significant disturbance. The presence of predators can influence bird behaviours, such as abandonment of nest sites or reduction of effective feeding. Where evidence suggests predator management is required, measures can include their exclusion through fencing and scaring or by direct control. Any such measures must consider the legal protection of some predators, as well as the likely effects of such control on other qualifying features. In the New Forest numbers of goshawk are increasing which may lead to the avoidance of traditional breeding sites by hobbies and an increase the likelihood of chick predation (although goshawk mainly take larger species of prey). The increase in the goshawk population is an indication of the health of the local environment and changes in native raptor population dynamics should be considered natural in a site as extensive as the New Forest and surrounding areas.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 4: Supplementary Advice for Qualifying Features: A224. *Caprimulgus europaeus*; European nightjar (Breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): function/ supporting process	**Conservation measures**	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to Maintain the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Further details about the necessary conservation measures for this site can be provided by Natural England. Habitat management should retain the open, mosaic structure of lowland wet and dry heath, ensuring all life cycles of heather are present. It may, in certain areas, be appropriate to maintain scrubby vegetation and occasional taller trees should be available for the nightjar to “churr” from. Where habitat conditions are currently unsuitable, management should seek to increase the availability and continuity of lowland heath or other suitable open habitat. Declines of the species in the UK have largely been attributed to loss and fragmentation of heathland which may explain a shift in habitat nationally towards clear-felled forestry plantations. The New Forest heathlands are extensive and extend to around 13,500ha comprising extensive dry and wet heaths and associated grasslands and mires and comprises most of the supporting habitat for the species but plantations provide additional habitat. Conifer plantations should therefore be managed to provide permanent open space. Following clear-fell, sites should be restored to heathland where appropriate. ..	NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096 Gates N. & Bull A., 2013. *New Forest Nightjar Report. Higher Level Stewardship Agreement The Verderers of the New Forest AG00300016*, RPS
Supporting habitat (within the SPA):	**Predation**	Restrict the predation and disturbance of breeding Nightjar caused by native and non-native predators.	This will ensure that breeding productivity (number of chicks per pair) and survival are sustained at rates that maintain or restore the abundance of the feature.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
predation			Impacts to breeding productivity can result directly from predation of eggs, chicks, juveniles and adults, and also from significant disturbance. The presence of predators can influence bird behaviours, such as abandonment of nest sites or reduction of effective feeding. Where evidence suggests predator management is required, measures can include their exclusion through fencing and scaring or by direct control. Any such measures must consider the legal protection of some predators, as well as the likely effects of such control on other qualifying features. In the vicinity of population centres, urban edge effects, of which cat predation is one element, can be a factor in breeding productivity	
Supporting habitat (both within and outside the SPA): function/supporting process	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See the notes for this attribute above in Table 1. Levels for supporting heathland habitat are within critical load limits (and therefore technically maintain), levels for supporting coniferous woodland exceed critical load limits.	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Breeding population (within the SPA)	**Population abundance**	Maintain the size of the breeding Nightjar population at a level which is consistently above 300 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	See general explanatory Notes for this attribute above in Table 1. The 2013 survey indicates a population of 544 pairs.	Gates N. & Bull A., 2013. *New Forest Nightjar Report. Higher Level Stewardship Agreement The Verderers of the New Forest* AG00300016, RPS (2013)
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting breeding habitat**	Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding)	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity of the SPA to support the breeding Nightjar population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target will apply to any supporting habitat which is known to occur outside the site boundary	Footprint Ecology (2008) Recreational Pressure in New Forest. This attribute will be periodically monitored as part of Natural England's SSSI

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				Condition Assessments
Supporting habitat (within the SPA): structure	**Vegetation characteristics**	Maintain vegetation structure suitable for nesting Nightjars (20-60 cm tall with frequent bare patches of >2 m², 10-20% bare ground and <50% tree/scrub cover overall; trees <2 m in height) throughout the nesting area.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/ rearing /concealment /roosting. Nightjar show a preference for bare patches or areas of very short vegetation with widely scattered tree where they are able to see predators approaching. These patches may be on open heathland and within open areas of plantation woodland. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Supporting habitat (within the SPA): disturbance	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance affecting nesting, roosting, foraging, feeding, moulting and/or loafing birds so that the breeding Nightjar feature is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, and presence of people, animals and structures. Nightjar is a bird known to be sensitive to disturbance. Disturbance caused by human activity is particularly significant because of its attraction as a tourist destination and proximity to urban areas. A 2008 study on recreational pressure within the New Forest showed that a level of recreational pressure of above approximately 60 visitors per 16 hour period there is a weak negative trend, where habitat utilisation by nightjar decreases as visitor pressure increases. Above 400 visitors per 16 hour period there are no nightjar present. The study indicated while nightjar within the New Forest are not currently	Footprint Ecology (2008) Recreational Pressure in New Forest. NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			being significantly impacted by visitor pressure, they are showing some avoidance of suitable habitat where estimated visitor pressure is high. There may therefore be concern if the number of people visiting the national park in the future substantially increases, and enlarging the area of nightjar habitat receiving high levels of visitor pressure. In addition, the creation or upgrading of tracks to facilitate visitor access across the New Forest may lead to the process of fragmentation, which in turn can have a number of effects, i.e. subdivision of habitat into smaller patches, isolation of habitat patches, increased edge effects, therefore with the potential for increased recreational pressure on suitable habitat as new access could encourage people to penetrate further across a site. New access routes will also in most cases cause direct habitat loss and damage through impaired function of ecosystem processes, drainage, compaction, trampling etc.	
Supporting habitat (both within and outside the SPA): structure	**Landscape**	Maintain the amount of open and unobstructed patches within nesting and foraging areas, including areas of clear-fell, windfall, wide tracks, open forest and heath.	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its nesting, roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within nesting, feeding or roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. Nightjar will also utilise areas of permanent open space and clear-fell within plantation woodland An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Supporting habitat (both within and outside the SPA): function/ supporting process	**Connectivity with supporting habitats**	Maintain the safe passage of Nightjars moving between nesting and feeding areas	The ability of the feature to safely and successfully move between feeding and nesting areas using flight-lines and movement routes is critical to their breeding success and to adult fitness and survival. The nightjar is insectivorous, feeding primarily on moths and beetles during the summer. The location of feeding areas which support the SPA's nightjar population is often not well understood and may require further studies or research. More generally, nightjars are known to forage in such habitats as open forest and heathland This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant. The foraging range of nightjar is known to extend up to several kilometres from their nest sites. Detailed information about the range of nightjar using this SPA	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			is currently not available.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Maintain the distribution, abundance and availability of key prey items (e.g. moths, beetles) at prey sizes preferred by Nightjar.	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population. The nightjar is insectivorous, feeding primarily on moths and beetles. Aspects which might affect prey availability will include lighting, pest control, changes in land use and habitat management	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 5: Supplementary Advice for Qualifying Features: A246. *Lullula arborea*; Woodlark (Breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): function/ supporting process	**Conservation measures**	Restore management or other measures (whether within and/or outside the site boundary as appropriate) necessary to restore the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements At this site, management should retain the open, mosaic structure of lowland wet and dry heath, ensuring that all life cycle stages of heather are present. Occasional taller trees should be present to provide song posts. Areas of bare or sparsely vegetated ground created as a result of rotational forestry management can also be valuable. Habitat management should seek to ensure that the overall extent and continuity of supporting habitat is at least maintained. Heathland management by burning and cutting produces ephemeral sites for woodlark. The timing of operations is important. A long tradition of grazing has produced and maintains the ideal habitat with a mosaic of vegetation with tightly grazing grasses	NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096 GATES.N.2014. New Forest Woodlark 2014 Survey Report. Higher Level Stewardship Agreement The Verderers of the New Forest AG00300016
Supporting habitat (within the SPA): predation	**Predation**	Restrict predation and disturbance of breeding Woodlark caused by native and non-native predators.	This will ensure that breeding productivity (number of chicks per pair) and survival are sustained at rates that maintain or restore the abundance of the feature. Impacts to breeding productivity can result directly from predation of eggs, chicks, juveniles and adults, and also from significant disturbance. The presence of predators can influence bird behaviours, such as abandonment of nest sites or reduction of effective feeding. Where evidence suggests predator management is required, measures can include their exclusion through fencing and scaring or by direct control.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Any such measures must consider the legal protection of some predators, as well as the likely effects of such control on other qualifying features.	
Supporting habitat (both within and outside the SPA): function/supporting process	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	The structure and function of the habitats which support this SPA feature may be sensitive to changes in air quality. Increased levels of nitrogen deposition may lead to a transition from a heather dominated vegetation community to one dominated by grass species.	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096
Breeding population (within the SPA)	**Population abundance**	Restore the size of the breeding Woodlark population to a level which is above 177 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	See general explanatory Notes for this attribute above in Table 1. Following a dramatic decline in breeding numbers and contraction of range nationally during the latter half of the 20th century, the numbers of breeding Woodlark have steadily increased since the 1986 national survey. The most recent national survey, undertaken in 2006, showed an overall increase in the population size and range for the whole of Britain. Surveys within the New Forest in 2006 and 2014 appear to show a decrease in population which contradicts the national trend over the same period. The 2014 survey recorded a total of 134 Woodlark territories within the area surveyed. Whilst the trend appears to show a continued decline in the population of Woodlark within the New Forest, the rate of decline appears to be slowing. It should however be noted that the 2014 survey was not a systematic survey of the entire SPA and focussed primarily on the crown lands managed by the Forestry Commission. Consequently the data is not	Gates.N.2014. New Forest Woodlark 2014 Survey Report. Higher Level Stewardship Agreement The Verderers of the New Forest AG00300016.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			directly comparable with previous surveys which covered the whole SPA. The reasons for the ongoing decline is unclear and further investigation is required	
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting breeding habitat**	Maintain the extent, distribution and availability of suitable breeding habitat which supports Woodlark for all necessary stages of its breeding cycles(courtship, nesting, feeding)	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the ability and capacity of the SPA to support the breeding woodlark population The extent and distribution of supporting habitat used by woodlark will vary over time as a result of habitat management, succession, and ad-hoc events such as heath fires. The objective is to seek to ensure that there is no overall reduction in habitat availability whilst taking this variability into account. There should at all times be sufficient extent of the habitat in order to support the population despite the variations in habitat cover over the year. Bare ground should be adjacent to structurally diverse vegetation, favouring very short heather areas. The majority of woodlark territories within the New Forest are centred either in or within 100m of dry heathland demonstrating that it may form an important component of the territory area. The SPA supports around 7,600ha of this habitat. Dry acid grassland and Lichen heath with a characteristically prostrate form of heather also support good numbers of territories, particularly in the north of the SPA. There is around 282ha of dry grassland communities within the SPA. Woodlark can colonise clear-fell conifer stands almost as soon as they are felled, 422ha of plantation is planned to be felled within the SPA over the next 10 years. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target will apply to any supporting habitat which is known to occur outside the site boundary.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments to the attribute or target. Gates.N.2014. New Forest Woodlark 2014 Survey Report. Higher Level Stewardship Agreement The Verderers of the New Forest AG00300016 New Forest Inclosures Forest Design Plan 2016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (within the SPA): structure	**Vegetation characteristics**	Restore the mix of trees, ground vegetation and bare ground (including frequency of bare patches of <0.5 ha within mosaic of short (<5 cm) to medium (10-20 cm) ground vegetation, and small clumps of shrubs or trees scattered throughout nesting and feeding areas.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/ rearing/ concealment/ roosting and/or displaying. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096 This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Supporting habitat (both within and outside the SPA): disturbance	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance affecting nesting, roosting, foraging, feeding, moulting and/or loafing birds so that the breeding Woodlark population is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, and presence of people, animals and structures. A 2008 study of recreational pressure in the New Forest suggested that woodlark are more likely to avoid areas of high visitor pressure when choosing a territory. It shows that below 200 visitors per 16 hour period there appears to be no effect on increasing visitor pressure. Above 200 visitors per 16 hour period there are no woodlark using the suitable habitat. These results indicate that visitor pressure is having an impact upon woodlark distribution and habitat utilisation, however this is not currently statistically significant. Nevertheless should	2008 Recreational Pressure in the New Forest (Footprint Ecology NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			visitor numbers increase in the future this may result in significant impacts on this species In addition, the creation or upgrading of tracks to facilitate visitor access across the New Forest may lead to the process of fragmentation, which in turn can have a number of effects, i.e. subdivision of habitat into smaller patches, isolation of habitat patches, increased edge effects, therefore with the potential for increased recreational pressure on suitable habitat as new access could encourage people to penetrate further across a site. New access routes will also in most cases cause direct habitat loss and damage through impaired function of ecosystem processes, drainage, compaction, trampling etc.	
Supporting habitat (both within and outside the SPA): structure	**Landscape**	Maintain open and un-obstructed terrain, typically within at least 0.2 km of nesting areas, with no increase in tall (>0.2 m) vegetation cover to >50% of the site overall.	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its nesting, roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within nesting, feeding or roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Maintain the distribution, abundance and availability of key prey items (e.g. spiders, weevils, caterpillars) at prey sizes preferred by Woodlark	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Woodlarks need areas of very short, sparse vegetation with a high abundance of invertebrate prey on bare ground. This needs to be interspersed with tussocky vegetation for nesting. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 6: Supplementary Advice for Qualifying Features: A302. *Sylvia undata*; Dartford warbler (Breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): function/ supporting process	**Conservation measures**	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to maintain the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore the breeding Dartford Warbler population at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. The site should have areas of structurally diverse heather and gorse. Dartford Warbler particularly favour areas of tall, dense gorse and tall mature heather for nesting. The availability of areas of shorter but structurally diverse vegetation nearby are important in providing invertebrate prey such as spiders and weevils. Open Forest grazing and rotational heather burning management is ideal although periodicity of operations is important allowing sufficient time to develop optimal structure 422ha of plantation is planned to be felled within the SPA over the next 10 years which will eventually provide additional habitat	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096
Supporting habitat (within the SPA): predation	**Predation**	Reduce predation and disturbance of breeding Dartford warbler caused by native and non-native predators.	This will ensure that breeding productivity (number of chicks per pair) and survival are sustained at rates that maintain or restore the abundance of the feature. Impacts to breeding productivity can result directly from predation of eggs, chicks, juveniles and adults and also from significant disturbance. The presence of predators can influence bird behaviours, such as abandonment of nest sites or reduction of effective feeding. Where evidence suggests predator management is required, measures can include their exclusion through fencing and scaring or by direct control.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Any such measures must consider the legal protection of some predators, as well as the likely effects of such control on other qualifying features.	
Supporting habitat (both within and outside the SPA): function/supporting process	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk) .	See notes for this attribute above in Table 5.	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096
Breeding population (within the SPA)	**Population abundance**	Restore the size of the breeding Dartford Warbler population to a level which is above 538 pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	See general explanatory Notes for this attribute above in Table 1. The figure given for the total SPA of Dartford Warbler was 538; this represents the minimum acceptable number of breeding pairs which should be present expressed as a 5-year mean for the feature to be considered in favourable condition. Monitoring of the SPA population has taken place in 1984, 1994, 2006 and 2014. This monitoring has demonstrated that numbers vary considerably from survey to survey with a marked decrease between 2006 and 2014. It is likely that this is a combination of a range of factors including climatic factors, increased recreational disturbance and variations in survey methodology. It should however be noted that the 2014 survey was not a systematic survey of the entire SPA and focussed primarily on the crown lands managed by the Forestry Commission. Consequently the data is not directly comparable with previous surveys which covered the whole SPA.	Gates.N.2014. New Forest Dartford warbler 2014 Survey Report. Higher Level Stewardship Agreement The Verderers of the New Forest AG00300016

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Dartford Warblers are particularly susceptible to climatic factors such as prolonged periods of snow cover in winter and cold, damp spring weather. Survival and productivity appears to be enhanced when patches of dense gorse are available when provide protection from bad weather. The objective is therefore both to ensure that the overall population is maintained above the minimum population size (subject to natural population variations in response to climatic factors) and to seek to ensure that new activities do not adversely affect the population trend, measured through on-going monitoring programmes.	
Supporting habitat (both within and outside the SPA): extent and distribution	**Extent and distribution of supporting breeding habitat**	Restore the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding):	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target will apply to any supporting habitat which is known to occur outside the site boundary Dartford Warbler territories within the New Forest SPA are aggregated around the main areas of heathland, predominantly in the western half of the Forest. Their distribution correlates well with that of areas of dry heathland Other habitats are less often used, with other heathland and grassland mosaic types the next most important habitats utilised within the New Forest. The SPA supports around 7,600ha of dry heathland habitat. There is around 282ha of dry grassland which can provide a sub-optimal habitat where there are mature gorse breaks. 422ha of plantation is planned to be felled within the SPA over the next 10 years and restored to heathland. However the heather and gorse stands will need sufficient time to develop optimal structure for the species.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Supporting habitat (within the SPA): structure	**Vegetation characteristics**	Maintain an optimal mix of vegetation suitable as nesting habitat (areas >50% heather, <25 trees/ha and [5-25%] scrub of 0.5-3 m overall) throughout the nesting area.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/ rearing/ concealment/ roosting. Dartford Warbler have species requirements that conservation measures should seek to maintain. Stands of gorse are closely associated with Dartford Warblers due to its high invertebrate biomass which may be related to its year	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			round flowering and evergreen nature. Its dense and spikey structure may also provide protection from both the weather and predators. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096
Supporting habitat (within the SPA): disturbance	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance affecting nesting, roosting, foraging, feeding, moulting and/or loafing birds so that the breeding Dartford Warbler feature is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. A 2008 survey of recreational pressure within the New Forest indicated that while Dartford warbler within the New Forest are not being significantly impacted by visitor pressure, the species is showing some avoidance of suitable habitat where estimated visitor pressure is high. There may therefore be concern if the number of people visiting the national park in the future substantially increases. In addition, the creation or upgrading of tracks to facilitate visitor access across the New Forest may lead to the process of fragmentation, which in turn can have a number of effects, i.e. subdivision of habitat into smaller patches, isolation of habitat patches, increased edge effects, therefore with the potential for increased recreational pressure on suitable habitat as new access could encourage people to penetrate further across a site. New access routes will also in most cases cause direct habitat loss and damage through impaired function of ecosystem processes, drainage, compaction, trampling etc.	Footprint Ecology (2008) Recreational Pressure in the New Forest. NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): structure	**Landscape**	Maintain the connectivity of open, structurally-diverse heath and patches of dense gorse across the SPA	Local populations of Dartford Warbler are subject to large variation in numbers in response to changing weather patterns and habitat structure. It is important that birds are able to move across the landscape and between patches of suitable habitat so they can re-colonise readily from strongholds. Habitat connectivity is particularly important for this species.	
Supporting habitat (both within and outside the SPA): function/supporting process	**Food availability within supporting habitat**	Maintain the distribution, abundance and availability of key prey items (e.g. beetles, spiders, caterpillars, bugs) of prey sizes preferred by Dartford Warbler.	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 7: Supplementary Advice for Qualifying Features: A314. *Phylloscopus sibilatrix*; Wood warbler (Breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Breeding population (within the SPA)	**Population abundance**	Restore the size of the breeding Wood Warbler population to a level which is above 350 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	See general explanatory Notes for this attribute above in Table 1. The Wood warbler is a long distance migrant species which has been declining across much of its UK range. There is evidence to indicate that the factors causing the decline are away from the breeding areas and operating on migration or the wintering grounds.	Vickery J.A. *et al.* 2014. The decline of Afro-Palaearctic migrants and an assessment of potential causes. Ibis, 156, 1–22
Supporting habitat (both within and outside the SPA): function/ supporting process	**Air quality**	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See the notes for this attribute in Table 5 above.	NATURAL ENGLAND, 2015. New Forest SITE IMPROVEMENT PLAN. At: http://publications.naturalengland.org.uk/publication/5174614971908096
Supporting habitat (both within and outside the SPA): function/supporting process	**Conservation measures**	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to maintain the structure, function and/or the supporting processes associated with the feature and its supporting habitats.	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Wood Warblers are associated with well-wooded landscapes and favour sub-mature and mature, usually oak dominated, woodlands. They prefer relatively closed-canopy woodlands with varied sub-canopy structure, relatively sparse understorey and some field layer vegetation.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (within the SPA): disturbance	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance of nesting, roosting, foraging, feeding, moulting and/or loafing birds so that the breeding Wood Warbler feature is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, and presence of people, animals and structures.	
Supporting habitat (within the SPA): extent and distribution	**Extent and distribution of supporting breeding habitat**	Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. Within the SPA there is 4430ha pasture woodland 400ha of old growth woodland within enclosed plantations. The extent outside the SPA is unknown	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Supporting habitat (within the SPA): function/ supporting process	**Food availability within supporting habitat**	Maintain the distribution, abundance and availability of key prey items (e.g. caterpillars, flies, moths, beetles, aphids, spiders) at prey sizes preferred by Wood Warbler.	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	
Supporting habitat (within the SPA): predation	**Predation**	Reduce the predation and disturbance of breeding Wood Warblers caused by native and non-native predators.	This will ensure that breeding productivity (number of chicks per pair) and survival are sustained at rates that maintain or restore the abundance of the feature. Impacts to breeding productivity can result directly from predation of eggs, chicks, juveniles and adults, and also from significant disturbance. The presence of predators can influence bird behaviours, such as abandonment of nest sites or reduction of effective feeding. Where evidence suggests predator management is required, measures can include their exclusion through fencing and scaring or by direct control. Any such measures must consider the legal protection of some predators, as well as the likely effects of such control on other qualifying features.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (within the SPA): structure	**Vegetation characteristics**	Maintain a woodland structure which typically comprises >60% high (>10 m) canopy cover, patches of ground vegetation of <20 cm locally frequent and <25% ground cover overall.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/ rearing/ concealment/ roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature. Wood warblers prefer open woods and avoid areas with dense shrub or understorey. They need some perches 1-2 m above the ground on approach to the nest but also need no visual obstruction so that they scan for predators on approach. They nest on or close to the ground, often on slopes, in relatively open ground vegetation with some cover (grass tussocks, sparse bramble, ferns, heavy leaf litter, fallen branches)	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 22 September 1993

3. Country:

UK (England)

4. Name of the Ramsar site:

The New Forest

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* □;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* □;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

50 49 32 N 01 39 22 W

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Southampton

Central southern England

Administrative region: Hampshire; Wiltshire

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 28002.81

Min. 9
Max. 125
Mean 54

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The New Forest is an area of semi-natural vegetation including valley mires, fens and wet heath within catchments whose uncultivated and undeveloped state buffer the mires against adverse ecological change. The habitats present are of high ecological quality and diversity with undisturbed transition zones.

The suite of mires is regarded as the *locus classicus* of this type of mire in Britain. Other wetland habitats include numerous ponds of varying size and water chemistry including several ephemeral ponds and a network of small streams mainly acidic in character which have no lowland equivalent in the UK. The plant communities in the numerous valleys and seepage step mires show considerable variation, being affected especially by the nutrient content of groundwater. In the most nutrient-poor zones, *Sphagnum* bog-mosses, cross-leaved heath, bog asphodel, common cottongrass and similar species predominate. In more enriched conditions the communities are more fen-like.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1, 2, 3

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 1

Valley mires and wet heaths are found throughout the site and are of outstanding scientific interest. The mires and heaths are within catchments whose uncultivated and undeveloped state buffer the mires against adverse ecological change. This is the largest concentration of intact valley mires of their type in Britain.

Ramsar criterion 2

The site supports a diverse assemblage of wetland plants and animals including several nationally rare species. Seven species of nationally rare plant are found on the site, as are at least 65 British Red Data Book species of invertebrate.

Ramsar criterion 3

The mire habitats are of high ecological quality and diversity and have undisturbed transition zones. The invertebrate fauna of the site is important due to the concentration of rare and scare wetland species. The whole site complex, with its examples of semi-natural habitats is essential to the genetic and ecological diversity of southern England.

See Sections 21/22 for details of noteworthy species

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	acidic, neutral, sand, clay, alluvium, peat, nutrient-poor, gravel
Geomorphology and landscape	lowland, hilly
Nutrient status	oligotrophic
pH	acidic, alkaline
Salinity	fresh
Soil	mainly mineral
Water permanence	usually permanent, usually seasonal / intermittent

Summary of main climatic features	Annual averages (Everton, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/everton.html) Max. daily temperature: 14.0° C Min. daily temperature: 7.0° C Days of air frost: 32.5 Rainfall: 763.7 mm Hrs. of sunshine: 1750.7

General description of the Physical Features:

The New Forest comprises a complex mosaic of habitats overlying mainly nutrient-poor soils over plateau gravels. The major components are the extensive wet and dry heaths with their rich valley mires and associated wet and dry grasslands, the ancient pasture woodlands and inclosure woodlands, the network of clean rivers and streams, and frequent permanent and temporary ponds.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The New Forest comprises a complex mosaic of habitats overlying mainly nutrient-poor soils over plateau gravels. The major components are the extensive wet and dry heaths with their rich valley mires and associated wet and dry grasslands, the ancient pasture woodlands and inclosure woodlands, the network of clean rivers and streams, and frequent permanent and temporary ponds.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Flood water storage / desynchronisation of flood peaks, Maintenance of water quality (removal of nutrients)

19. Wetland types:

Inland wetland

Code	Name	% Area
Other	Other	92.5
U	Peatlands (including peat bogs swamps, fens)	5.3
Xf	Freshwater, tree-dominated wetlands	0.8
W	Shrub-dominated wetlands	0.6
M	Rivers / streams / creeks: permanent	0.4
Xp	Forested peatland	0.4

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The New Forest valley mires and fens include the following community types:

M21a *Narthecium ossifragum–Sphagnum papillosum* mire, *Sphagnum auriculatum–Rhynchospora* sub-community; M6di *Carex echinata–Sphagnum recurvum* mire, *Juncus acutiflorus* sub-community; M29 *Hypericum elodes–Potamogeton polygonifolius* soakway; M1 *Sphagnum auriculatum* bog pool; M14 *Schoenus nigricans–Narthecium ossifragum* mire, and other marl bogs.

Alder carr: W4 *Betula pubescens–Molinia caerulea* and W5 *Alnus glutinosa–Carex paniculata*.

Wet heath: M16a *Erica tetralix–Sphagnum compactum* wet heath, *Succisa pratensis–Carex panicea* sub-community, and M16c *Erica tetralix–Sphagnum compactum* wet heath, *Rhynchospora alba–Drosera intermedia* sub-community.

Other inundation communities of note are: MG8; MG11; MG13; M22 and M23.

Bog woodland – rich in relict lichen communities.

Residual floodplain woodland.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

Pulicaria vulgaris, Eriophorum gracile, Mentha pulegium, Ludwigia palustris, Pilularia globulifera, Elatine hexandra, Eleocharis acicularis, Gentiana pneumonanthe, Illecebrum verticillatum, Lycopodium inundatum, Carex montana, Cicendia filiformis, Deschampsia setacea, Thelypteris palustris, Hammarbya paludosa, Eleocharis parvula, Galium debile, Gentiana pneumonanthe, Impatiens noli-tangere, Myosurus minimus, Oenanthe pimpinelloides, Parentucellia viscose, Polypogon monspeliensis, Polygonum minus, Ranunculus tripartitus, Rhynchospora fusca, Thelypteris palustris, Utricularia intermedia.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

Dartford warbler , *Sylvia undata*, Europe	538 pairs, representing an average of 33.6% of the GB population (Source period not collated)

Species with peak counts in winter:

Hen harrier, *Circus cyaneus*, Europe	15 individuals, representing an average of 2% of the GB population (Source period not collated)

Species Information

Species occurring at levels of international importance.

Invertebrates.

Coenagrion mercuriale, Lucanus cervus

Nationally important species occurring on the site.

Amphibians.

Triturus cristatus

Fish.

Lampetra planeri, Cottus gobio

Invertebrates.

Scientific Name	Common Name	GB Status
Amara famelica	A ground beetle	pRDB3

Bagous frit A weevil pRDB3
Buckleria paladum A plum moth pRDB3
Caloptilia falconipennel A micro moth pRDB3
Cantharis fusca A soldier beetle pRDB3
Coniocleonus nebulosus A weevil pRDB3
Crambus silvella A pyralid moth pRDB3
Dieckmaniellus gracilis A seed weevil pRDB3
Euplectus punctatus A short-winged mould pRDB3
Lampronia fuscatella A longhorn moth pRDB3
Leptura fulva A longhorn beetle pRDB3
Miscroscydmus minimus A small ant-like beetle pRDB3
Paraphotistus nigricorni A click beetle pRDB3
Procraerus tibialis A click beetle pRDB3
Telmatophilus brevicolli A silken fungus beetle pRDB3
Tenthredopsis friesei A sawfly pRDB3
Acritus homoeopathicus A carrion beetle RDB3
Ampedus cinnabarinus A click beetle RDB3
Aradus corticalis a flat bark bug RDB3
Arctosa fulvolineata A wolf spider RDB3
Brachyopa bicolor A hoverfly RDB3
Callicera aurata A hoverfly RDB3
Catocala promissa Light Crimson Underwing RDB3
Chorthippus vagans Heath Grasshopper RDB3
Coenagrion mercuriale Southern Damselfly RDB3
Colydium elongatum A narrow timber beet RDB3
Corticeus unicolour A darkling beetle RDB3
Diodontus insidiosus A solitary wasp RDB3
Enochrus isotae A scavenger water beetle RDB3
Grammoptera ustulata A longhorn beetle RDB3
Haematopota grandis A horse fly RDB3
Haliplus variegatus A crawling water beetle RDB3
Halpodrassus umbratilis A ground spider RDB3
Heliothis maritima Shoulder-striped Clover RDB3
Heterogenea asella Triangle RDB3
Hirudo medicinalis Medicinal Leech RDB3
Hydrothassa hannoveriana A leaf beetle RDB3
Leptothorax interruptus An ant RDB3
Leptura sexguttata 6 spotted longhorn RDB3
Malachius aeneus A malachine beetle RDB3
Mesosa nebulosa A longhorn beetle RDB3
Microrhagus pygmaeus A false click beetle RDB3
Moma alpium Scarce merveille du jour RDB3
Nysius helveticus A ground bug RDB3
Ortholomus punctipennis A ground bug RDB3
Orthoperus brunnipes A minute fungus beetle RDB3
Pachybrachius luridus A ground bug RDB3
Paederus caligatus A rove beetle RDB3
Pelecocera tricincta A hoverfly RDB3
Psen spooneri A solitary wasp RDB3
Thyridanthrax fenestratu A bee fly RDB3
Tipula (Yamatipula) marginata A cranefly RDB3
Triplax lacordairii A shiny fungus beetle RDB3
Aderus brevicornis An aderid beetle pRDB2
Donacia bicolora A leaf beetle pRDB2

Gnorimus nobilis A dung beetle or chafer pRDB2
Limonia (Mewtalimnobia) A cranefly pRDB2
Neompheria bimaculata A fungus gnat pRDB2
Trachys minuta A jewel beetlep pRDB2
Xyletinus longitarsis A wood boring beetle pRDB2
Zeugophora flavicollis A leaf beetle pRDB2
Agabus brunneus A water beetle RDB2
Argynnis adippe High Brown Fritillary RDB2
Brachypeza armata A fungus gnat RDB2
Catocala sponsa Dark Crimson Underwing RDB2
Diaperis boleti A darkling beetle RDB2
Graptodytes flavipes A water beetle RDB2
Helophorus laticollis A scavenger water beetle RDB2
Lymexylon navale A timber beetle RDB2
Pachythelia villosella A bagworm moth RDB2
Pocota personata A hoverfly RDB2
Solva maculata A fly RDB2
Stenoptilia graphodactyl A plume moth RDB2
Stethophyma grossum Large Marsh Grasshopper RDB2
Thanatus formicinus A running crab spider RDB2
Anthicus tristis An antlike beetle pRDB1
Chrysops sepulchralis A horse fly pRDB1
Cicadette montana New Forest Cicada pRDB1
Endophloeus markovichian A narrow timber beetle pRDB1
Euheptaulacus sus a dung beetle pRDB1
Gasterophilus nasalis A bot fly pRDB1
Heptaulacus testudinariu A dung beetle or chafer pRDB1
Lagria atripes A darkling beetle pRDB1
Lebia cyanocephala A ground beetle pRDB1
Manda mandibularis A rove beetle pRDB1
Platydema violaceum A darkling beetle pRDB1
Pseudopomyza atrimana A fly pRDB1
Pterostichus kugelanni A gorund beetle pRDB1
Silvanoprus fagi A beetle pRDB1
Strangalia revestita A longhorn beetle pRDB1
Tachinus bipustulatus A rove beetle pRDB1
Tachys edmondsi A ground beetle pRDB1
Tachys walkerianus A ground beetle pRDB1
Acylophorus glaberrimus A rove beetle RDB1
Andrena ferox A solitary bee RDB1
Anthaxa nitidula A jewel beetle RDB1
Apalus muralis An oil beetle RDB1
Aphodius niger A dung beetle or chafer RDB1
Bagous brevis A weevil RDB1
Bagous czwalinai A weevil RDB1
Bagous longitarsis A weevil RDB1
Batrisodes delaporti A short-winged mould RDB1
Caliprobola speciosa A hoverfly RDB1
Chrysomela tremula A leaf beetle RDB1
Cryptocephalus nitidulus A leaf beetle RDB1
Emus hirtus Hairy Rove-beetle RDB1
Eucnemis capucina A false click beetle RDB1
Eutheia linearis A small antlike beetle RDB1
Formica transkaucasica The Bog Ant RDB1

Gryllus campestris Field Cricket RDB1
Homonotus sanguinolentus A spider-hunting wasp RDB1
Longitarsus nigerrimus A leaf beetle RDB1
Megapenthes lugens A click beetle RDB1
Melandyra barbata A false darkling beetle RDB1
Paromalus parallelepiped A carrion beetle RDB1
Potamia setifemur A muscid fly RDB1
Pterostichus aterrimus A ground beetle RDB1
Triops cancriformsi Apus RDB1
Velleius dilatatus Hornet Rove-beetle RDB1
Anergates atratulus Dark Guest Ant RDB K
Atomaria lohsei A silken fungus beetle RDB K
Ptenidium turgidum A featherwing beetle RDB K
Aleochara fumata A rove beetle pRDBK
Atheta nannion A rove beetle pRDBK
Atheta puberula A rove beetle pRDBK
Bibloplectus tenebrosus A short-winged mould pRDBK
Cryptophagus micaceus A silken fungus beetle pRDBK
Eutheia plicata A small antlike beetle pRDBK
Gyrophaena poweri A rove beetle pRDBK
Hister quadrimaculatus A carrion beetle pRDBK
Leiodes macropus A round fungus beetle pRDBK
Leiodes nigrita A round fungus beetle pRDBK
Leiodes triepkii A round fungus beetle pRDBK
Limotettix atricapillus A leafhopper pRDBK
Mordellistena humeralis A tumbling flower beetle pRDBK
Onthophagus fracticornis A dung beetle or chafer pRDBK
Phyllodrepa salicis A rove beetle pRDBK
Ptinella limbata A featherwing beetle pRDBK
Scydomoraphes sparshalli A small antlike beetle pRDBK
Sitona puberulus A weevil pRDBK
Stenichnus poweri A small antlike beetle pRDBK
Stenus morio A rove beetle pRDBK
Tabanus miki A horse fly pRDBK
Zyras cognatus A rove beetle pRDBK
Agathidium confusum A round fungus beetle RDB I
Amarochara bonnairei A rove beetle RDB I
Atomaria sahlbergi A silken fungus beetle RDB I
Cassida nebulosa A leaf beetle RDB I
Euconnus denticornis A small antlike beetle RDB I
Euplectus decipiens A short-winged mould RDB I
Euryusa optabilis A rove beetle RDB I
Ityocara rubens A rove beetle RDB I
Lithocharis obsoleta A rove beetle RDB I
Medon castaneus A rove beetle RDB I
Planeustomus flavicollis A rove beetle RDB I
Stenus asphaltinus A rove beetle RDB I
Stichoglossa semirufa A rove beetle RDB I
Tachnnus scapularis A rove beetle RDB I
Tychobythinus glabratus A short-winged mould RDB I
Bidessus unistriatus
Formica candida
Longitarsus ferrugineus
Lymnaea glabra

Biblioplectus tenebrosus
Helophorus laticollis
Hydroporus rufifrons
Phaonia jaroschewskii
Eristalis cryptarum
Chirocephalus diaphanous
Eyndyas nigripes
Helophorus longitarsus
Hydrochus elongates
Hygropora cunctans
Aleochara discipennis
Athetis palustris
Pelosia muscerda
Dolichopus andalusiacus
Tetanocera freyi
Bagous collignesis
Telmaturgus tumidulus
Tabanus bovines

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Archaeological/historical site
Environmental education/ interpretation
Forestry production
Livestock grazing
Non-consumptive recreation
Scientific research
Sport fishing
Sport hunting
Tourism

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	+
Local authority, municipality etc.	+	+
National/Crown Estate	+	+
Private	+	
Other	+	+

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
Current scientific research	+	
Commercial forestry	+	+
Cutting/coppicing for firewood/fuel	+	+
Cutting of vegetation (small-scale/subsistence)	+	
Fishing: recreational/sport	+	+
Bait collection		+
Shifting arable agriculture		+
Livestock watering hole/pond	+	
Grazing (unspecified)	+	+
Rough or shifting grazing		+
Permanent pastoral agriculture	+	+
Hay meadows	+	+
Hunting: recreational/sport	+	+
Sewage treatment/disposal	+	+
Flood control	+	+
Mineral exploration (excl. hydrocarbons)	+	+
Transport route	+	+
Urban development		+
Non-urbanised settlements		+
Military activities	+	

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Commercial-scale forest exploitation	1		+	+	+
Drainage/land-claim: (unspecified)	1		+	+	+
Introduction/invasion of non-native plant species	1		+		
Recreational/tourism disturbance (unspecified)	1		+	+	

For category 2 factors only. What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Is the site subject to adverse ecological change? NO

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	+
National Nature Reserve (NNR)	+	+
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	+
Management agreement	+	
Site management statement/plan implemented	+	
Special Area of Conservation (SAC)	+	

b) Describe any other current management practices:

The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Contemporary.

Environment.
SSSI monitoring.

Flora and Fauna.
Research into the effects of disturbance of ground-nesting birds has been discussed and once methodologies have been agreed resources will be sought.

Completed.

Flora and Fauna.
Vegetation and Invertebrate Surveys of selected sites.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Facilities include Minstead Study Centre and the Countryside Education Trust which is available for local schools and institutions. A ranger/recreation Service is provided by the Forestry Commission.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality.
Camping, informal walking, horse-riding, cycling, bird-watching, shooting, etc - all year.

No evidence that current levels of recreational activities threaten site. Recreational facilities are now under review.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

Bratton, JH (ed.) (1991) *British Red Data Books: 3. Invertebrates other than insects*. Joint Nature Conservation Committee, Peterborough

Cooper, G (2004) *The New Forest*. Hampshire County Council HantsWeb. www.hants.gov.uk/newforest

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Ratcliffe, DA (ed.) (1977) *A Nature Conservation Review. The selection of biological sites of national importance to nature conservation in Britain*. Cambridge University Press (for the Natural Environment Research Council and the Nature Conservancy Council), Cambridge (2 vols.)

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Stewart, NF (2004) *Important stonewort areas. An assessment of the best areas for stoneworts in the United Kingdom*. Plantlife International, Salisbury

Stroud, DA, Chambers, D, Cook, S, Buxton, N, Fraser, B, Clement, P, Lewis, P, McLean, I, Baker, H & Whitehead, S (eds.) (2001) *The UK SPA network: its scope and content*. Joint Nature Conservation Committee, Peterborough (3 vols.) www.jncc.gov.uk/UKSPA/default.htm

Wiggington, M (1999) *British Red Data Books. 1. Vascular plants*. 3rd edn. Joint Nature Conservation Committee, Peterborough

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Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
Telephone**: +41 22 999 0170** • Fax: **+41 22 999 0169** • email: **ramsar@ramsar.org**

Appendix 3

EC Directive 79/409 on the Conservation of Wild Birds: Special Protection Area (SPA)

Name: Solent and Southampton Water

Unitary Authority/County: Hampshire County Council, New Forest District Council, Test Valley Borough Council, Southampton City Council Unitary Authority, Eastleigh Borough Council, Fareham District Council and Isle of Wight Council Unitary Authority.

Consultation proposal: The Solent and Southampton Water SPA site comprises a series of estuaries and adjacent coastal habitats important for breeding gulls and terns and wintering waterfowl. The following SSSIs; Lymington River Reedbeds, Sowley Pond, Hythe to Calshot Marshes, Eling and Bury Marshes, Lower Test Valley, Lincegrove and Hacketts Marshes and Titchfield Haven, and parts of Yar Estuary, Hurst Castle and Lymington River Estuary, North Solent, Lee-on-Solent to Itchen Estuary, Upper Hamble Estuary and Woods, Newtown Harbour, Thorness Bay, Medina Estuary, King's Quay Shore, Ryde Sands and Wootton Creek, Brading Marshes to St Helen's Ledges, Whitecliff Bay and Bembridge Ledges have been recommended as a Special Protection Area because of their European ornithological importance.

Status: Classified 1 October 1998.

Boundary of SPA: SPA boundary is coincident with Lymington River Reedbeds SSSI, Sowley Pond SSSI, Hythe to Calshot Marshes SSSI and Titchfield Haven SSSI and includes parts of the other SSSI listed above. See map for clarification of the SPA boundary.

European ornithological importance of SPA

Solent and Southampton Water SPA is of European importance because:

a) The site qualifies under article 4.1 of the Birds Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain population of a species listed in Annex 1 in any season:

Annex 1 species	5 yr peak mean		Count years
Mediterranean Gull *Larus melanocephalus*	2 pairs	(8.2-13.9% GB)	1994-1998
Sandwich tern *Sterna sandvicensis*	231 pairs	(1.7 % GB)	1993-1997
Common tern *Sterna hirundo*	267 pairs	(2.2 % GB)	1993-1997
Little tern *Sterna albifrons*	49 pairs	(2 % GB)	1993-1997
Roseate tern *Sterna dougalli*	2 pairs	(3.1 % GB)	1993-1997

Bird Numbers from: JNCC Seabird Colony Register

b) The site qualifies under article 4.2 of the Birds Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographic population of a regularly occurring migratory species (other than those listed in Annex 1) in any season.

Non- Annex 1 migratory bird species	5 yr peak mean from -1992/93-1996/97	
Dark- bellied brent geese *Branta bernicla bernicla*	7506[I]	(2.5% W Siberia/W Europe)
Teal *Anas crecca*	4,400[I]	(1.1% NW Europe)
Ringed plover *Charadrius hiaticula*	552[I]	(1.1% Europe/NW Africa)
Black-tailed godwit *Limosa limosa*	1125[I]	(1.6 % Iceland)

Bird Numbers from: WeBS Wildfowl & Waders database

Unit of population size: I- individual birds wintering

c) The site is used regularly by over 20,000 waterfowl (waterfowl as defined by the Ramsar Convention) or 20,000 seabirds in any season.

5 yr peak mean from 1992/93- 1996/97	
51,361[1]	(21,401 wildfowl 29,960 waders)

Unit of population size: I- individual birds wintering

Additional non-qualifying interest

An outstanding assemblage of wintering and passage birds are dependent on wetland habitats within the site, including the following Annex 1 species not mentioned previously: red-throated diver *Gavia stellata*, black-throated diver *G. arctica*, great northern diver *G. immer*, Slavonian grebe *Podiceps auritus*, little egret *Egretta garzetta*, hen harrier *Circus cyaneus*, marsh harrier *Circus aeruginosus*, merlin *Falco columbarius*, peregrine *Falco peregrinus* and short-eared owl *Asio flammeus*.

This citation / map relates to a site entered in the Register of European sites for Great Britain.
Register reference number UK9010051
Date of registration ... 1995
Signed ...
On behalf of the Secretary of State for the Environment

European Site Conservation Objectives for
Solent and Southampton Water Special Protection Area
Site Code: UK9011061

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- **The extent and distribution of the habitats of the qualifying features**
- **The structure and function of the habitats of the qualifying features**
- **The supporting processes on which the habitats of the qualifying features rely**
- **The population of each of the qualifying features, and,**
- **The distribution of the qualifying features within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

A046a *Branta bernicla bernicla*; Dark-bellied brent goose (Non-breeding)
A052 *Anas crecca*; Eurasian teal (Non-breeding)
A137 *Charadrius hiaticula*; Ringed plover (Non-breeding)
A156 *Limosa limosa islandica*; Black-tailed godwit (Non-breeding)
A176 *Larus melanocephalus*; Mediterranean gull (Breeding)
A191 *Sterna sandvicensis*; Sandwich tern (Breeding)
A192 *Sterna dougallii*; Roseate tern (Breeding)
A193 *Sterna hirundo*; Common tern (Breeding)
A195 *Sterna albifrons*; Little tern (Breeding)
Waterbird assemblage

This is a European Marine Site

This SPA is a part of the the Solent Maritime European Marine Site (EMS). These Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS. Natural England's formal Conservation Advice for European Marine Sites can be found via GOV.UK.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 (as amended) ('the Habitats Regulations'). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives, and the accompanying Supplementary Advice (where this is available), will also provide a framework to inform the management of the European Site and the prevention of deterioration of habitats and significant disturbance of its qualifying features

These Conservation Objectives are set for each bird feature for a Special Protection Area (SPA).

Where these objectives are being met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 21 February 2019 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 01 October 1998

3. Country:

UK (England)

4. Name of the Ramsar site:

Solent and Southampton Water

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* □;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* □;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

50 44 25 N 01 31 32 W

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Southampton

Solent and Southampton Water lies on the central south coast of England.

Administrative region: City of Portsmouth; City of Southampton; Hampshire; Isle of Wight

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 5346.44

Min. -1
Max. 9
Mean 1

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The area covered extends from Hurst Spit to Gilkicker Point along the south coast of Hampshire and along the north coast of the Isle of Wight. The site comprises of estuaries and adjacent coastal habitats including intertidal flats, saline lagoons, shingle beaches, saltmarsh, reedbeds, damp woodland, and grazing marsh. The diversity of habitats support internationally important numbers of wintering waterfowl, important breeding gull and tern populations and an important assemblage of rare invertebrates and plants.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1, 2, 5, 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 1

The site is one of the few major sheltered channels between a substantial island and mainland in European waters, exhibiting an unusual strong double tidal flow and has long periods of slack water at high and low tide. It includes many wetland habitats characteristic of the biogeographic region: saline

lagoons, saltmarshes, estuaries, intertidal flats, shallow coastal waters, grazing marshes, reedbeds, coastal woodland and rocky boulder reefs.

Ramsar criterion 2

The site supports an important assemblage of rare plants and invertebrates. At least 33 British Red Data Book invertebrates and at least eight British Red Data Book plants are represented on site.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
51343 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

Ringed plover , *Charadrius hiaticula*, Europe/Northwest Africa	397 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Dark-bellied brent goose, *Branta bernicla bernicla*,	6456 individuals, representing an average of 3% of the population (5 year peak mean 1998/9-2002/3)
Eurasian teal , *Anas crecca*, NW Europe	5514 individuals, representing an average of 1.3% of the population (5 year peak mean 1998/9-2002/3)
Black-tailed godwit , *Limosa limosa islandica*, Iceland/W Europe	1240 individuals, representing an average of 3.5% of the population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
Details of bird species occuring at levels of National importance are given in Section 22

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15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:
Atlantic

b) biogeographic regionalisation scheme (include reference citation):
Council Directive 92/43/EEC

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16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	acidic, neutral, shingle, sand, mud, alluvium, sedimentary
Geomorphology and landscape	lowland, island, coastal, floodplain, shingle bar, subtidal sediments (including sandbank/mudbank), intertidal sediments (including sandflat/mudflat), open coast (including bay), enclosed coast (including embayment), estuary, lagoon, intertidal rock
Nutrient status	eutrophic
pH	no information
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	mainly mineral
Water permanence	usually permanent
Summary of main climatic features	Annual averages (Everton, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/everton.html) Max. daily temperature: 14.0° C Min. daily temperature: 7.0° C Days of air frost: 32.5 Rainfall: 763.7 mm Hrs. of sunshine: 1750.7

General description of the Physical Features:

The Solent and Southampton Water comprises a series of estuaries and harbours with extensive mudflats and saltmarshes together with adjacent coastal habitats including saline lagoons, shingle beaches, reedbeds, damp woodland and grazing marsh.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Solent encompasses a major estuarine system on the south coast of England with four coastal plain estuaries (Yar, Medina, King's Quay Shore, Hamble) and four bar-built estuaries (Newtown Harbour, Beaulieu, Langstone Harbour, Chichester Harbour). The Solent and its inlets are unique in Britain and Europe for their hydrographic regime of four tides each day, and for the complexity of the marine and estuarine habitats present within the area. Sediment habitats within the estuaries include extensive estuarine flats, often with intertidal areas supporting eelgrass *Zostera* spp. and green algae, sand and shingle spits, and natural shoreline transitions. The mudflats range from low and variable salinity in the upper reaches of the estuaries to very sheltered almost fully marine muds in Chichester and Langstone Harbours.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces, Sediment trapping

19. Wetland types:

Marine/coastal wetland

Code	Name	% Area
G	Tidal flats	47.9
H	Salt marshes	18.5
Sp	Saline / brackish marshes: permanent	14.9
E	Sand / shingle shores (including dune systems)	12.1
Tp	Freshwater marshes / pools: permanent	3.7
D	Rocky shores	1.5

J	Coastal brackish / saline lagoons	0.7
Xf	Freshwater, tree-dominated wetlands	0.7

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The estuaries and harbours of the Solent are particularly sheltered and form the largest number and tightest cluster of small estuaries anywhere in Great Britain. The Solent and Isle of Wight system is notable for its large range and extent of different habitats.

The intertidal area is predominantly sedimentary in nature with extensive intertidal mud and sandflats within the sheltered harbours and areas of gravel and pebble sediments on more exposed beaches. These conditions combine to favour an abundant benthic fauna and green algae which support high densities of migrant and over-wintering wildfowl and waders. Eelgrass *Zostera* beds occur discontinuously along the north shore of the Isle of Wight and in a few places along the northern shore of The Solent.

The Solent system supports a wide range of saltmarsh communities. Upper saltmarshes are dominated by sea purslane *Atriplex portulacoides*, sea plantain *Plantago maritima*, sea meadow grass *Puccinellia maritima* and sea lavender *Limonium vulgare*; locally thrift *Armeria maritima* and the nationally scarce golden samphire *Inula crithmoides* are abundant. Lower saltmarsh vegetation tends to be dominated by sea purslane, cord grass *Spartina* spp., glasswort *Salicornia* spp. and sea-blite *Suaeda maritima*. Cord-grasses dominate much of the saltmarsh in Southampton Water and in parts of the Solent and it was the original location of the introduction of *Spartina alterniflora* and subsequent hybridisation with the native species.

There are several shingle spits including Hurst spit, Needs Ore Point, Calshot spit and Newtown Harbour spits which support a characteristic shingle flora.

A range of grassland types lie inshore of the intertidal zone including unimproved species-rich neutral and calcareous grasslands, brackish grazing marsh systems and reed dominated freshwater marshes.

The brackish water lagoons associated with grazing marsh systems behind the seawalls, e.g. Keyhaven-Lymington, Gilkicker lagoon, and at Brading Marshes contain internationally important communities of rare and endangered invertebrates and plants.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

Eleocharis parvula, Geranium purpureum forsteri, Lotus angustissimus, Ludwigia palustris, Orobanche purpurea, Lamprothamnium papulosum, Spartina maritima Zostera marina

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

Mediterranean gull , *Larus melanocephalus*, Europe	11 apparently occupied nests, representing an average of 10.1% of the GB population (Seabird 2000 Census)
Black-headed gull , *Larus ridibundus*, N & C Europe	6911 apparently occupied nests, representing an average of 5.4% of the GB population (Seabird 2000 Census)
Sandwich tern , *Sterna (Thalasseus) sandvicensis sandvicensis*, W Europe	268 apparently occupied nests, representing an average of 2.5% of the GB population (Seabird 2000 Census)
Roseate tern , *Sterna dougallii dougallii*, W Europe	1 apparently occupied nests, representing an average of 1.9% of the GB population (Seabird 2000 Census)
Common tern , *Sterna hirundo hirundo*, N & E Europe	192 apparently occupied nests, representing an average of 1.8% of the GB population (Seabird 2000 Census)
Little tern , *Sterna albifrons albifrons*, W Europe	22 apparently occupied nests, representing an average of 1.1% of the GB population (Seabird 2000 Census)

Species with peak counts in spring/autumn:

Little egret , *Egretta garzetta*, West Mediterranean	115 individuals, representing an average of 6.9% of the GB population (5 year peak mean 1998/9-2002/3)
Spotted redshank , *Tringa erythropus*, Europe/W Africa	13 individuals, representing an average of 9.5% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , *Tringa nebularia*, Europe/W Africa	58 individuals, representing an average of 9.7% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Little grebe , *Tachybaptus ruficollis ruficollis*, Europe to E Urals, NW Africa	105 individuals, representing an average of 1.3% of the GB population (5 year peak mean 1998/9-2002/3)
Slavonian grebe , *Podiceps auritus*, Northwest Europe	12 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)
Black-necked grebe , *Podiceps nigricollis nigricollis*, Europe, N Africa	3 individuals, representing an average of 2.5% of the GB population (5 year peak mean 1998/9-2002/3)
Great cormorant , *Phalacrocorax carbo carbo*, NW Europe	247 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)

Common shelduck , *Tadorna tadorna*, NW Europe	964 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian wigeon , *Anas penelope*, NW Europe	7907 individuals, representing an average of 1.9% of the GB population (5 year peak mean 1998/9-2002/3)
Northern pintail , *Anas acuta*, NW Europe	359 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)
Northern shoveler , *Anas clypeata*, NW & C Europe	267 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)
Red-breasted merganser , *Mergus serrator*, NW & C Europe	142 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)
Water rail , *Rallus aquaticus*, Europe	17 individuals, representing an average of 3.7% of the GB population (5 year peak mean 1998/9-2002/3)
Grey plover , *Pluvialis squatarola*, E Atlantic/W Africa -wintering	1171 individuals, representing an average of 2.2% of the GB population (5 year peak mean 1998/9-2002/3)
Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	10417 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian curlew , *Numenius arquata arquata*, N. a. arquata Europe (breeding)	1766 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Invertebrates.

Allomelita pellucida, Gammarus insensibilis, Nematostella vectensis, Arctosa fulvolineata, Aulonia albimana, Anisodactylus poeciloides, Anthonomus rufus, Baris analis, Berosus spinosus, Cantharis fusca, Drypta dentata, Leptura fulva, Meligethes bidentatus, Paracymus aeneus, Staphylinus caesareus, Aphrosylus mitis, Atylotus latistriatus, Dorycera graminum, Haematopoda grandis, Hippobosca equina, Linnaemya comta, Stratiomys longicornis, Syntormon mikii, Tetanocera freyi, Villa circumdata, Trachysphaera lobata, Paludinella littorina, Truncatellina cylindrica, Andrena alfkenella, Acleris lorquiniana, Elachista littoricola, Melissoblaptes zelleri, Platytes alpinella, Psamathrocrita argentella, Armandia cirrhosa

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Aquatic vegetation (e.g. reeds, willows, seaweed)
Archaeological/historical site
Environmental education/ interpretation
Fisheries production
Livestock grazing
Non-consumptive recreation
Scientific research

Sport fishing
Sport hunting
Tourism
Traditional cultural
Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	+
Local authority, municipality etc.	+	+
National/Crown Estate	+	+
Private	+	+
Public/communal	+	+
Other	+	+

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	
Tourism	+	
Recreation	+	
Current scientific research	+	
Collection of non-timber natural products: (unspecified)	+	
Commercial forestry		+
Cutting/coppicing for firewood/fuel	+	
Fishing: (unspecified)	+	
Fishing: commercial	+	
Fishing: recreational/sport	+	
Marine/saltwater aquaculture	+	
Gathering of shellfish	+	
Bait collection	+	

Arable agriculture (unspecified)		+
Permanent arable agriculture		+
Permanent pastoral agriculture	+	
Hay meadows	+	
Hunting: recreational/sport	+	
Industry		+
Sewage treatment/disposal	+	
Harbour/port	+	
Flood control	+	
Irrigation (incl. agricultural water supply)		+
Mineral exploration (excl. hydrocarbons)		+
Oil/gas exploration		+
Oil/gas production		+
Transport route		+
Domestic water supply		+
Urban development		+
Non-urbanised settlements		+
Military activities	+	+

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Erosion	2		+		+

For category 2 factors only.
What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Erosion - Coastal Defence Strategies, regulation of private coastal defences, shoreline management plans, ChAMPs are in place or are being developed.

Is the site subject to adverse ecological change? YES

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
National Nature Reserve (NNR)	+	+
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	+
Management agreement	+	+
Special Area of Conservation (SAC)	+	
Management plan in preparation	+	

b) Describe any other current management practices:
The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Contemporary.
Numbers of migratory and wintering waterfowl are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee. Bird Ringing by Solent Shorebirds Study Group.

Environment.
Coastal Sediment (SCOPAC)
Water Quality (EA/Southern Water)
Various research and educational establishments carry out ongoing research into a number of different aspects of the environment.

Flora.
Saltmarsh Monitoring (EN project).
Spartina survey (EN project).

Completed.

Flora.
Sand dune and saltmarsh NVC survey.
Habitats.
Habitat surveys (various local individual surveys).
Species surveys (various local individual surveys).

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Various educational programmes exist within the voluntary conservation organisations, research institutes, education centres and also Local Authorities e.g. Newtown National Nature Reserve managed by National Trust, Medina Valley Centre, and Southampton Oceanography Centre.

There are a number of interpretation facilities present and proposed in the area e.g. National Nature Reserve & Local Nature Reserve and proposed centre of coastal management on Isle of Wight.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality.

Almost all the estuaries in the Ramsar site are used extensively for a wide range of leisure and recreational activities, particularly water-based recreation.

Land based recreation:

Walking including dog-walking is popular along large stretches of the coast and estuaries. The presence of country parks, NNR and LNRs on the coast also attract large numbers of people to certain locations.

Bait-digging and collection of shellfish occurs in a number of locations. Birdwatching is also a popular activity with a number of favoured locations with easy access. Some golf courses are also present.

Water-based recreation:

The Solent is an internationally important centre for yachting, dinghy sailing and power-boating and national important for canoeing, and water-skiing. A small amount of hovercraft racing sometimes occurs.

Wildfowling and egg collection:

Private, syndicate and club wildfowling operate on the marshes. Small-scale egg-collecting also occurs. Bait-digging and angling also occur.

Air Recreation:

There is a proposed microlighting centre within the area.

The high degree of recreation in the Solent is accompanied by a high degree of supporting developments e.g. marinas, boatyards, clubs, holiday centres occur throughout the area.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

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EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Solent Maritime
Unitary Authority/County:	City of Portsmouth, City of Southampton, Hampshire, Isle of Wight, West Sussex
SAC status:	Designated on 1 April 2005
Grid reference:	SU756003
SAC EU code:	UK0030059
Area (ha):	11325.09
Component SSSI:	Bouldnor and Hamstead Cliffs SSSI, Chichester Harbour SSSI, Eling and Bury Marshes SSSI, Hurst Castle and Lymington River Estuary SSSI, Hythe to Calshot Marshes SSSI, King's Quay Shore SSSI, Langstone Harbour SSSI, Lee-on-the-Solent to Itchen Estuary SSSI, Lincegrove and Hackett's Marshes SSSI, Lower Test Marshes SSSI, Medina Estuary SSSI, Newtown Harbour SSSI, North Solent SSSI, Thorness Bay SSSI, Upper Hamble Estuary and Woods SSSI, Yar Estuary SSSI

Site description:

The Solent encompasses a major estuarine system on the south coast of England with four coastal plain estuaries (Yar, Medina, King's Quay Shore, Hamble) and four bar-built estuaries (Newtown Harbour, Beaulieu, Langstone Harbour, Chichester Harbour). The Solent and its inlets are unique in Britain and Europe for their hydrographic regime with its double tides, as well as for the complexity of the marine and estuarine habitats present within the area. Sediment habitats within the estuaries include extensive estuarine flats, intertidal areas that support eelgrass *Zostera* spp., sand and shingle spits, and natural shoreline transitions. The mudflats range from low and variable salinity in the upper reaches of the estuaries to very sheltered almost fully marine muds in Chichester and Langstone Harbours. As well as occurring within the estuaries, mudflats and sandflats are found throughout the Solent and form the predominant intertidal substrates. Unusual features include the presence of very rare sponges in the Yar estuary and a sandy 'reef' of the polychaete *Sabellaria spinulosa* on the steep eastern side of the entrance to Chichester Harbour.

Shallow sediment communities (comprising the subtidal sandbanks feature) occur around the Solent, particularly in the large harbours. They are typically colonised by a burrowing fauna of worms, crustaceans, bivalve molluscs and echinoderms. Where coarse stable material is present, species attached to the surface may include foliose algae, hydroids, bryozoans and ascidians. Mixtures of sand and associated hard substrate can lead to the presence of very rich communities. Mobile fauna at the surface of the sandbanks may include shrimps, prosobranch molluscs, crabs and fish. Shallow sandy sediments may be important nursery areas for fish and feeding grounds for seabirds.

Pioneer saltmarsh vegetation colonises intertidal mud and sandflats in areas protected from strong wave action. This habitat is dominated by open stands of glasswort *Salicornia* spp. or annual sea-blite *Suaeda maritima*. It occurs within pioneer marsh communities along the lower marsh and at the lower limits of tidal inundation, as well as in small depressions or saltpans in the upper and middle saltmarsh, or in narrow strips running along the margins of

rivulets and creeks within the saltmarsh. This is one of only two sites where significant amounts of the native cordgrass species, small cord-grass *S. maritima* are found. It is also the only site for the naturalised North American species, smooth cord-grass *Spartina alterniflora* in the UK, and one of the few remaining sites for Townsend's cord-grass *S.* x *townsendii*. There are also extensive areas of common cord-grass *Spartina anglica* throughout the site. Thus all four cord-grass taxa occur here in close proximity.

The Solent contains the second-largest aggregation of Atlantic salt meadows in south and south-west England. The salt meadows are representative of the ungrazed type and support a range of communities dominated by sea-purslane *Atriplex portulacoides*, common sea-lavender *Limonium vulgare* and thrift *Armeria maritima*. In general, the salt meadow is somewhat less truncated by man-made features in the Solent than other parts of the south coast. In places such as Chichester Harbour it shows rare and unusual transitions to freshwater reedswamp and alluvial woodland as well as coastal grassland. Typical Atlantic salt meadow is still widespread in this site, despite a long history of colonisation by cord-grass *Spartina* spp.

Driftline habitats support a number of specialist plant species and can be found on a variety of coarse substrates across the Solent, including shingle beaches, shingle spits, shingle islands and chenier banks (formed by the deposition of broken shells by wave action on the saltmarsh edge). A transition is found in many areas from vegetated shingle to saltmarsh. Two important driftline communities can be identified. The first is dominated by spear-leaved orache *Atriplex prostrata* or grass-leaved orache *A. littoralis* on the seaward edge of the shingle. The second are sea sandwort *Honkenya peploides* – sea rocket *Cakile maritima* strandline communities with perennial associations of sea mayweed *Tripleurospermum maritimum*, curled dock *Rumex crispus*, sea beet *Beta vulgaris* ssp. *maritima*, sea campion *Silene uniflora* and yellow-horned poppy *Glaucium flavum*.

On more stable (typically landward) shingle or stony substrates, additional perennial species are found (these communities comprise the perennial vegetation of stony banks feature). There are at least four distinct community types present within the Solent including a specialised community characterised by hare's-foot clover *Trifolium arvense* occurring with lichens and mosses. Sites such as Calshot Spit and Chichester Harbour are important locations for this feature.

The site supports a number of coastal lagoons both on the Isle of Wight and along the Hampshire coast. This suite of lagoons provides examples of a variety of successional stages and salinity regimes including quite brackish conditions. Some of the lagoons support specialised invertebrates such as the nationally rare insensible shrimp *Gammarus insensibilis* occurring at Yar Bridge lagoon on the Isle of Wight.

The extensive sand dunes at East Head at the mouth of Chichester Harbour are dominated by marram grass *Ammophila arenaria*. There are also accreting sand dunes found at Pilsey Island in Chichester Harbour.

Desmoulin's whorl snail *Vertigo moulinsiana,* which is rare in Great Britain and usually occurs within base-rich wetlands where there are long established swamps, fens and marshes, is found in the reedbeds at the top of Fishbourne channel in Chichester Harbour.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Annual vegetation of drift lines
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Coastal lagoons*
- *Spartina* swards (*Spartinion maritimae*). (Cord-grass swards)
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide. (Intertidal mudflats and sandflats)
- Perennial vegetation of stony banks. (Coastal shingle vegetation outside the reach of waves)
- *Salicornia* and other annuals colonising mud and sand. (Glasswort and other annuals colonising mud and sand)
- Sandbanks which are slightly covered by sea water all the time. (Subtidal sandbanks)
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes). (Shifting dunes with marram)

Qualifying species: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Desmoulin's whorl snail *Vertigo moulinsiana*

Annex I priority habitats are denoted by an asterisk (*).

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030059
Date of registration: 14 June 2005
Signed: Trevor Salmon
On behalf of the Secretary of State for Environment, Food and Rural Affairs

European Site Conservation Objectives for Solent Maritime Special Area of Conservation Site Code: UK0030059

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of qualifying natural habitats and habitats of qualifying species**
- **The structure and function (including typical species) of qualifying natural habitats**
- **The structure and function of the habitats of qualifying species**
- **The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely**
- **The populations of qualifying species, and,**
- **The distribution of qualifying species within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H1110. Sandbanks which are slightly covered by sea water all the time

H1130. Estuaries

H1140. Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats

H1150. Coastal lagoons*

H1210. Annual vegetation of drift lines

H1220. Perennial vegetation of stony banks; Coastal shingle vegetation outside the reach of waves

H1310. *Salicornia* and other annuals colonising mud and sand; Glasswort and other annuals colonising mud and sand

H1320. *Spartina* swards (*Spartinion maritimae*); Cord-grass swards

H1330. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

H2120. Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram

S1016. *Vertigo moulinsiana*; Desmoulin`s whorl snail

* denotes a priority natural habitat or species (supporting explanatory text on following page)

This is a European Marine Site

This site is a part of the Solent Maritime European Marine Site. These Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS. Natural England's formal Conservation Advice for European Marine Sites can be found via GOV.UK.

*** Priority natural habitats or species**

Some of the natural habitats and species for which UK SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Habitats Directive. The term 'priority' is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the "Habitats Regulations"). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Solent and Isle of Wight Lagoons
Unitary Authority/County:	City of Portsmouth, Hampshire, Isle of Wight
SAC status:	Designated on 1 April 2005
Grid reference:	SZ608977
SAC EU code:	UK0017073
Area (ha):	36.24
Component SSSI:	Brading Marshes to St Helens Ledges SSSI, Gilkicker Lagoon SSSI, Hurst Castle and Lymington River Estuary SSSI, Langstone Harbour SSSI

Site description:
The Solent on the south coast of England encompasses a series of coastal lagoons, including percolation, isolated and sluiced lagoons. The site includes a number of lagoons in the marshes in the Keyhaven – Pennington area, at Farlington Marshes in Langstone Harbour, behind the sea-wall at Bembridge Harbour and at Gilkicker, near Gosport. The lagoons show a range of salinities and substrates, ranging from soft mud to muddy sand with a high proportion of shingle, which support a diverse fauna including large populations of three notable species: the nationally rare foxtail stonewort *Lamprothamnium papulosum*, the nationally scarce lagoon sand shrimp *Gammarus insensibilis*, and the nationally scarce starlet sea anemone *Nematostella vectensis*. The lagoons in Keyhaven – Pennington Marshes are part of a network of ditches and ponds within the saltmarsh behind a sea-wall. Farlington Marshes is an isolated lagoon in marsh pasture that, although separated from the sea by a sea-wall, receives sea water during spring tides. Gilkicker Lagoon is a sluiced lagoon with marked seasonal salinity fluctuation and supports a high species diversity. The lagoons at Bembridge Harbour have formed in a depression behind the sea-wall and sea water enters by percolation and by man-made culverts. Species diversity in these lagoons is high and the fauna includes very high densities of *N. vectensis* and the nationally rare Bembridge water beetle *Paracymus aeneus*.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Coastal lagoons*

Annex I priority habitats are denoted by an asterisk (*).

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0017073
Date of registration: 14 June 2005
Signed: Trevor Salmon
On behalf of the Secretary of State for Environment, Food and Rural Affairs

European Site Conservation Objectives for Solent and Isle of Wight Lagoons Special Area of Conservation Site Code: UK0017073

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of qualifying natural habitats**
- **The structure and function (including typical species) of qualifying natural habitats, and**
- **The supporting processes on which qualifying natural habitats rely**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H1150. Coastal lagoons*

* denotes a priority natural habitat or species (supporting explanatory text on following page)

This is a European Marine Site

This site is a part of the Solent and Isle of Wight Lagoons European Marine Site. These Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS. Natural England's formal Conservation Advice for European Marine Sites can be found via GOV.UK.

*** Priority natural habitats or species**

Some of the natural habitats and species for which UK SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Habitats Directive. The term 'priority' is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the "Habitats Regulations"). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

Appendix 4

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	River Itchen
Unitary Authority/County:	City of Southampton, Hampshire
SAC status:	Designated on 1 April 2005
Grid reference:	SU467174
SAC EU code:	UK0012599
Area (ha):	309.26
Component SSSI:	River Itchen SSSI

Site description:
The Itchen typifies the classic chalk river and shows a greater uniformity in physical characteristics along its entire length than other rivers of this type. Since the river is mainly spring-fed, there is only a narrow range of seasonal variation in physical and chemical characteristics. The water is of high quality, being naturally base-rich and of great clarity; and its temperature is relatively constant, with dissolved oxygen levels at or near saturation.

The river's vegetation is dominated by higher plants, and the aquatic flora is exceptionally species rich with many of the typical chalk stream plants present in abundance. The majority of species are present throughout the system and downstream changes are less than in most other rivers. The river is rich in invertebrates and supports diverse populations of aquatic molluscs. The Itchen supports one of the few populations of the native freshwater crayfish remaining in the rivers of southern England and a population of otters.

The river is dominated throughout by aquatic *Ranunculus* spp. The headwaters contain pond water-crowfoot *Ranunculus peltatus*, while two *Ranunculus* species occur further downstream: stream water-crowfoot *R. penicillatus* ssp. *pseudofluitans*, a species especially characteristic of calcium-rich rivers, and river water-crowfoot *R. fluitans*.

The fish fauna of the Itchen is typical of lowland chalk rivers. Strong populations of bullhead *Cottus gobbio* and brook lamprey *Lampetra planeri* are notable elements of the natural fish fauna. The river provides good water quality, extensive beds of submerged plants that act as a refuge for the species, and coarse sediments that are vital for spawning and juvenile development. The river's runs of Atlantic salmon *Salmo salar* fluctuate markedly.

The upper and mid river provides much suitable habitat for otters. A localised population of Atlantic stream crayfish *Austropotamobius pallipes* remains in a headwater of the river.

The Itchen valley contains areas of fen, swamp and meadow supporting vegetation with diverse plant communities, some typically species-rich. Meadow ditches support strong populations of southern damselfly *Coenagrion mercuriale*. The numbers recorded place the site amongst the most important in Britain for this species.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. (Rivers with floating vegetation often dominated by water-crowfoot)

Qualifying species: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Atlantic salmon *Salmo salar*
- Brook lamprey *Lampetra planeri*
- Bullhead *Cottus gobio*
- Otter *Lutra lutra*
- Southern damselfly *Coenagrion mercuriale*
- White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes*

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0012599
Date of registration: 14 June 2005

Signed: Trevor Salmon

On behalf of the Secretary of State for Environment, Food and Rural Affairs

European Site Conservation Objectives for River Itchen Special Area of Conservation Site Code: UK0012599

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of qualifying natural habitats and habitats of qualifying species**
- **The structure and function (including typical species) of qualifying natural habitats**
- **The structure and function of the habitats of qualifying species**
- **The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely**
- **The populations of qualifying species, and,**
- **The distribution of qualifying species within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H3260. Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation; Rivers with floating vegetation often dominated by water-crowfoot

S1044. *Coenagrion mercuriale*; Southern damselfly

S1092. *Austropotamobius pallipes*; White-clawed (or Atlantic stream) crayfish

S1096. *Lampetra planeri*; Brook lamprey

S1106. *Salmo salar*; Atlantic salmon

S1163. *Cottus gobio*; Bullhead

S1355. *Lutra lutra*; Otter

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the "Habitats Regulations"). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

European Site Conservation Objectives: Supplementary advice on conserving and restoring site features

River Itchen Special Area of Conservation (SAC)
Site Code: UK0012599

Photo from Environment Agency Webpage.

Date of Publication: 19 March 2019

About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to River Itchen SAC.

This advice should therefore be read together with the SAC Conservation Objectives available here.

This advice replaces a draft version dated 16 January 2019 following the receipt of comments from the site's stakeholders.

You should use the Conservation Objectives, this Supplementary Advice and any case-specific advice given by Natural England when developing, proposing or assessing an activity, plan or project that may affect this site'.

The tables provided below bring together the findings of the best available scientific evidence relating to the site's qualifying features, which may be updated or supplemented in further publications from Natural England and other sources. The local evidence used in preparing this supplementary advice has been cited. The references to the national evidence used are available on request. Where evidence and references have not been indicated, Natural England has applied ecological knowledge and expert judgement. You may decide to use other additional sources of information.

This Supplementary Advice to the Conservation Objectives presents attributes which are ecological characteristics of the designated species and habitats within a site. The listed attributes are considered to be those that best describe the site's ecological integrity and which, if safeguarded, will enable achievement of the Conservation Objectives. Each attribute has a target which is either quantified or qualitative depending on the available evidence. The target identifies as far as possible the desired state to be achieved for the attribute.

In many cases, the attribute targets shown in the tables indicate whether the current objective is to 'maintain' or 'restore' the attribute. This is based on the best available information, including that gathered during monitoring of the feature's current condition. As new information on feature condition becomes available, this will be added so that the advice remains up to date.

The targets given for each attribute do not represent thresholds to assess the significance of any given impact in Habitats Regulations Assessments. You will need to assess this on a case-by-case basis using the most current information available.

Some, but not all, of these attributes can also be used for regular monitoring of the actual condition of the designated features. The attributes selected for monitoring the features, and the standards used to assess their condition, are listed in separate monitoring documents, which will be available from Natural England.

These tables do not give advice about SSSI features or other legally protected species which may also be present within the European Site.

If you have any comments or queries about this Supplementary Advice document please contact your local Natural England adviser or email HDIRConservationObjectivesNE@naturalengland.org.uk

About this site

European Site information

Name of European Site	River Itchen Special Area of Conservation (SAC)
Location	Hampshire The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	1st April 2005
Qualifying Features	See section below
Designation Area	309.26 ha
Designation Changes **Feature Condition Status**	N/A Details of the feature condition assessments made at this site can be found using Natural England's Designated Sites System
Names of component Sites of Special Scientific Interest (SSSIs)	River Itchen SSSI
Relationship with other European or International Site designations	N/A

Site background and geography

The Itchen typifies the classic chalk river and shows a greater uniformity in physical characteristics along its entire length than other rivers of this type. Since the river is mainly spring-fed, there is only a narrow range of seasonal variation in physical and chemical characteristics. The water is of high quality, being naturally base-rich and of great clarity; and its temperature is relatively constant, with dissolved oxygen levels at or near saturation.

The river's vegetation is dominated by higher plants, and the aquatic flora is exceptionally species rich with many of the typical chalk stream plants present in abundance. The majority of species are present throughout the system and downstream changes are less than in most other rivers. The river is rich in invertebrates and supports diverse populations of aquatic molluscs. The Itchen supports one of the few populations of the native freshwater crayfish remaining in the rivers of southern England and a population of otters.

The river is dominated throughout by aquatic *Ranunculus* spp. The headwaters contain pond water-crowfoot *Ranunculus peltatus*, while two *Ranunculus* species occur further downstream: stream water-crowfoot R. penicillatus ssp. pseudofluitans, a species especially characteristic of calcium-rich rivers, and river water-crowfoot *R. fluitans*.

The fish fauna of the Itchen is typical of lowland chalk rivers. Strong populations of bullhead *Cottus gobbio* and brook lamprey *Lampetra planeri* are notable elements of the natural fish fauna. The river provides good water quality, extensive beds of submerged plants that act as a refuge for the species, and coarse sediments that are vital for spawning and juvenile development. The river's runs of Atlantic salmon *Salmo salar* fluctuate markedly.

The upper and mid river provides much suitable habitat for otters. A localised population of Atlantic stream crayfish *Austropotamobius pallipes* remains in a headwater of the river.

The Itchen valley contains areas of fen, swamp and meadow supporting vegetation with diverse plant communities, some typically species-rich. Water courses, including meadow ditches, base-rich runnels and flushes in open areas, small side- channels and parts of the main river support strong populations of southern damselfly *Coenagrion mercuriale*. The numbers recorded place the site amongst the most important in Britain for this species.

The River Itchen falls within the Hampshire Downs National Character Area (NCA). The Hampshire Downs are part of the central southern England belt of Chalk, rising to 297m in the north-west on the Hampshire–Wiltshire border. A steep scarp face delineates the Downs to the north, overlooking the Thames Basin, and to the east, overlooking the Weald. The majority of the area is an elevated, open, rolling landscape dominated by large arable fields with low hedgerows on thin chalk soils, scattered woodland blocks (mostly on clay with-flint caps) and shelterbelts. To the east hedgerows are often overgrown and there are larger blocks of woodland. A fifth of the area is within the North Wessex Downs Area of Outstanding Natural Beauty and 6 per cent in the South Downs National Park due to the scenic quality of the landscape. More information on the Hampshire Downs NCA can be found here.

About the qualifying features of the SAC

The following section gives you additional, site-specific information about this SAC's qualifying features. These are the natural habitats and/or species for which this SAC has been designated.

Qualifying habitats:

- **H3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation ('Rivers with floating vegetation often dominated by water-crowfoot')**

This habitat type is generally characterised by the abundance of water-crowfoots *Ranunculus* spp. Floating mats of these white-flowered species are characteristic of river channels in early to mid-summer. They help to vary water flow, promote fine sediment deposition, and provide shelter and food for fish and invertebrate animals.

There are several variants of this habitat in the UK, depending on geology and river type, and at each site, the *Ranunculus* species will be associated with a different assemblage of other aquatic plants. The River Itchen is dominated throughout by aquatic *Ranunculus* spp. The headwaters contain pond water-crowfoot *Ranunculus peltatus*, while two *Ranunculus* species occur further downstream: stream water-crowfoot *R. penicillatus* ssp. *pseudofluitans*, a species especially characteristic of calcium-rich rivers, and river water-crowfoot *R. fluitans*.

The habitat type is widespread in rivers in the UK, especially on softer and more mineral-rich substrates. It is largely absent from areas underlain by acid rock types (principally in the north and west). It has been adversely affected by nutrient enrichment, mainly from sewage inputs and agriculture, and where agriculture has caused serious siltation. It is also vulnerable to artificial reductions in river flows and to unsympathetic channel engineering works. Consequently, the habitat has been reduced or has disappeared from parts of its range in Britain.

Qualifying Species:

- ***S1044 Coenagrion mercuriale; Southern damselfly***

The southern damselfly is one of several members of the genus *Coenagrion* males have a distinctive 'mercury' mark on segment 2 of the abdomen but females appear very similar to other *Coenagrion* species. The southern damselfly has very specialised habitat requirements, with most populations being confined to shallow, well-vegetated, base-rich runnels and flushes in open areas or small side-channels of chalk rivers. Some important populations are however found on larger carrier streams and sections of rivers and their margins.

The larvae live in flushes and shallow runnels, often less than 10 cm deep, with slow-flowing water. Adults fly from June to August. Females lay eggs onto submerged plants, and the predatory aquatic larvae probably take two years to mature.

In the UK the southern damselfly occurs mainly in south-west England and in south Wales. It has declined in many places and appears to be present only in low numbers at most of its localities. Strong populations of southern damselfly occur at the Itchen, estimated to be thousands of individuals. The site in central southern England represents one of the major population centres in the UK. It also represents a population in a managed chalk-river flood plain, an unusual habitat for this species in the UK, rather than on heathland.

- ***S1092 Austropotamobius pallipes;* White-clawed (or Atlantic stream) crayfish**

There are several species of crayfish present in the UK but the white-claw crayfish is the only native species. The white-clawed crayfish lives in a diverse variety of clean aquatic habitats but especially favours hard-water streams and rivers. A major threat to the native white-clawed crayfish is posed by the

introduction of non-native species of crayfish, which have been farmed in Britain since the late 1970s. Soon after this, crayfish plague (a virulent disease caused by the fungus *Aphanomyces astaci*) broke out and spread rapidly, causing drastic losses of native crayfish in rivers in England. It is believed that this disease was introduced and is spread by the most frequently farmed species, the North American signal crayfish *Pacifastacus leniusculus*, a carrier of the disease. All North American crayfish species can be carriers of crayfish plague. Crayfish plague can be introduced into a waterbody not only by entry of crayfish but also by water, fish or equipment that has been in contact with signals. This greatly increases the risk to remaining white-clawed crayfish populations.

Austropotamobius pallipes was once widespread in most parts of England and is common in parts of eastern Wales. It is present in south-west Northern Ireland. However, the species is now seriously threatened over most of its range in Britain, with the most significant declines in the south.

White-clawed crayfish can grow up to 12cms long and live in rivers and streams about 1 metre deep where they hide in rocks and submerged wood. They can live up to 12 years and they usually have their first young when they are 3 years old. Females carry their eggs for 7-9 months until they hatch, once hatched the young hitch-hike on their mothers for a further 2 weeks. There appear to be differences in life history between northern and southern populations, for example crayfish in the Itchen are thought to hold young for a shorter time than in more northern populations.

- ***S1096 Lampetra planeri; Brook lamprey***

The brook lamprey is a primitive, jawless fish resembling an eel, and is the smallest of the lampreys found in the UK. It is a non-migratory freshwater species, occurring in streams and occasionally in lakes in north-west Europe. Like other lamprey species, the brook lamprey requires clean gravel beds for spawning and soft marginal silt or sand for the ammocoete larvae. It spawns mostly in parts of the river where the current is not too strong.

The brook lamprey has declined in parts of the UK, although it is still widespread. This species is the most abundant and widespread of the British lampreys and is often found in the absence of the other two species, for example above a barrier that precludes the presence of the migratory species.

- ***S1106 Salmo salar; Atlantic salmon***

The Atlantic salmon is an anadromous species (i.e. adults migrate from the sea to breed in freshwater). Spawning takes place in shallow excavations called redds, found in shallow gravelly areas in clean rivers and streams where the water flows swiftly. The young that emerge spread out into other parts of the river. Within the River Itchen, after a period of 1-2 years the young salmon migrate downstream to the sea as ‘smolts’; this is much quicker than the normal 1-6 year period found elsewhere. Salmon have a homing instinct that draws them back to spawn in the river of their birth after 1-3 years in the sea. This behavior has resulted in genetically distinct stock between rivers and even within individual rivers, with some evidence of further genetic distinctiveness in the tributaries of large rivers.

Salmon rivers vary considerably in their ecological and hydrological characteristics and in the life-cycle strategies adopted by the salmon within them. There are particularly strong contrasts between southern and northern rivers, and the UK’s varied climate, geology and terrain means that high diversity can be found within some of the large rivers. The cool and wet climate in the north, often with harder, more resistant rocks and steeper slopes, results in salmon rivers that are sparsely vegetated, nutrient-poor and prone to sudden increases in flow (‘spates’) in response to heavy downfalls or sudden snow-melt. As a result, salmon may take several years to reach the smolt stage and migrate to sea. In the south, rivers flow across gentler terrain and softer rocks, in a warmer, drier climate. Here, salmon often grow sufficiently quickly to smolt as yearlings.

The species is subject to many pressures in Europe, including pollution, the introduction of non-native salmon stocks, physical barriers to migration, exploitation from netting and angling, physical degradation of spawning and nursery habitat, and increased marine mortality.

- ***S1163 Cottus gobio; Bullhead***

The bullhead is a small bottom-living fish that inhabits a variety of rivers, streams and stony lakes. It appears to favour fast-flowing, clear shallow water with a hard substrate (gravel/cobble/pebble) and is frequently found in the headwaters of upland streams. However, it also occurs in lowland situations on softer substrates, so long as the water is well-oxygenated and there is sufficient cover. It is not found in badly polluted rivers.

The Itchen is a classic lowland chalk river that supports high densities of bullhead throughout much of its length. The river provides good water quality, extensive beds of submerged plants that act as a refuge for the species, and coarse sediments that are vital for spawning and juvenile development.

Bullheads spawn from February to June and up to four times. The male excavates a nest under a suitable large stone to attract a female. Part of this may be achieved by emission of acoustic 'knocking' sounds by the males. The female lays a batch of up to 400 eggs (2–2.5 mm in diameter), which adhere to the underside of the stone. In situations without suitable stones, bullheads may use other media, such as woody material or tree roots. The male then defends the brood against egg predators such as caddis larvae and manages the nest by fanning the eggs with his pectoral fins. The eggs hatch after 20 to 30 days, depending on water temperature. The newly hatched larvae (6–7mm in length) are supplied by a large yolk sac, which is absorbed after 10 days, after this time they leave the nest.

Generally, bullheads attain a length of 40–50 mm after their first year, 60 mm after their second and 70–90 mm after their third. They do not generally live for more than three or four years, although fish of over 10 years old have been recorded.

- ***S1355. Lutra lutra; Otter***

Otters are semi aquatic, living mainly along rivers. They mainly eat fish, though crustaceans, frogs, voles and aquatic birds may also be taken. Being at the top of the food chain, an otter needs to eat up to 15% of its body weight in fish daily.

Otters are solitary shy animals, usually active at dusk and during the night. Otters can travel widely over large areas. Some are known to use 20 km or more of river habitat. Otters tend to live alone as they are very territorial. Otters deposit faeces in prominent places along a watercourse (known as spraints) which have a characteristic sweet musky odour. These mark their range which may help neighbouring animals keep in social contact with one another.

The Otter is also a ‘European Protected Species’ in the UK, and it is an offence to disturb, capture, injure or kill an otter (either on purpose or by not taking enough care), or to damage, destroy or obstruct access to its breeding or resting places, without first getting a license.

Table 1: Supplementary Advice for Qualifying Features: H3260. Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation; Rivers with floating vegetation often dominated by water-crowfoot

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Restore the total extent of the H3260 feature to that characteristic of the natural fluvial processes associated with the river type	There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis. Restoration of this feature is targeted due to historic channel modification and a predominantly non-natural physical structure of the river as well as pressures from nutrient enrichment and localised sedimentation serving to limit the extent of this feature that would otherwise occur naturally (RHS 2014, Leafpacs Macrophyte Survey 2014).	River Habitat Survey 2014, Leafpacs Macrophyte Survey 2014. Assessed against revised Common Standards Monitoring (CSM) targets 2014.
Structure and function (including its typical species)	**Biological connectivity**	The movement of characteristic biota should not be artificially constrained.	Many species, including fish and invertebrates, require natural freedom of movement to complete their life cycle in rivers and maximise their population size and genetic diversity. Longitudinal connectivity within the river channel and river banks; and lateral connectivity between the channel and the floodplain are both critical to a healthy river ecosystem.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Constraints to longitudinal movement such as waterfalls and debris dams are a natural feature of rivers and add to the complexity and diversity of the habitat. New artificial constraints to movement should be avoided and existing artificial constraints should be addressed through strategic river restoration as outlined above. Barriers should be removed wherever possible to restore all aspects of habitat integrity - fish passes constitute a partial mitigation measure for longitudinal biological movement and should only be considered where it is not possible to remove the barrier. Where established, they should allow for the passage of as many species as possible, including southern damselfly, otter, Annex II fish species such as lamprey species and other characteristic species However a balance needs to be achieved by weighing the desire to ensure longitudinal connectivity against the need to minimise the risk of spreading signal crayfish to the headwaters from the lower catchment. As such this should be considered when making an assessment on the removal of any artificial structure.	
Structure and function (including its typical species)	**Biotope (habitat) mosaic**	Restore the extent and pattern of in-channel and riparian biotopes (habitats) to that characteristic of natural fluvial processes.	Watercourses with a high degree of naturalness are governed by dynamic processes which result in a mosaic of characteristic physical habitats or biotopes, including a range of substrate types, variations in flow, channel width and depth, in-channel and side-channel sedimentation features (including transiently exposed sediments), bank profiles (including shallow and steep slopes), erosion features (such as cliffs) and both in-channel and bankside (woody and herbaceous) vegetation cover. All of these biotopes, and their characteristic patterns within the river corridor, are important to the full expression of the biological community. A range of physical habitat modifications cause simplification of biotope mosaics, resulting in declines of characteristic biota dependent upon biotopes that have been lost or reduced in extent. Rivers that have sections that are already significantly	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan NATURAL ENGLAND (2016), A narrative for conserving freshwater and wetland habitats in England.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			physically modified should be subject to a process for planning and implementing physical restoration measures. This should be based on restoring natural geomorphological processes (including restoration of hydrological continuity between river and floodplain) as far as possible to allow restoration of characteristic and sustainable biotope mosaics, working within the practical constraints of essential flood protection for people and the built environment. Excessive levels of livestock grazing denudes the riparian zone, causes artificially high bank instability, and degradation of the fauna and flora of exposed riverine sediments. Low levels of grazing by suitable livestock are important in generating the full expression of riparian biotopes. See also the 'Vegetation structure: riparian zone' attribute. A range of physical modifications have affected the Itchen river habitat, which have adverse consequences for characteristic biological communities of the habitat including specifically notified species. Modifications include weirs and other in-channel structures causing impoundment, siltation and interruptions to biological movements, over deepening, over-widening and straightening of channels, and bank re-sectioning and reinforcement.	TEST AND ITCHEN RIVER RESTORATION STRATEGY. (2013). (Available on request from Natural England)
Structure and function (including its typical species)	**Fisheries**	Restore fish densities at or to a level at or below the natural environmental carrying capacity of the river, and below historical levels (this means no stocking to previously unstocked rivers or river sections). Trout stocking should not elevate densities of adult trout (stocked plus natural) to more than 1-3 fish 100m-2, this being the estimated range of natural trout densities in SAC rivers.	Fish stocking can cause elevated levels of competition and predation that may damage the characteristic biological community. Ideally, fishery management should be based on natural recruitment, with an emphasis on restoring characteristic river habitat in ways that promote natural recruitment. Exploitation should be controlled to suitable levels, and net limitations and catch-and-release techniques used where necessary to avoid population impacts. Fish introductions, exploitation and other removals should not interfere with the ability of the river to support self-sustaining populations of characteristic species. Stocking should be undertaken so as to avoid risks of disease transfer, including crayfish plague where white-clawed crayfish populations are at risk Exploitation and removals should not cause significant	NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) Data may be available from Natural England and survey/stocking data from Environment Agency upon request Environment Agency (2017): Solent and South Downs: Fish Monitoring report 2017

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			suppression of characteristic fish species (e.g. Atlantic salmon, eel, pike) or affect the balance of the fish or wider biological community. The stocking of carp to still waters immediately adjacent to SAC rivers is undesirable if there is continuity between river and still water during periods of flood and no effective biosecurity measures are in place. Stocking for population conservation purposes should only be considered as an interim measure whilst underlying environmental problems are addressed, and should not be undertaken if natural recovery can be achieved in reasonable timescales. Fish should be sourced to avoid impacts on the genetic integrity of local populations (including sub-catchment genetics where appropriate, e.g. for salmon). Fish stocking and transfers are a potential vector of crayfish plague (see feature on table 3). Fish should only be stocked from fish farms or other sources that are free of non-native crayfish or crayfish plague, or fish farms where suitable quarantine arrangements are in place. Excessively high densities of other fish species may cause unacceptably high predation pressure and competitive interactions	
Structure and function (including its typical species)	**Invasive, non-native and/or introduced species**	Ensure non-native species categorised as 'high-impact' in the UK under the Water Framework Directive are either rare or absent but if present are causing minimal damage to the feature and there is no further spread. Where possible action should be taken to reduce the distribution of such species.	Non-native species constitute a major threat to many river systems. Impacts may be on the river habitat itself (e.g. damage to banks and consequent siltation) or directly on characteristic biota (through predation, competition and disease), or a combination of these. For example, species such as signal crayfish have been responsible for much of the decline of native crayfish through competition, habitat damage and the introduction of crayfish plague. The UK Technical Advisory Group of the Water Framework Directive produces a regularly updated classification of aquatic alien species (plants and animals) according to their level of impact. In general high impact species are of greatest concern but low or unknown impact species may be included in the target on a site-specific basis where there is evidence that they are causing a negative impact (for example high cover values or abundances). Those taxa considered likely to colonise lakes, are indicated by an 'L' in the UKTAG guidance. Examples of	NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			such high-impact species may include Water Fern, New Zealand pygmyweed and the zebra mussel. Species that can dominate and impact river banks of the Itchen include Himalayan balsam *Impatiens glandulifera,* Japanese knotweed *Fallopia japonica,* giant hogweed *Heracleum mantegazzianum,* pick-a-back-plant *Tolmiea menziesii* and *Lysichiton* spp. These species should be absent, or no more than occasional if present. There are widespread issues with Himalayan and orange balsam along the riparian corridor but the extent of the problem is unknown.	
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature: Plant communities characterised by pond water crowfoot *Ranunculus peltatus* and associated aquatic herbs and grasses Populations of fish species including bullhead, atlantic salmon and brook lamprey Southern damselfly Otter	Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; • Structural species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • Influential species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) • Site-distinctive species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			this site becomes available.	
Structure and function (including its typical species)	**Riparian zone**	Restore a patchy mosaic of natural woody and herbaceous (tall and short swards) riparian vegetation. The riparian zone should be sufficiently wide to act as a healthy and functional habitat zone within the river corridor.	A mosaic of natural and semi-natural riparian vegetation types provides conditions for all characteristic in-channel and riparian biota to thrive, creating patches of tall and short riparian swards, a mixture of light and shade on the river channel, and tree root systems and a supply of large woody debris that add channel complexity. Patchy tree cover provides shade protection against rising water temperatures caused by climate change. Between 30 and 50% riparian tree cover is generally considered optimal for in-channel and riparian habitats. Intensive cutting across significant proportions of the riparian zone is not appropriate. Also see above comments on livestock grazing. See also Table 2 for tree/scrub cover targets for southern damselfly.	TEST AND ITCHEN RIVER RESTORATION STRATEGY. (2013). (Available on request from Natural England)
Structure and function (including its typical species)	**Screening of intakes and discharges**	All intakes and discharges likely to trap a significant number of individuals of characteristic species are being adequately screened.	Intakes and discharges can be responsible for significant mortalities of fish. Long-distance migratory species such as Atlantic salmon, sea trout, brook lamprey and European eel can be particularly susceptible. Archimedes screw turbines are a recent development in small-scale hydropower and should also be screened until such times that there is robust evidence that they cause no damage to characteristic fish populations. It is important that screens are maintained so that they do not impact water flows and levels (see 'Water course flow' attribute, below)	
Structure and function (including its typical species)	**Sediment regime**	Restore the natural supply of coarse and fine sediment to the river	Coarse sediment supply is essential for the stability of the river channel and for creating and sustaining key biotopes including riffles and exposed shingle banks. Coarse sediment supply can be interrupted by weirs and other impounding structures, and by dredging or extraction, and can result in channel incision and heavy bankside erosion that have consequences for both biodiversity and river management (e.g. flood risk). Excessive fine sediment supply can lead to the smothering of coarse substrates and the loss of flora and fauna dependent on them (note that impoundment of the river can have the same effects). Where fine sediment delivery is a problem, control measures need to be planned in the catchment. Siltation resulting from a variety of factors (direct inputs of silt	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			into the system from land use, runoff from diffuse sources, deposition arising from impoundments and overwide channels) is a widespread problem affecting the River Itchen, with consequences for macrophytes, southern damselfly habitat (where in ditches) and spawning gravels for fish. Further studies and initiatives seeks to further understand and reverse ecological problems associated with sediment and nutrients in the upper River Itchen,	
Structure and function (including its typical species)	**Supporting off-site habitat**	Habitats beyond the site boundary upon which characteristic biological communities of the site depend should be maintained in a state that does not impair the full expression of the characteristic biota within the site.	The characteristic biological communities of the site are dependent on the integrity of sections of river channel, riparian areas, and transitional and marine waters that lie outside of the site boundary. Headwater areas and tributaries may not fall within the site boundary, yet a range of species characteristic of the site may use these areas for spawning and juvenile development and be critical for sustaining populations within the site. Fully developed riparian zones are essential to site integrity, yet part of this zone may lie outside of the site boundary, particularly if the river channel is operating under natural processes and moves laterally over time within the floodplain. The conditions experienced by long-distance migratory species (such as salmon, sea and river lampreys, allis and twaite shads and eels) outwith the site (through the saline transition zone, estuary, coastal waters and into the high seas) are critical to the well-being of populations within the site. Off-site influences that may impact on the well-being of the population within the site may include, but not limited to, entrainment, temperature, water quality, mortality from exploitation. The adjacent habitat is in hydrological continuity with the river. The river floodplain comprises characteristic vegetation types that reflect the natural variation in topographical and hydrological conditions. The fen habitats show characteristic zonations of vegetation types arising from hydrological factors and the zonation is not truncated or fragmented by land use or management factors.	NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Thermal regime**	Restore a natural thermal regime to the river subject to a changing climate, ensuring that water temperatures should not be significantly artificially elevated	Climate change is driving increases in river temperatures which will create stress for a range of characteristic riverine species, particularly those on the southern limit of their range. This must not be exacerbated by catchment activities that are likely to raise water temperatures further. These may include impoundment, abstraction, discharges, excessive tree removal or maintenance. Any activities which seek to create or enhance habitat through water transfer from the main channel (e.g. rewetting of flood plains) also need to be considered against the scale of impact they have on the thermal regime. Restoration of riparian tree cover to suitable levels will be needed in many cases, particularly in headwater streams, systems affected by alder *phytophthora* and river reaches lacking any riparian trees (Any tree planting needs to take account of southern damselfly, see Table 2).	TEST AND ITCHEN RIVER RESTORATION STRATEGY. (2013). (Available on request from Natural England)
Structure and function (including its typical species)	**Vegetation structure: cover of submerged macrophytes**	Maintain a sufficient proportion of all aquatic macrophytes to allow them to reproduce in suitable habitat and unaffected by river management practices.	Removal of submerged aquatic vegetation (often called 'weed-cutting') might be undertaken for flood risk management or fishery purposes. Except in situations of extreme flood risk, best practice is for cutting to leave a mosaic of submerged and marginal vegetation, and should promote a characteristic diversity of plant species. It is recommended that where appropriate a weed management plan is developed for the site, allowing for higher levels of cutting at flood risk pinch-points, balanced by lower levels of cutting in other stretches. Any weed-cutting operations should be undertaken to leave a sufficient proportion (of the order of at least 50% by area and river length) of in-channel and marginal vegetation in the river to support characteristic biota (in terms of cover, food supply and spawning substrate). Weed-cutting should not interfere with the ability of the river channel to downsize through encroachment of marginal vegetation during the summer flow recession. Weed cutting should not interfere with the provision of juvenile Salmon habitat in river types naturally supporting submerged vascular plants.	

<table>
<tr><th colspan="2">Attributes</th><th>Targets</th><th>Supporting and Explanatory Notes</th><th>Sources of site-based evidence (where available)</th></tr>
<tr><td>Structure and function (including its typical species)</td><td>Vegetation structure: riparian zone</td><td>Restore grazing activity in the riparian zone and in the river channel at or to suitably low levels.</td><td>Ideally, grazing levels should be managed at low levels across whole riparian fields. Where this is not feasible, set-back fencing may be established with access provision for limited grazing within the riparian zone. Particularly sensitive areas (e.g. exposed riverine sediments likely to support good invertebrate communities) may need to be fenced off to avoid any concentration of livestock activity, even if only present in low numbers. Close bankside fencing that excludes the development of a functional river corridor is not appropriate.</td><td></td></tr>
<tr><td>Structure and function (including its typical species)</td><td>Water course flow</td><td>Restore the natural flow regime of the river, with daily flows as close to what would be expected in the absence of abstractions and discharges (the naturalised flow).

Springs in aquifer-fed rivers should be maintained.</td><td>The natural flow regime both shapes and sustains characteristic biotope mosaics, affecting factors such as current velocities and bed hydraulics, water levels and depths, wetted area, temperature regime and dissolved oxygen regime, All parts of the natural flow regime are important, including flushing flows, seasonal baseflows and natural low flows. Natural seasonal flow recession is critical in supporting the full expression of ephemeral habitats (marginal and riparian vegetation, exposed riverine sediments, ephemeral headwaters).

<table>
<tr><td></td><td colspan="4">Deviation from daily naturalised flow</td></tr>
<tr><td></td><td>Unit 143</td><td>Unit 142</td><td>Unit 105</td><td>Units 106-108</td></tr>
<tr><td><Qn95 (low flows)</td><td><5%</td><td><10%</td><td><5%</td><td><10%</td></tr>
<tr><td>Qn50-95 (low – moderate flows)</td><td><10%</td><td><15%</td><td><10%</td><td><15%</td></tr>
<tr><td>Qn10 – 50 (moderate – high flows)</td><td><15%</td><td><20%</td><td><15%</td><td><20%</td></tr>
<tr><td>>Qn10 (high flows)</td><td><15%</td><td><10%</td><td><15%</td><td><10%</td></tr>
</table>

Minor spatial and temporal non-compliances can be tolerated as long as the increased impact on naturalised flows is not dramatic. A total of 10 days of continuous non-compliance in any one year, or 20 days of non-compliance overall, should be considered as the maximum that could be considered acceptable. It is also suggested that non-compliance over a</td><td></td></tr>
</table>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			total river length of no more than 5% of a reporting unit should be considered as the maximum acceptable Any significant impacts on the natural flow regime should be rectified sustainably by reducing flow modifications, not by artificial augmentation, or by altering channel form to fit reduced levels of flow. There should be no increase in the existing level of impact on the natural flow regime, and any significant impacts should be controlled to acceptable levels. Flow targets for WFD high ecological status should be used to avoid deterioration and for restoration where this is technically feasible.	
Structure and function (including its typical species)	**Woody debris**	Restore the presence of coarse woody debris within the structure of the channel. In smaller watercourses, temporary debris dams should be a feature of channel dynamics.	Dead woody material that falls into streams ('woody debris') plays an important role in increasing habitat diversity, providing shelter for fish, supplying a food source for aquatic invertebrates, and for slowing the passage of nutrients downstream. Woody debris is therefore a key feature of healthy rivers. Woody debris should be left in situ, unless there are overriding reasons of public safety (for example to prevent flooding or bridge collapse).	TEST AND ITCHEN RIVER RESTORATION STRATEGY. (2013). (Available on request from Natural England)
Supporting processes (on which the feature relies)	**Air quality**	Maintain as necessary, the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	This habitat type is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated with it. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH_3), oxides of nitrogen (NO_x) and sulphur dioxide (SO_2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. Currently there are no critical loads defined on APIS for the H3260 feature.	
Supporting processes (on which the feature relies)	**Water chemistry - alkalinity**	Maintain natural levels of alkalinity	Natural alkalinity levels are critical to characteristic biological communities, with many species adapted to certain parts of the alkalinity range. Mass transfers of water can disrupt the natural alkalinity regime.	
Supporting processes (on which the feature relies)	**Water quality - acidification**	Maintain levels of acidity to those which reflect unimpacted conditions.	Acid deposition can cause major changes to flora, fauna and ecosystem functioning and affects organisms as diverse as diatoms, invertebrates and fish. Acid impacts are typically sporadic and tend to be greatest during the winter months. Humic compounds provide buffering capacity that helps to reduce fluctuations in pH. Acidification lowers dissolved organic carbon in water, reducing the buffering capacity and altering ecosystem functioning. The values given should be applied throughout the site, not just at routine sampling points.	NATURAL ENGLAND (2014). Progress goals and selected targets for N2K Rivers. Available on request from Natural England
Supporting processes (on which the feature relies)	**Water quality - nutrients**	The natural nutrient regime of the river should be protected, with any anthropogenic enrichment above natural/background concentrations limited to levels at which adverse effects on characteristic biodiversity are unlikely. Nutrient targets for the River Itchen should reflect natural/ background concentrations and	Elevated nutrient levels interfere with competitive interactions between higher plant species and between higher plants and algae, leading to dominance by attached forms of algae and a loss of characteristic plant species (which may include lower plants such as mosses and liverworts). Through changes to plant growth and plant community composition and structure they also affect the wider food web, altering the balance between species with different feeding and behavioural strategies. The respiration of artificially large growths of benthic or floating algae may generate large diurnal sags in dissolved oxygen and	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England upon request)

<table>
<tr><th colspan="2">Attributes</th><th>Targets</th><th>Supporting and Explanatory Notes</th><th>Sources of site-based evidence (where available)</th></tr>
<tr><td></td><td></td><td>limit enrichment to levels at which adverse effects on characteristic biodiversity are unlikely. Phosphorus targets do vary between individual SSSI units and are as follows:

<table><tr><th>SSSI Unit</th><th>Phosphorus target</th></tr><tr><td>143</td><td>20µg/l SRP</td></tr><tr><td>142</td><td>40µg/l SRP</td></tr><tr><td>105</td><td>20µg/l SRP</td></tr><tr><td>106-107</td><td>20µg/l SRP</td></tr><tr><td>108</td><td>50µg/l SRP</td></tr></table></td><td>poor substrate conditions (increased siltation) for fish and invertebrate species. The management focus is typically on phosphorus in rivers, on the assumption that it can be more easily controlled at levels that limit the growth of plant species. However, nitrogen may also be important in river eutrophication and ideally co-limitation would be the management aim.

The River Itchen often suffers from growth of filamentous algae, believed to be caused by excessive levels of phosphate from a variety of sources.</td><td>NATURAL ENGLAND (2014). Progress goals and selected targets for N2K Rivers. (Available on request from Natural England)</td></tr>
<tr><td>Supporting processes (on which the feature relies)</td><td>Water quality - organic pollution</td><td>Organic pollution levels should be controlled to levels that have minimal impact on the characteristic biota, targets as follows:

10%ile Dissolved Oxygen - 85% saturation

Mean Biological Oxygen Demand: - 1.5 mg L-1

90%ile total ammonia - 0.25 mg L^{-1} NH_3-N

95%ile un-ionised ammonia - 0.021 m L^{-1} NH_3-N</td><td>Organic pollution affects the biota in a number of ways, including direct toxicity (from ammonia and nitrite), reduced dissolved oxygen levels (from microbial breakdown of organic material), and nutrient enrichment. Reducing organic pollution levels reduces toxic effects but unmasks enrichment effects. Controlling the continuous input of low levels of organic material is critical to controlling the enrichment effect. The values given apply throughout the site not just at routine sampling points - assessment can be made by modelling (assuming full mixing of effluents at the point of discharge).

A Diffuse Water Pollution Plan identifies numerous issues with water quality, from point sources from Waste Water Treatment Works to road runoff. The Plan is a critical document to achieve favourable condition. Pollution causes excessive algal growth, smothering macrophytes, and increased BOD, decreasing oxygen availability for spawning gravels used by salmon and trout.</td><td>Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request

NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan

NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request)</td></tr>
<tr><td>Supporting processes (on which the feature relies)</td><td>Water quality - other pollutants</td><td>Achieve at least 'Good' chemical status (i.e. compliance with relevant Environmental Quality Standards).</td><td>A wide range of pollutants may impact on habitat integrity depending on local circumstance. Good chemical status includes a list of Environmental Quality Standards (EQS) for individual pollutants that are designed to protect aquatic biota with high levels of precaution. These values should be applied</td><td>Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both</td></tr>
</table>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			throughout the site, not just at routine sampling points.	organisations upon request
Version Control Advice last updated: **15 March 2019** – following feedback from stakeholders. Target for **Extent of feature within site** changed to restore and supporting notes updated; explanatory notes for **Biological Connectivity** updated to reflect need to balance connectivity with minimising risk of spread of signal crayfish; target for **Invasive non-native species** revised to include prevention of spread; site specific species added to **Key structural, influential and/or distinctive species** attribute;				
Variations from national feature-framework of integrity-guidance: N/A				

Table 2: Supplementary Advice for Qualifying Features: S1044. *Coenagrion mercuriale*; Southern damselfly

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	**Population abundance**	Restore the abundance of the population to level which is above 10 damselflies / 100 metres of transect (HARVEY *et al*., 2005), whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent. Comparisons made between transects or sites based on a single sample count do not allow robust assessment of sites. Comparative measures of adult damselfly abundance per 100m transect indicate transect and site favourability in the absence of attribute limits (HARVEY *et al*., 2005).	This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally at least 10 years). The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment. Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean counts or breeding surveys. This value is also provided recognising there will be inherent variability as a result of	RUMBLE *et al.* (2006) THOMPSON *et al.* (2003)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			natural fluctuations and margins of error during data collection. Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise whether the figures stated are the best available. Transects are linear areas of continuous suitable habitat. Suitable habitat refers to; • Open, unshaded lengths of ditch with slow water velocity or only moderate velocity in the central channel and shallow, slow-flowing areas at the edges • Ditch edges with broad fringes of herbaceous emergent and submerged macrophytes, typically including some cover of reed sweet-grass (*Glyceria maxima*), water mint (*Mentha aquatica*), fool's watercress (*Apium nodiflorum*), watercress • (*Rorippa nasturtium-aquaticum*) and brooklime/ water speedwell (*Veronica* spp.). • Areas of adjacent bankside vegetation with medium-height tussocks. • Ditch largely unshaded by bankside shrubs and trees. • Unpolluted conditions indicated by absence of encroaching algae and bacterial film. No invasive tall emergents such as reed canary-grass (*Phalaris arundinacea*). • Some cover of silt or other organic substrate in ditch/stream. A target for the total extent of watercourse where the 10 damselflies / 100 m of transect target should be met is being developed.	
Supporting habitat: extent and	**Distribution of supporting habitat**	Restore the distribution and continuity of the feature and its supporting habitat, including	A contraction in the range, or geographic spread, of the feature (and its component vegetation) across the site will reduce its overall area, the local diversity and variations in its structure	NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
distribution		where applicable its component vegetation types and associated transitional vegetation types, across the site	and composition, and may undermine its resilience to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for this feature and this may affect its viability. Maintenance of the area of open habitat surrounding streams, ditches, carriers and runnels is important as this provides feeding, resting and courting areas. Ideally, a structurally diverse habitat should be maintained close to known breeding sites with scattered scrub to provide shelter. There is evidence that the three population 'hubs' are becoming (or already are) physically and genetically isolated. These population hubs are centred at Twyford, Highbridge and Itchen Valley Country Park.	(Available from Natural England on request)
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Restore the total extent of the habitats which support the H3260 feature to that characteristic of the natural fluvial processes associated with the river type Wet woodland 69.57ha Lowland neutral grassland and Fen meadow 97.35 Swamp, reed-beds and tall-herb fen 145.75ha	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data.	NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) RUMBLE *et al*. (2006)
Supporting habitat: structure /function	**Emergent and bankside vegetation: Chalk streams and rivers:**	Restore a diverse riparian habitat structure, including areas of adjacent bankside vegetation with medium height tussocks and/or emergents in watercourse, and only scattered scrub or trees shading	The southern damselfly usually emerges from the water as final instar larvae by ascending emergent vegetation, rather than by walking onto shore. Tall rushes and sedges are known to have been used and emergence perches for the southern damselfly include semi-emergent plants such as lesser water parsnip (*Berula erecta*), bittersweet (*Solanum dulcamara*), water mint (*Mentha aquatica*) and watercress (*Rorippa nasturtium-aquaticum*). Ideal emergence perches are likely to be plants	RUSHBROOK (2018a) RUMBLE *et al*. (2006)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			with rigid stems that would not bend in the wind. The damselfly's wings and abdomen were less likely to be damaged if they did not touch surrounding vegetation during expansion and drying. The eggs are laid into water plant tissue and plant species used as oviposition substrates may include fool's watercress (*Apium nodiflorum*), lesser water parsnip, reed sweet-grass (*Glyceria maxima*), watercress, brooklime (*Veronica beccabunga*) and blue water-speedwell (*V. anagallis-aquatica*), marsh St John's wort (*Hypericum elodes*), bog pondweed (*Potamogeton polygonifolius*) and jointed rush (*Juncus articulatus*).	
Supporting habitat: structure/ function	**Emergent and bankside vegetation: Chalk streams and rivers:**	Restore an abundance of emergent and fringing vegetation of reeds, grasses and herbs i.e. free of scrub and tree regeneration and little bare ground.	Scrub should be present at no more than 10% along the edges of these waterways. This is usually maintained through extensive grazing with cattle. Such grazing needs to be amended so that water course fringes are clear of scrub but not overly poached. Undoubtedly, one of the main reasons for the decline of the southern damselfly in Britain over the last 40 years has been the change in grazing regimes on some sites. Undergrazing impacts on wet meadow systems, causing degradation of southern damselfly habitat in particular. The use of moderate grazing regimes should reduce the establishment of scrub and invading emergents on most sites. Grazing by heavier animals, such as cattle and horses, is preferred, as it causes some poaching of watercourse margins and creates the diversity of tussock structure preferred by the southern damselfly.	NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan RUSHBROOK (2018a) RUMBLE *et al.* (2006)
Supporting habitat: structure/ function	**Emergent and bankside vegetation: chalk streams and rivers:**	Retain small areas of tall scrub or trees within 20 m of watercourse for perching adults. This scrub and tree cover should not shade the watercourse.	Some scattered scrub can provide areas for roosting, maturation, feeding, displaying and basking.	
Supporting habitat: structure/ function	**Flow: Chalk streams and rivers**	Restore open, unshaded lengths of ditch with slow flow or with moderate (7.5–20 cm s^{-1}) flow.	The southern damselfly requires base-rich, shallow streams with a constant slow-to-moderate flow and relatively high water temperature. The rate of water flow can affect the composition of waterside plants used for emergence and oviposition. The southern damselfly favours chalk streams and rivers with slow	RUSHBROOK (2018a) RUMBLE *et al.*, (2006)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			or moderate flow which support a wide variety of emergent plant species.	
Supporting habitat: structure/ function	**Nutrient status: chalk streams and rivers:**	Restore phosphate concentrations to be less than 0.025 mg l-1 but see individual unit targets for H3260 feature in Table 1.	Phosphate concentration is generally less than 0.025 mg l-1 in most watercourses occupied by the southern damselfly in England.	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request
Supporting habitat: structure/ function	**River morphology: Chalk streams and rivers**	Restore the physical structure of the river channel and its banks in a natural state	The southern damselfly requires base-rich, shallow streams with a constant slow-to-moderate flow and relatively high water temperature. A natural state may be considered as one where the watercourse is not artificially straightened, deepened, canalised or otherwise altered as this will usually adversely affect both flow, vegetation growth and the shallowness (where the water is warmest) of the channel edge where the larvae live. A natural channel will also maximise the diversity of in-channel habitat which provides the principal prey items for *C. mercuriale* larvae which are predominantly smaller invertebrates, which may include freshwater shrimp, fly larvae, including blackflies (*simuliids*) and non-biting midges (*chironomids*), mayfly larvae (*ephemeropterans)*, and small freshwater shrimp (*gammarids*).	RUSHBROOK (2018a) RUMBLE *et al*. (2006)
Supporting habitat: structure/ function	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal:bacterial ratio, within typical values for the supporting habitat	Soil supports basic ecosystem function and is a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with the supporting habitat of this Annex II feature.	
Supporting habitat: structure/ function	**Trophic conditions: chalk streams and rivers**	Maintain mesotrophic conditions indicated by a lack of areas of watercourse with encroachment of algae (except brown flocculent algae), bacterial film or invasive tall emergents such as *Phalaris*	A wide range of pH is found in watercourses on southern damselfly sites, although the majority of sites fall within the range 7.0–7.5. These conditions ensure sufficient oxygen for larval and egg development and no eutrophication and encroachment of invasive emergents and algae.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		arundinacea, Solidago canadensis, Filipendula ulmaria and Rubus spp		
Supporting habitat: structure/ function	**Vegetation composition: scrub cover**	Restore only small areas of tall scrub or trees within 20 metres of watercourse but not on intervening habitat between two areas of population. Trees and scrub cover less than 25% overall in fen or grassland close to breeding sites.	Some scattered trees and scrub associated with base-rich runnels and streams can provide areas for roosting, maturation, feeding, displaying and basking	NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) RUSHBROOK (2018a) RUMBLE *et al.* (2006)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Adaptation and resilience**	Restore the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being high, taking into account the sensitivity, fragmentation, topography and management of its habitats and supporting habitats. This means that this site is considered to be amongst the most vulnerable sites overall which are likely to require the most adaptation action, most urgently. A site based assessment should be carried out as a priority. This means that action to address specific issues is likely, such as reducing habitat fragmentation, creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species may be more or less vulnerable than their habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable. See Table 1 for discussion of water levels/flows.	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360]. RUSHBROOK (2018a) RUMBLE *et al*. (2006)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Air quality**	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	The supporting habitat of this feature is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition (including food-plants) and reducing supporting habitat quality and population viability of this feature. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH_3), oxides of nitrogen (NO_x) and sulphur dioxide (SO_2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. Currently there are no critical loads defined on APIS for the H3260 watercourse supporting habitat of southern damselfly.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	ENGLISH NATURE (2004), River Itchen SSSI, Views About Management NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan ROUQUETTE (2005). RUSHBROOK (2018b)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water quantity/ quality**	Where the feature or its supporting habitat is dependent on surface water and/or groundwater, restore water quality and quantity to a standard which provides the necessary conditions to support the feature	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request NATURAL ENGLAND (2018)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Water quality data is found within the H3260 section of this document (Table 1.)	environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed to reflect the ecological needs of the species feature. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC. See also Table 1 for further discussion of water levels/flows.	Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan
Version Control: Advice last updated: **16 March 2019** following stakeholder feedback. Explanatory notes for **Population Abundance** expanded to provide more information on transects and suitable habitat; **distribution of supporting habitat** explanatory notes updated to include location of three main population hubs;				
Variations from national feature-framework of integrity-guidance: Attributes relating to seepages and runnels in heathland habitats removed as this is an example of chalk stream habitats				

Table 3: Supplementary Advice for Qualifying Features: S1092. *Austropotamobius pallipes*; White-clawed (or Atlantic stream) crayfish

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	**Population abundance**	Maintain the abundance of the population at a level which would mean at least 5 out of 100 refuges contain white-clawed crayfish within a unit of assessment, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally at least 10 years). The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment. Unless otherwise stated, the population size or presence will be that measured using standard methods. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data	RUSHBROOK (2013) RUSHBROOK *et al*. (2012)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			collection. Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are the best available.	
Population (of the feature)	**Population health**	Restore an absence of non-native crayfish species from the site and the catchment surrounding the site	Once non-native crayfish species (such as signal, red-swamp and spiny-cheeked crayfish) are established in a waterbody, native populations of crayfish may be eliminated rapidly by them through direct competition for food, predation or the transfer of disease. These species can also cause physical damage to supporting habitat. The presence of non-native species within or close to the SAC poses a risk of adversely affecting the abundance and health of the feature. The presence of signal crayfish in parts of the catchment will pose a significant risk to the white-clawed crayfish population through the potential to spread crayfish plague.	NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan RUSHBROOK (2013) RUSHBROOK *et al*. (2012)
Population (of the feature)	**Population health**	Maintain an absence of individuals within the site infected with crayfish plague and porcelain disease should not be seen to affect >10% of crayfish population.	Non-native crayfish species (such as signal crayfish) carry a fungal infection called the crayfish plague (*Aphanomyces astaci*), which is lethal to European crayfish (including our native white-clawed crayfish) and has resulted in their eradication from a number of waters in England. The presence of this disease within the native crayfish population, either within or close to the SAC, may adversely affect the abundance and health of the feature. Porcelain disease may be present in a population at low levels without apparent harm. However this can be an indication of environmental stress and problems may occur if a higher prevalence is reached.	HOLDITCH (2003) NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request)
Population (of the feature)	**Population health**	Ensure human activities within or around the site do not pose a significant risk of plague transfer	Non-native crayfish species (such as signal crayfish) carry a fungal infection called the crayfish plague (*Aphanomyces astaci*), which is lethal to European crayfish (including our native white-clawed crayfish) and has resulted in their eradication from a number of waters in England. Human activities, such as angling and fish farming, is able to facilitate the spread of non-native species and the spread of this disease if legislative controls and best management practice are not followed.	
Supporting habitat:	**Distribution of supporting**	Restore the distribution and continuity of the feature and its	A contraction in the range, or geographic spread, of the feature (and its component vegetation) across the site will reduce its	RUSHBROOK (2013)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
extent and distribution	**habitat**	supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site	overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for this feature and this may affect its viability.	RUSHBROOK *et al*. (2012)
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Restore the total extent of the habitat(s) which support the H3260 feature to that characteristic of the natural fluvial processes associated with the river type	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data.	
Supporting habitat: structure/ function	**River bed**	Restore an abundance of naturally occurring cobbles, rubble and boulders on the river bed	Habitat conditions for white-clawed crayfish vary naturally in rivers. Some river sections may provide optimal habitat whilst others may be largely unsuitable. Optimal conditions typically occur in relatively shallow, fast flowing reaches with coarse substrates. A characteristically diverse biotope mosaic allows the white-clawed crayfish and other species to move within the channel to locate optimal habitat conditions in the face of a fluctuating flow regime. Pools, exposed tree root systems and marginal shallows are important high-flow refugia for the species. Impounding structures in particular can have a dramatic effect on white-clawed crayfish habitat, generating heavy siltation and loss of coarse substrates on which white-clawed crayfish depend. White-clawed crayfish are not usually found inhabiting substrates covered in mud or silt, although they may cross such areas while foraging. Land-use change, the draining of lakes or ponds, and lowering or widening a stream or river bed can increase siltation and reduce water flow, resulting in a change	HOLDITCH (2003) RUSHBROOK (2013) RUSHBROOK *et al*. (2012)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			in the channel flora and creating unsuitable conditions for crayfish. While they are known to occur in sections of river where the banks are poached by cattle, such activity can have an adverse effect on a population by increasing turbidity and decreasing dissolved oxygen concentrations as a result of sediment and excrement entering the water	
Supporting habitat: structure/ function	**River/ waterbody vegetation**	Maintain the extent of submerged and marginal vegetation within the river channel / standing water body (as appropriate)	To be considered in conjunction with supplementary advice for associated Annex I habitat features. Habitat conditions for white-clawed crayfish vary naturally in rivers. Some river sections may provide optimal habitat whilst others may be largely unsuitable. Optimal conditions typically occur in relatively shallow, fast flowing reaches with coarse substrates. A characteristically diverse biotope mosaic allows the white-clawed crayfish and other species to move within the channel to locate optimal habitat conditions in the face of a fluctuating flow regime. Pools, exposed tree root systems and marginal shallows are important high-flow refugia for the species. Impounding structures in particular can have a dramatic effect on white-clawed crayfish habitat, generating heavy siltation and loss of coarse substrates on which white-clawed crayfish depend.	
Supporting habitat: structure/ function	**Shoreline refugia**	Restore the extent and diversity of shoreline refuges associated with the water body, such as submerged tree roots, bank crevices and marginal vegetation	White-clawed crayfish of all ages need refuges, or places to shelter or hide. Juvenile crayfish are especially vulnerable to predation by fish, ducks and other water birds, otter and mink, carnivorous dragonfly larvae and other predatory invertebrates, including adult crayfish. Crayfish are also vulnerable to high flows in watercourses, when they can be washed away from favourable habitats and stranded, crushed or eaten. Pools, exposed tree root systems and marginal shallows are important high-flow refugia for the species.	RUSHBROOK (2013) RUSHBROOK *et al*. (2012)
Supporting habitat: structure/ function	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal:bacterial ratio, within typical values for the supporting	Soil supports basic ecosystem function and is a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		habitat	soil properties may therefore affect the ecological structure, function and processes associated with the supporting habitat of this Annex II feature.	
Supporting habitat: structure/ function	**Supporting off-site habitat**	Restore the quality of any supporting habitat present beyond the site boundary upon which the white-clawed crayfish population of the site depend	White-clawed crayfish populations within the designated boundary of the SAC may be dependent on the continued or restored integrity of sections of river channel and riparian areas that lie outside of the site boundary. For example, headwater areas and tributaries may not fall within the site boundary, yet white-clawed crayfish may use these areas for spawning and juvenile development and be critical for sustaining populations in the SAC further downstream.	
Supporting habitat: structure/ function	**Total Nitrogen**	Restore levels typically at or below 0.2 mg.l-1 NO2 suggested as reflecting the EPA limit for salmonid waters.	These need to be made bespoke the individual site, as they will vary both between fluvial and static water bodies, and within those class types. High levels of nitrogen are likely to be toxic to crayfish. There seems to be a tolerance of nitrates in this species, with food consumption being impacted before other physiological impacts are noted, though mortality climbs with increasing concentration.	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request
Supporting habitat: structure/ function	**Turbidity: rivers**	Restore an annual mean level of typically less than 25 mg/l of suspended solids throughout the site	The supporting riverine habitat of the feature should be characterised by clean gravels; excess siltation can obstruct crayfish gills and this may cause physico-pathological changes in the long term. Construction operations often cause marked and extensive turbidity in water, coupled with an increase in iron content	HOLDITCH (2003) NATURAL ENGLAND CSM Assessment (2015). Data available upon request
Supporting habitat: structure/ function	**Un-ionised Ammonia**	Maintain ammonia levels at or to less than 0.6mg NH3 l-1 throughout the site	High level of ammonia in watercourses, derived from organic pollution, is likely to be toxic to white-clawed crayfish.	NATURAL ENGLAND (2014). Progress goals and Selected Targets for N2K Rivers. Available on request from Natural England
Supporting habitat: structure/ function	**Water pH**	Maintain pH levels at or to within the range 6.5 - 9	Higher pH levels as part of supporting water habitat chemistry maximise the survival and growth of animals.	
Supporting habitat: structure/ function	**Water quality: biological**	Restore supporting habitat to Good biological status (i.e. compliance with relevant Environmental Quality	Good water quality is important to this feature to ensure sufficient availability of prey which includes worms, insect larvae, snails, small fish, macrophytes and algae. For many SAC features which are dependent on wetland habitats	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Standards) throughout the site. Water quality data is found within the H3260 section of this document (Table 1.)	supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this supporting habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.	may be available from both organisations upon request NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan
Supporting habitat: structure/ function	**Water quality: chemical**	Restore supporting habitat to Good chemical status (i.e. compliance with relevant Environmental Quality Standards) throughout the site. Water quality data is found within the H3260 section of this document (Table 1)	Good water quality is important to ensure availability of prey which includes worms, insect larvae, snails, small fish, macrophytes and algae. For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan
Supporting habitat: structure/ function	**Water temperature**	Maintain water temperature at naturally-occurring levels	Good water quality is important to ensure availability of food which includes worms, insect larvae, snails, small fish, macrophytes and algae	
Supporting habitat: structure/ function	**Woody debris**	Maintain an abundance of large woody debris within the channel or water body	Woody debris is an important component of river habitat for white-clawed crayfish as well as the wider biological community. White-clawed crayfish are particularly associated with woody debris in lowland reaches, where it is likely that it provides an alternative source of cover from predators and floods. It may also be used as an alternative spawning	NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			substrate. Where they are present, fallen branches and trunks are used extensively by crayfish as refuge on the River Itchen. Woody debris is typically removed during maintenance operations, but it is important to retain as much as possible, particularly where other forms of refuge are in short supply.	
Supporting habitat: structure/ function	**Biological connectivity**	The movement of white-clawed crayfish within the site should not be artificially constrained.	Vertical drops are sufficient to prevent upstream movement of adult white-clawed crayfish. Even low weirs will therefore prevent recolonisation of upper reaches affected by lethal pollution episodes or drought, and more generally will also lead to constraints on life cycle movements and genetic interactions throughout the river that may have adverse consequences. However a balance needs to be achieved by weighing the desire to ensure longitudinal connectivity against the need to minimise the risk of spreading signal crayfish to the headwaters from the lower catchment. As such this should be considered when making an assessment on the removal of any artificial structure.	
Supporting habitat: structure/ function	**Calcium levels**	Maintain calcium levels at or to above 5mg/l	Because of their thick exoskeletons and regular moult cycles, freshwater crustaceans such as crayfish have high calcium needs. When calcium levels drop, their exoskeletons become weaker reducing the abundance, size, and weight of these crustaceans. A reduction in size can slow the onset of sexual maturity, making them more vulnerable to predators. This, in turn, may further affect the overall size of their population. Finally, affected crustaceans may become less tolerant of other factors such as temperature, toxic metals, and Ultra Violet radiation.	
Supporting habitat: structure/ function	**Oxygen levels**	Restore supporting rivers and waterbodies in/to a well-oxygenated state, typically with a dissolved oxygen standard of >70%	Good water quality, reflected in high oxygen levels, is important to ensure availability of food which includes worms, insect larvae, snails, small fish, macrophytes and algae	NATURAL ENGLAND CSM Assessment (2015). Data available upon request
Supporting habitat: structure/ function	**Pollution**	Ensure supporting habitat is not at risk of effluent discharges from agricultural or fish farms from within the site's wider catchment	Native crayfish are particularly susceptible to pollution incidents, and the transfer of diseases from other sources	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				may be available from both organisations upon request
Supporting habitat: structure/ function	**River banks**	Maintain the full extent of bankside tree cover including their root systems	Habitat conditions for white-clawed crayfish vary naturally in rivers. Some river sections may provide optimal habitat whilst others may be largely unsuitable. Optimal conditions typically occur in relatively shallow, fast flowing reaches with coarse substrates. A characteristically diverse biotope mosaic allows the white-clawed crayfish and other species to move within the channel to locate optimal habitat conditions in the face of a fluctuating flow regime. Pools, exposed tree root systems and marginal shallows are important high-flow refugia for the species. Impounding structures in particular can have a dramatic effect on white-clawed crayfish habitat, generating heavy siltation and loss of the coarse substrates on which white-clawed crayfish depend.	
Supporting habitat: structure/ function	**River flow**	Ensure more than 90% of the naturalised daily mean flow remains in the river all year round	The natural flow regime both shapes and sustains characteristic biotope mosaics, affecting factors such as current velocities and bed hydraulics, water levels and depths, wetted area, temperature regime and dissolved oxygen regime, All parts of the natural flow regime are important, including flushing flows, seasonal baseflows and natural low flows. Natural seasonal flow recession is critical in supporting the full expression of supporting habitats (marginal and riparian vegetation, exposed riverine sediments, ephemeral headwaters). Any significant impacts on the natural flow regime should be rectified sustainably by reducing flow modifications, not by artificial augmentation, or by altering channel form to fit reduced levels of flow.	
Supporting habitat: structure/ function	**River morphology**	Restore the physical structure of the river channel and its banks in a natural state	To be considered in conjunction with supplementary advice for associated Annex I habitat features. Habitat conditions for white-clawed crayfish vary naturally in rivers. Some river sections may provide optimal habitat whilst others may be largely unsuitable. Optimal conditions typically occur in relatively shallow, fast flowing reaches with coarse substrates. A characteristically diverse biotope mosaic allows the white-clawed crayfish and other species to move within the channel to locate optimal habitat conditions in the face of a fluctuating	HOLDITCH (2003) RUSHBROOK (2013) RUSHBROOK *et al*. (2012)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			flow regime. Pools, exposed tree root systems and marginal shallows are important high-flow refugia for the species. Impounding structures in particular can have a dramatic effect on white-clawed crayfish habitat, generating heavy siltation and loss of coarse substrates on which white-clawed crayfish depend. A natural channel morphology provides a diversity of refuge and feeding opportunities for white-clawed crayfish. The proximity of different refuges facilitates foraging and the movement of individuals to different habitats with age. Operations that widen, deepen and/or straighten the channel reduce variations in habitat. Land-use change, the draining of lakes or ponds, and lowering or widening a stream or river bed can increase siltation and reduce water flow, resulting in a change in the channel flora and creating unsuitable conditions for crayfish. While they are known to occur in sections of river where the banks are poached by cattle, such activity can have an adverse effect on a population by increasing turbidity and decreasing dissolved oxygen concentrations as a result of sediment and excrement entering the water	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Adaptation and resilience**	Restore the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being high, taking into account the sensitivity, fragmentation, topography and management of its habitats and supporting habitats. This means that this site is considered to be the most vulnerable sites overall and are likely to require the most adaptation action, most urgently. A site based assessment should be carried out as a priority. This means that action to address specific issues is likely, such as reducing habitat fragmentation, creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species may be more or less	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360]. RUSHBROOK (2013) RUSHBROOK *et al*. (2012)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			vulnerable than their habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Air quality**	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	The supporting habitat of this feature is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition (including food-plants) and reducing supporting habitat quality and population viability of this feature. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	ENGLISH NATURE (2004), River Itchen SSSI, Views About Management NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Fish density**	Maintain fish populations at or to densities low enough to avoid significant predation of juvenile crayfish	Predatory fish species may include chub, eel, perch, pike and trout Fish stocking and transfers are a potential vector of crayfish plague. Fish should only be stocked from fish farms or other sources that are free of non-native crayfish or crayfish plague, or fish farms where suitable quarantine arrangements are in place. Excessively high densities of other fish species may cause unacceptably high predation pressure and competitive interactions.	NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water quantity/ quality**	Where the feature or its supporting habitat is dependent on surface water and/or groundwater restore water quality and quantity to a standard which provides the necessary conditions to support the feature Water quality data is found within the H3260 section of this document (Table 1.)	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed to reflect the ecological needs of the species feature. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan
Version Control Advice last updated: **16 March 2019** following stakeholder feedback explanatory notes for **Biological Connectivity** attribute revised to clarify need to balance biological connectivity with minimise risk of signal crayfish spreading upstream.				
Variations from national feature-framework of integrity-guidance: N/A				

Table 4: Supplementary Advice for Qualifying Features: S1096. *Lampetra planeri*; Brook lamprey

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	**Juvenile densities**	Restore juvenile densities at those expected under unimpacted conditions throughout the site, taking into account natural habitat conditions and allowing for natural fluctuations. A mean density of brook lamprey in suitable habitat of >5 m-2.	Impacts on physical, chemical or hydrological integrity, or from non-native species, may suppress juvenile densities.	JNCC, Common Standards Monitoring guidance for freshwater fauna (2015) NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND(2018) River Itchen Brook Lamprey survey and condition assessment
Population (of the feature)	**Population abundance**	Maintain the abundance of the population at a level which is close to that expected under unimpacted conditions throughout the site (subject to natural habitat conditions and allowing for natural fluctuations), whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent. As a minimum, brook lamprey should be present in not less than 50% of all sampling sites surveyed with suitable habitat present within the natural range. Where brook lamprey have been found in the past they should be present at 90% of sampling sites	This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally at least 10 years). The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level	NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND(2018) River Itchen Brook Lamprey survey and condition assessment

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		if suitable habitat remains	established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment. Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean counts or breeding surveys. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection. Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are the best available.	
Supporting habitat: extent and distribution	**Distribution of supporting habitat**	Restore the distribution and continuity of the feature and its supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for this feature and this may affect its viability.	
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Restore the total extent of the habitat(s) which support the H3260 feature to that characteristic of the natural fluvial processes associated with the river type	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate	NATURAL ENGLAND (2018) River Itchen Brook Lamprey survey and condition assessment

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			depending on the nature, age and accuracy of data collection, and subject to periodic review in light of improvements in data.	
Supporting habitat: structure/ function	**Biological connectivity**	See general advice for river habitat (H3260)	Lampreys can pass some potential barriers by attaching themselves to structures or river banks by their suctorial discs and creeping up by strong bursts of swimming. However, many in-channel structures are known to either completely or partially block access to historical spawning grounds. Whilst in-channel structures can artificially generate both siltbeds and clean gravels, both of value to lamprey species, this is not a justification for their continued existence or the construction of new structures. Suitable habitat for lamprey and other species can and should be generated by natural processes - where physical restoration of the channel is required this may involve changes in the distribution of species within the river system.	
Supporting habitat: structure/ function	**Biotope mosaic**	See general advice for river habitat (H3260)	Habitat conditions for lamprey species vary naturally in rivers. Some river sections may provide optimal habitat for some or all life stages whilst others may be largely unsuitable. Adult lamprey require spawning substrates of coarse material in which to deposit eggs in shallow scrapes (redds). Larval lamprey (ammocoetes) live in silt beds, which are often in channel margins but in relation to sea lamprey are known to occur in deep water in main river reaches. The advice for H3260 is based on natural river function, which provides a characteristic biotope mosaic that caters for lamprey life stages to a degree characteristic of the river.	
Supporting habitat: structure/ function	**Control of livestock grazing activity**	See general advice for river habitat (H3260)	Over-grazing of riparian areas can have a dramatic effect on lamprey habitat, trampling marginal siltbeds, eliminating marginal vegetation and generating excessive loads of fine sediment on spawning gravels. Ideally, grazing levels should be managed at low levels across whole riparian fields. Where this is not feasible, set-back fencing may be established with access provision for limited grazing within the riparian zone Particularly sensitive areas (e.g. exposed riverine sediments likely to support good invertebrate communities) may need to be fenced off to avoid any concentration of livestock activity, even if only present in	NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			low numbers. Close bankside fencing that excludes the development of a functional river corridor is not appropriate	
Supporting habitat: structure/ function	**Fisheries - exploitation**	All exploitation (e.g. netting or angling) of lamprey species should be undertaken sustainably without compromising any components of the population,	Controls on exploitation should include migratory passage within territorial waters, including estuarine and coastal net fisheries, as well as exploitation within the river. The Environment Agency do not consent netting of sea, brook or river lamprey on the River Itchen.	
Supporting habitat: structure/ function	**Fisheries - introduction of fish species**	Ensure fish stocking/introductions do not interfere with the ability of the river to support self-sustaining populations of the feature	The presence of artificially high densities of fish may create unacceptably high levels of predatory pressure on brook lamprey and ammocoetes of all species. The management aim is to provide conditions in the river that support a healthy, natural and self-sustaining salmon population, achieved through habitat protection/restoration and the control of exploitation as necessary. Stocking represents a loss of naturalness and, if successful, obscures the underlying causes of poor performance (potentially allowing these risks to perpetuate). It carries various ecological risks, including the loss of natural spawning from broodstock, competition between stocked and naturally produced individuals, disease introduction and genetic alterations to the population	
Supporting habitat: structure/ function	**Flow regime**	See general advice for river habitat (H3260).	The natural flow regime is critical to all aspects of lamprey life cycle. It shapes the characteristic biotope mosaic, maintains water in critical biotopes (including marginal siltbeds), and provides adequate flows for migratory passage (which is important not only for river and sea lamprey but also brook lamprey in its shorter distance migrations within the river).	
Supporting habitat: structure/ function	**Integrity of off-site habitats**	See general advice for river habitat (H3260)	Lamprey populations may be dependent on the integrity of sections of river channel, riparian areas and transitional and marine waters that lie outside of the site boundary. Headwater areas and tributaries may not fall within the site boundary, yet lamprey (particularly brook and river lamprey) may use these areas for spawning and juvenile development and be critical for sustaining populations within the site. River and sea lamprey require safe passage through coastal waters and estuaries.	
Supporting	**Riparian zone**	See general advice for river	Active marginal vegetation including riparian trees provides	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
habitat: structure/ function		habitat (H3260)	important habitat for lamprey ammocoetes, as it encourages and stabilises the formation of silt beds in which ammocoetes burrow. Riparian trees also add substrate diversity and aid the formation of siltbeds and clean gravels. They also provide temperature gradients in the channel that improves the availability of suitable micro-habitat.	
Supporting habitat: structure/ function	**Screening of intakes and discharges**	See general advice for river habitat (H3260)	Adult lamprey and migrating sub-adults (transformers) can be entrained in intakes and discharges along with other fish species.	
Supporting habitat: structure/ function	**Sediment regime**	See general advice for river habitat (H3260)	Natural levels of coarse sediment supply are critical to the maintenance of high quality spawning habitat for lamprey species, maintaining bed substrates in optimal condition for egg-laying and juvenile and adult cover. Excessive delivery of fine sediment, from the catchment or artificially enhanced bank erosion, can cause siltation of egg-laying sites and juvenile and adult refugia.	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request
Supporting habitat: structure/ function	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, within typical values for the supporting habitat	Soil supports basic ecosystem function and is a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with the supporting habitat of this Annex II feature. Spawning habitat comprises well-oxygenated gravel/pebble (1.5–11.0 cm diameter) dominated substrate of at least 10 cm depth and overlain by a range of water depths (0.2–1.5 m). River and sea lamprey typically spawn in deeper water than brook lamprey, but in larger reaches brook lamprey will also spawn in deep water. Elevated levels of fines (<0.83 mm diameter) can interfere with egg survival	MAITLAND (2003) NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request)
Supporting habitat: structure/ function	**Vegetation composition: invasive non-native species**	See general advice for river habitat (H3260)	Species such as signal crayfish can have a serious effect on lamprey habitat and may predate heavily on brook lamprey and ammoecoets of all lamprey species if present at high densities. Chinese mitten crab is also of concern, not only in the lower	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			reaches of main river but due to its potential to migrate long distances upstream.	
Supporting habitat: structure/ function	**Water quality - acidification**	See general advice for river habitat (H3260)	Brook lamprey may be affected by acidification in low alkalinity headwaters.	
Supporting habitat: structure/ function	**Water quality - nutrients**	Restore the natural nutrient regime of the rivers, with any anthropogenic enrichment above natural/background concentrations limited to levels at which adverse effects on the feature are unlikely. See information for H3260 feature in table 1.	Nutrient enrichment can lead to loss of substrate condition for spawning, egg development and ammocoete growth, due to benthic algal growth and associated enhanced siltation and sediment anoxia. Lamprey species may be affected by both episodic and chronic organic pollution. Episodic pollution causes direct mortalities whilst chronic pollution affects substrate condition through the build-up of excessive microbial populations.	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request MAITLAND (2003)
Supporting habitat: structure/ function	**Woody debris**	See general advice for river habitat (H3260)	Woody debris is an important component of river habitat for lampreys as well as the wider biological community. It encourages characteristic heterogeneity in biotopes, provides a mosaic of substrates types that lamprey species need to fulfil their life cycle.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Adaptation and resilience**	Restore the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being high, taking into account the sensitivity, fragmentation, topography and management of its habitats and supporting habitats. This means that this site is considered to be the most vulnerable sites overall and are likely to require the most adaptation action, most urgently. A site based assessment should be carried out as a priority. This means that action to address specific issues is likely, such as reducing habitat fragmentation, creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species may be more or less vulnerable than their habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable.	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360].

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Air quality**	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	The supporting habitat of this feature is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition (including food-plants) and reducing supporting habitat quality and population viability of this feature. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	ENGLISH NATURE (2004), River Itchen SSSI, Views About Management Natural England (2014), River Itchen SAC Site Improvement Plan (2018) River Itchen Brook Lamprey survey and condition assessment (Carcinus)
Supporting processes (on which the	**Water quantity/ quality**	Where the feature or its supporting habitat is dependent on surface water and/or	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical,	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
feature and/or its supporting habitat relies)		groundwater, restore water quality and quantity to a standard which provides the necessary conditions to support the feature Water quality data is found within the H3260 section of this document (Table 1)	especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed to reflect the ecological needs of the species feature. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.	Water Pollution Plan (2018). Data may be available from both organisations upon request NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan
Version Control Advice last updated: **16 March 2019** following stakeholder feedback; explanatory notes for **Fisheries – exploitation** updated to reflect status of netting within the River Itchen				
Variations from national feature-framework of integrity-guidance: N/A				

Table 5: Supplementary Advice for Qualifying Features: S1106. *Salmo salar*; Atlantic salmon

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	**Adult run size**	Restore the population to that expected under un-impacted conditions, allowing for natural fluctuations. This should include a seasonal pattern of migration characteristic of the river and maintenance of the multi-sea-winter component. Ensure that the stock exceeds its Conservation Limit in 4 out of 5 years The Conservation Limit indicates the minimum desirable adult spawning stock levels (expressed as annual number of eggs deposited) below which stocks should not be allowed to fall. Conservation limit for the River Itchen is considered to be 1.63 million eggs per year.	Impacts on physical, chemical or hydrological integrity, or from non-native species, or from exploitation in freshwater or marine and coastal waters, may suppress adult run size. Salmon stocking is not permitted on the River Itchen. To assess the status of the river's salmon stock the Environment Agency have developed salmon Conservation Limits (CLs). These limits indicate the minimum desirable adult spawning stock levels (expressed as annual number of eggs deposited) below which stocks should not be allowed to fall. Annual egg deposition is calculated based on Returning Stock Estimates (RSE) from fish counters located in the lower reaches of the Rivers Test and Itchen. The Conservation Limit is set at a stock size below which further reductions in spawning numbers are likely to result in reductions in the number of juvenile fish produced in the next generation. Therefore, if the stock for a particular river is already performing below its CL, any further reductions in adult spawners would be expected to result in a direct reduction in juvenile production. This is because the river is already below its carrying capacity for juvenile salmon and therefore changes in the number of spawning fish directly influence recruitment to the next generation. Each individual salmon river's annual performance is expressed as a percentage of its meeting the CL, with 100% being at the CL. Stock on each river should exceed its Conservation Limit in 4 out of 5 years. To ensure that this happens a stock Management Target (MT) has also been set which is approximately 35% higher than the Conservation Limit. The Management Target is an aspirational target that fishery managers should aim to achieve to ensure that the stock has the best possible opportunity to meet the objectives.	Environment Agency (2017): Solent and South Downs: Fish Monitoring report 2017 Environment Agency (2019) Information on salmon conservation limits. EA *pers comm.*

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			The salmon egg conservation limit on the River Itchen is 1.63 million eggs per year, the egg management target is 1.97million eggs per year. Between 1990 and 2018 the Salmon egg conservation limit on the River Itchen was exceeded in only 2010, 2014 and 2015. In most years less than 50% of salmon egg conservation limit target was reached	
Population (of the feature)	**Juvenile densities**	Restore juvenile densities at those expected under unimpacted conditions throughout the site, taking into account natural habitat conditions and allowing for natural fluctuations	Impacts on physical, chemical or hydrological integrity, or from non-native species, or from exploitation of spawning adults in freshwater or marine and coastal waters, may suppress juvenile densities.	JNCC, Common Standards Monitoring guidance for freshwater fauna (2015) Environment Agency (2017): Solent and South Downs: Fish Monitoring report 2017
Population (of the feature)	**Spawning distribution**	Restore the distribution of spawning to reflect unimpacted conditions through the site, and avoid reductions in existing levels.	After a year or more at sea, adult salmon return from their feeding grounds back to their river. Once it is time for them to spawn they will migrate upstream to the areas of the SAC where they were born to spawn themselves. These spawning areas may be in small tributaries of river systems where there is clean gravel and a good flow of fresh clean water. Maintaining these spawning areas is critical to the successful reproduction and long-term viability of this feature.	Environment Agency (2017): Solent and South Downs: Fish Monitoring report 2017
Supporting habitat: extent and distribution	**Distribution of supporting habitat**	Restore the distribution and continuity of the feature and its supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for this feature and this may affect its viability.	Environment Agency (2017): Solent and South Downs: Fish Monitoring report 2017

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat: extent and distribution	**Extent of supporting habitat**	[Maintain OR Restore] the total extent of the habitat(s) which support the H3260 feature to that characteristic of the natural fluvial processes associated with the river type	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data.	
Supporting habitat: structure/ function	**Biological connectivity**	See general advice for river habitat (H3260)	Freedom of movement throughout the river system is critical to all life stages of salmon. Barriers to adult migration have cumulative effects on the ability of individuals to reach spawning grounds and need to be considered in combination.	
Supporting habitat: structure/ function	**Biotope mosaic**	See general advice for river habitat (H3260)	Within the river, a characteristic habitat mosaic shaped by natural processes provides the diversity of water depths, current velocities and substrate types necessary to fulfil the spawning, juvenile, adult and migratory requirements of salmon as well as other characteristic species. Some river sections will be naturally sub-optimal for some salmon life stages, and this is just a characteristic of the river. The species requires adult holding areas (generally pools of at least 150 cm depth, with cover from features such as undercut banks, vegetation, submerged objects and surface turbulence), spawning habitat (stable, clean gravel/pebble-dominated substrate without an armoured layer and with <10% fines in the top 30cm, and with 15-75cm of overlying water), nursery habitat (for fry, water of <20 cm deep and a gravel/ pebble/ cobble substrate; for parr, water 20-40 cm deep and similar substrate). Close juxta position of biotopes is needed to allow easy movement of individuals between suitable areas of the channel under different flow conditions and with age.	
Supporting habitat: structure/ function	**Flow regime**	See general advice for river habitat (H3260).	The natural flow regime is critical to all aspects of the salmon life cycle, including migratory passage through the estuary and up the river to spawning grounds, egg incubation in redds, fry and parr habitat quality and extent, and downstream smolt migration.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat: structure/ function	**Riparian zone**	See general advice for river habitat (H3260)	High riparian tree cover is beneficial to salmon, in terms of physical habitat provision and combatting increasing temperatures caused by climate change. However, the extent of tree cover needs to be optimised to provide suitable conditions for the whole characteristic biological community.	
Supporting habitat: structure/ function	**Sediment regime**	See general advice for river habitat (H3260)	Natural levels of coarse sediment supply are critical to the maintenance of high quality juvenile and salmon habitat, maintaining spawning gravels and characteristic biotope mosaics. Excessive delivery of fine sediment, from the catchment or artificially enhanced bank erosion, can damage gills, impair vision and cause siltation of spawning and nursery areas. Siltation within and on top of coarse beds is a major threat to salmon within the River Itchen, preventing the flow of dissolved oxygen to eggs and prevent the movement of waste products from redds. In addition, elevated levels of suspended solids can clog the respiratory structures.	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request)
Supporting habitat: structure/ function	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, within typical values for the supporting habitat	Soil supports basic ecosystem function and is a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with the supporting habitat of this Annex II feature.	
Supporting habitat: structure/ function	**Thermal regime**	See general advice for river habitat (H3260)	Water temperature can affect egg development, fish survival, feeding and growth. The salmon is considered particularly vulnerable to increasing temperatures in the southern part of its English range, most notably in chalk streams.	
Supporting habitat: structure/ function	**Vegetation composition: invasive non-native species**	See general advice for river habitat (H3260)	Species such as signal crayfish can have a serious effect on salmon habitat and can predate heavily on salmon juveniles if present at high densities. Chinese mitten crab has the potential to migrate long distances up rivers and damage marginal habitats used by both adult and juvenile salmon.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat: structure/ function	**Water quality - acidification**	See general advice for river habitat (H3260)	Salmon are highly sensitive to acidification stress.	
Supporting habitat: structure/ function	**Water quality - nutrients**	Restore the natural nutrient regime of the rivers, with any anthropogenic enrichment above natural/background concentrations limited to levels at which adverse effects on the feature are unlikely. See information for H3260 feature in table 1.	In addition to the wider ecosystem effects of eutrophication that have a detrimental effect on salmon habitat, enrichment can place salmon at a competitive disadvantage, for instance relative to brown trout. Salmon are efficient foragers that are adapted to low productivity environments, and increased productivity makes efficient foraging obsolete. Eutrophication and episodic pollution causes direct mortalities, whilst chronic pollution affects substrate condition through the build-up of excessive microbial populations. Salmon are particularly sensitive to reduce dissolved oxygen levels, in the water column and within the gravel substrate of spawning redds (nests).	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request
Supporting habitat: structure/ function	**Woody debris**	See general advice for river habitat (H3260)	Woody debris is an important component of river habitat for salmon as well as the wider biological community.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Adaptation and resilience**	Restore the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being high, taking into account the sensitivity, fragmentation, topography and management of its habitats and supporting habitats. This means that this site is considered to be the most vulnerable sites overall and are likely to require the most adaptation action, most urgently. A site based assessment should be carried out as a priority. Actions to address specific issues may include removing barriers to fish passes, appropriate tree planting, provision of protective screening on intakes and discharges, and addressing particular management and condition issues. Individual species may be more or less vulnerable than their habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable.	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360].

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Air quality**	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	The supporting habitat of this feature is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition (including food-plants) and reducing supporting habitat quality and population viability of this feature. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	ENGLISH NATURE (2004), River Itchen SSSI, Views About Management NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan Environment Agency (2017): Solent and South Downs: Fish Monitoring report 2017
Supporting processes	**Control of livestock**	See general advice for river habitat (H3260)	Over-grazing of riparian areas can have a dramatic effect on salmon habitat.	NATURAL ENGLAND (2018) Definition of Favourable

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(on which the feature and/or its supporting habitat relies)	**grazing activity**		Ideally, grazing levels should be managed at low levels across whole riparian fields. Where this is not feasible, set-back fencing may be established with access provision for limited grazing within the riparian zone Particularly sensitive areas (e.g. exposed riverine sediments likely to support good invertebrate communities) may need to be fenced off to avoid any concentration of livestock activity, even if only present in low numbers. Close bankside fencing that excludes the development of a functional river corridor is not appropriate	Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan
Supporting processes (on which the feature and/or its supporting habitat relies)	**Fisheries - exploitation**	Ensure exploitation (e.g. netting or angling) of Atlantic salmon is undertaken sustainably without compromising any components of the population, including multi-sea winter fish and seasonal components of the adult run.	Controls on exploitation should include migratory passage within territorial waters, including estuarine and coastal net fisheries, as well as exploitation within the river from rod fisheries. Salmon fishing on the River Itchen is undertaken on a zero exploitation basis, e.g. catch and return; however there may be unintentional mortality to individual fish as a consequence of catch and release.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Fisheries - introduction of fish species**	Ensure fish stocking/introductions do not interfere with the ability of the river to support self-sustaining populations of the feature	The presence of artificially high densities of other fish creates unacceptably high levels of predatory and competitive pressure on juvenile salmon. The management aim is to provide conditions in the river that support a healthy, natural and self-sustaining salmon population, achieved through habitat protection/restoration and the control of exploitation as necessary. Stocking represents a loss of naturalness and, if successful, obscures the underlying causes of poor performance (potentially allowing these risks to perpetuate). It carries various ecological risks, including the loss of natural spawning from broodstock, competition between stocked and naturally produced individuals, disease introduction and genetic alterations to the population.	
Supporting processes (on which the feature and/or its supporting	**Fisheries - introduction of salmon**	Ensure fish stocking/introductions do not interfere with the ability of the river to support self-sustaining populations of the feature	The management aim is to provide conditions in the river that support a healthy, natural and self-sustaining salmon population, achieved through habitat protection/restoration and the control of exploitation as necessary.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
habitat relies)			Stocking represents a loss of naturalness and, if successful, obscures the underlying causes of poor performance (potentially allowing these risks to perpetuate). It carries various ecological risks, including the loss of natural spawning from broodstock, competition between stocked and naturally produced individuals, disease introduction and genetic alterations to the population No stocking of salmon should take place within the River Itchen to maintain the genetic integrity of the species.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Integrity of off-site habitats**	See general advice for river habitat (H3260)	Salmon populations are dependent on the integrity of sections of river channel, riparian areas, and transitional and marine waters that lie outside of the site boundary. Headwater areas and tributaries may not fall within the site boundary, yet salmon may use these areas for spawning and juvenile development and be critical for sustaining populations within the site. Fully developed riparian zones are essential for salmon habitat, yet part of this zone may lie outside of the site boundary, particularly if the river channel is operating under natural processes and moves laterally over time within the floodplain. The conditions experienced by salmon on their marine migration (through the saline transition zone, estuary, coastal waters and into the high seas) are critical to the well-being of populations within the river, and vice versa.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Screening of intakes and discharges**	See general advice for river habitat (H3260)	Salmon can be seriously affected by inadequate screening on their adult and smolt migrations, as well as on their smaller juvenile dispersion movements between spawning grounds and nursery areas.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Vegetation structure: cover of submerged macrophytes**	See general advice for river habitat (H3260)	In rivers where it naturally occurs, submerged and marginal vegetation is an important element of juvenile salmon habitat.	
Supporting	**Water**	Where the feature or its	For many SAC features which are dependent on wetland	Environment Agency &

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
processes (on which the feature and/or its supporting habitat relies)	**quantity/ quality**	supporting habitat is dependent on surface water and/or groundwater restore water quality and quantity to a standard which provides the necessary conditions to support the feature Water quality data is found within the H3260 section of this document (Table 1.)	habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed to reflect the ecological needs of the species feature. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.	NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan
Version Control Advice last updated: **16 March 2019** following stakeholder feedback. Target and explanatory notes for **Adult run size** revised to provide more detail and clarity; additional information added to explanatory notes for **Adaptation & Resilience** to provide clarity on how salmon may be impacted; clarity on status of exploitation of salmon on River Itchen added to **Fisheries – exploitation** explanatory notes; explanatory notes for **Fisheries – introduction of salmon** attribute updated to reflect current status of stocking within the SAC.				
Variations from national feature-framework of integrity-guidance: N/A				

Table 6: Supplementary Advice for Qualifying Features: S1163. *Cottus gobio*; Bullhead

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	**Juvenile densities**	Maintain juvenile densities at those expected under unimpacted conditions throughout the site, taking into account natural habitat conditions and allowing for natural fluctuations	Impacts on physical, chemical or hydrological integrity, or from non-native species, may suppress juvenile densities.	JNCC, Common Standards Monitoring guidance for freshwater fauna (2015) NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request)
Population (of the feature)	**Population abundance**	Maintain the abundance of the population at a density which is close to that expected under unimpacted conditions throughout the site (subject to natural habitat conditions and allowing for natural fluctuations), whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent. Adult population densities should be no less than 0.5 m-2 in lowland rivers (source altitude ≤100m).	This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally at least 10 years). The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is	NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) Data may be available from Natural England upon request and population survey data from the Environment Agency upon request

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment. Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean counts or breeding surveys. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection. Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are the best available.	
Supporting habitat: extent and distribution	**Distribution of supporting habitat**	Restore the distribution and continuity of the feature and its supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for this feature and this may affect its viability.	NATURAL ENGLAND (2015). CSM Assessment Data available upon request
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Restore the extent of the habitats which support the H3260 feature to that characteristic of the natural fluvial processes associated with the river type	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat: structure/ function	**Flow regime**	See general advice for river habitat (H3260).	The natural flow regime is critical to all aspects of the bullhead life cycle, maintaining the high current velocities and substrate conditions that are optimal for the species.	
Supporting habitat: structure/ function	**Integrity of off-site habitats**	See general advice for river habitat (H3260)	Bullhead populations within the SAC may be dependent on the integrity of sections of river channel and riparian areas that lie outside of the site boundary. Headwater areas and tributaries may not fall within the site boundary, yet bullhead may use these areas for spawning and juvenile development and be critical for sustaining populations within the site.	
Supporting habitat: structure/ function	**Riparian zone**	See general advice for river habitat (H3260)	Active marginal vegetation including riparian trees provides important cover for bullhead. A mosaic of vegetation types and sward heights provides suitable conditions for the whole characteristic biological community including bullhead.	
Supporting habitat: structure/ function	**Screening of intakes and discharges**	See general advice for river habitat (H3260)	Bullhead can be entrained in intakes and discharges along with other fish species.	
Supporting habitat: structure/ function	**Sediment regime**	See general advice for river habitat (H3260)	Natural levels of coarse sediment supply are critical to the maintenance of high quality bullhead habitat, maintaining bed substrates in optimal condition for egg-laying and juvenile and adult cover. Excessive delivery of fine sediment, from the catchment or artificially enhanced bank erosion, can cause siltation of egg-laying sites and juvenile and adult refugia.	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request
Supporting habitat: structure/ function	**Soils, substrate and nutrient cycling**	Restore the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, within typical values for the supporting habitat	Soil supports basic ecosystem function and is a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with the supporting habitat of this Annex II feature.	
Supporting habitat: structure/ function	**Vegetation composition: invasive non-native species**	See general advice for river habitat (H3260)	Species such as signal crayfish can have a serious effect on bullhead habitat (by destabilising banks and enhancing fine sediment input), and can predate heavily on bullhead if present at high densities. Chinese mitten crab has the potential to migrate long distances up rivers and can cause similar damage	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			to bullhead habitat.	
Supporting habitat: structure/ function	**Vegetation structure: cover of submerged macrophytes**	See general advice for river habitat (H3260)	In rivers where it naturally occurs, submerged and marginal vegetation can provide important cover for bullhead, particularly if coarse (cobble) substrates are in short supply for cover.	
Supporting habitat: structure/ function	**Water quality - acidification**	See general advice for river habitat (H3260)	The bullhead is susceptible to acidification stress in low alkalinity waters.	
Supporting habitat: structure/ function	**Water quality - nutrients**	Restore the natural nutrient regime of the river s, with any anthropogenic enrichment above natural/background concentrations limited to levels at which adverse effects on the feature are unlikely. See information for H3260 feature in table 1.	Nutrient enrichment can lead to loss of substrate condition for bullhead due to benthic algal growth and associated enhanced siltation. The bullhead is susceptible to both episodic and chronic organic pollution. Episodic pollution causes direct mortalities whilst chronic pollution affects substrate condition through the build-up of excessive microbial populations.	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request
Supporting habitat: structure/ function	**Woody debris**	See general advice for river habitat (H3260)	Woody debris is an important component of river habitat for bullhead as well as the wider biological community. Bullheads are particularly associated with woody debris in lowland reaches, where it is likely that it provides an alternative source of cover from predators and floods. It may also be used as an alternative spawning substrate.	
Supporting habitat: structure/ function	**Biological connectivity**	See general advice for river habitat (H3260)	Vertical drops of >18-20 cm are sufficient to prevent upstream movement of adult bullheads. They will therefore prevent recolonisation of upper reaches affected by lethal pollution episodes or drought, and more generally will also lead to constraints on genetic interactions that may have adverse consequences.	
Supporting habitat: structure/ function	**Biotope mosaic**	See general advice for river habitat (H3260)	Habitat conditions for bullhead vary naturally in rivers. Some river sections may provide optimal habitat whilst others may be largely unsuitable. Optimal conditions typically occur in relatively shallow, fast flowing reaches with coarse substrates (used for egg-laying and juvenile/adult cover). A characteristically diverse biotope mosaic allows the bullhead	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			and other species to move within the channel to locate optimal habitat conditions in the face of a fluctuating flow regime. Pools, exposed tree root systems and marginal shallows are important high-flow refugia for the species. The advice for H3260 is based on natural river function, which provides a characteristic biotope mosaic that caters for bullhead to a degree characteristic of the river.	
Supporting habitat: structure/ function	**Control of livestock grazing activity**	See general advice for river habitat (H3260)	Over-grazing of riparian areas can have a dramatic effect on bullhead habitat, eliminating marginal habitat and generating excessive loads of fine sediment. Ideally, grazing levels should be managed at low levels across whole riparian fields. Where this is not feasible, set-back fencing may be established with access provision for limited grazing within the riparian zone Particularly sensitive areas (e.g. exposed riverine sediments likely to support good invertebrate communities) may need to be fenced off to avoid any concentration of livestock activity, even if only present in low numbers. Close bankside fencing that excludes the development of a functional river corridor is not appropriate	NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan
Supporting habitat: structure/ function	**Fisheries - introduction of fish species**	Ensure fish stocking/ introductions do not interfere with the ability of the river to support self-sustaining populations of the feature	The presence of artificially high densities of fish can creates unacceptably high levels of predatory pressure on bullhead. The management aim is to provide conditions in the river that support a healthy, natural and self-sustaining salmon population, achieved through habitat protection/restoration and the control of exploitation as necessary. Stocking represents a loss of naturalness and, if successful, obscures the underlying causes of poor performance (potentially allowing these risks to perpetuate). It carries various ecological risks, including the loss of natural spawning from broodstock, competition between stocked and naturally produced individuals, disease introduction and genetic alterations to the population	
Supporting processes (on which the feature and/or its supporting	**Adaptation and resilience**	Restore the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being high, taking into account the sensitivity, fragmentation, topography and management of its habitats and supporting habitats. This means that this site is considered to be the most vulnerable	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
habitat relies)			sites overall and are likely to require the most adaptation action, most urgently. A site based assessment should be carried out as a priority. This means that action to address specific issues is likely, such as reducing habitat fragmentation, creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species may be more or less vulnerable than their habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable.	SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360].
Supporting processes (on which the feature and/or its supporting habitat relies)	**Air quality**	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	The supporting habitat of this feature is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition (including food-plants) and reducing supporting habitat quality and population viability of this feature. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting processes (on which the	**Conservation measures**	Restore the management measures (either within and/or outside the site boundary as	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site	ENGLISH NATURE (2004), River Itchen SSSI, Views About Management

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
feature and/or its supporting habitat relies)		appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan NATURAL ENGLAND (2015). CSM Assessment Data available upon request
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water quantity/ quality**	Where the feature or its supporting habitat is dependent on surface water and/or groundwater, restore water quality and quantity to a standard which provides the necessary conditions to support the feature Water quality data is found within the H3260 section of this document (Table 1)	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed to reflect the ecological needs of the species feature. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 7: Supplementary Advice for Qualifying Features: S1355. *Lutra lutra*; Otter

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	**Anthropogenic mortality**	Reduce levels of mortality as a result of anthropogenic (man-made) factors so that they are not adversely affecting the overall abundance and viability of the population.	High numbers of otter casualties within or adjacent to SAC catchments will adversely affect the condition and viability of the population and mitigation measures should be initiated as quickly as possible. Causes of mortality may include roads, accidents with fishing equipment (nets, lobster creels), poisoning, pollutants, hunting and acidification/contamination of water courses (which reduces fish populations). It should be noted that otters are also a European protected species, and that it is an offence to deliberately disturb, capture, injure or kill an otter.	
Population (of the feature)	**Population abundance**	Restore the continued presence of an actively-breeding otter population within the SAC, whilst avoiding deterioration from current levels as indicated by the latest mean peak count, estimate or equivalent.	This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally at least 10 years). The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment. For otters, it is difficult to estimate population size. It could be assumed that where there is a high frequency of positive signs in an area, such as a large number of spraints (of several ages), that otters are likely to be occupying the site. Breeding will be indicated by the presence of natal dens, cub sightings and intensive otter activity (e.g. feeding, sprainting, pathways through vegetation). DNA analysis of spraints is now being used as a technique for identifying otters.	
Supporting habitat: extent and distribution	**Distribution of supporting habitat**	Restore the distribution and continuity of the feature and its supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for this feature and this may affect its viability.	NATURAL ENGLAND (2015). CSM Assessment Data available upon request
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Restore the total extent of the habitat(s) which support the H3260 feature to that characteristic of the natural fluvial processes associated with the river type Wet woodland 69.57ha Lowland neutral grassland and Fen meadow 97.35	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Swamp, reed-beds and tall-herb fen 145.75ha		
Supporting habitat: structure/ function	**Abundance of breeding and resting places**	Restore an abundance of natural breeding and resting sites within the site	It should be noted that otters are highly mobile and are likely to spend their time within wider territories, where designated sites only form a proportion of their range and make a contribution to their wider requirements. Otters are a European protected species, and it is an offence to disturb their resting places. Otters will often use many holts at any one time. They may give birth in one, but raise their young in another. Important features of a successful breeding site are the availability of food, limited disturbance and safety from the risk of flooding. It is important to consider the whole site and not just the known holts as appropriate management will influence all of these factors. Some natal den structures have a limited lifespan (e.g. hollow tree trunks, piles of timber etc.) and if alternative opportunities for natal dens are limited, suitable replacements can be created or constructed. Maintaining dense bank vegetation, areas of reed etc. will ensure that there are suitable areas for resting couches.	
Supporting habitat: structure/ function	**Availability of refugia**	Restore an abundance of dense bankside vegetation to limit significant disturbance to animals	For rivers, most of the floodplain is outside the boundary of the site, yet the integrity of the interest feature will often be dependent upon the quality of the adjacent habitat out with the boundary of the site. This is likely to be the case where bankside vegetation may be an important barrier to disturbing activity but may lie adjacent to and outside the boundary. Nevertheless it will be important to maintain, or in some cases, to restore dense bankside cover.	
Supporting habitat: structure/ function	**Food availability**	Restore fish biomass within expected natural levels for the supporting habitat (subject to natural fluctuations).	In freshwater, key fish prey sources for otters include eels, salmonids, roach and sticklebacks. Frogs can also form an important part of the diet, depending on the habitat and time of year. Crayfish and water beetles may also form part of the diet, as well as an occasional waterbird (young coots, moorhens, ducks) or mammal (rabbits, water voles - although this is uncommon). The diet of coastal otters may include eelpout, rockling,	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			butterfish, lumpsuckers and an occasional crab. The diet of otters varies depending on the availability of prey, which in turn varies with the time of year. There should be a diverse range of food sources available throughout the year, within the normal expectations of each particular water course. It should be noted however, that otters may take prey from adjacent fisheries which are stocked to an artificially high level, especially where there are numerous stocked gravel pits on a floodplain. This can lead to artificially high prey densities adjacent to European sites, which might be expected to, in turn, result in artificially high densities of otter on the designated sites. This highlights the importance of biosecurity around stocked fisheries, and if implemented at all artificial still water fisheries on a floodplain might result in a legitimate reduction in otter density.	
Supporting habitat: structure/ function	**Habitat quality - river habitat**	Restore the quality of supporting river habitat features, based on the advice for H3260 habitat, based on natural river function, which provides a characteristic biotope mosaic that caters for otters.	Dense bank vegetation, marshes and reedbeds are important for otters, but they will use a long stretch of river and this won't necessarily fall within a protected site. Dense bank vegetation and reedbeds are favoured as resting areas, but otters will often travel some distance to a preferred 'couch' and this will not necessarily be along the edge of the river. The structure and quality of bankside vegetation, reedbeds and other nearby habitats should be maintained, particularly where there is evidence of use by otters. However, it is thought that the most significant determinant of otter usage of a habitat is the abundance of prey (Kruuk *et al*., 1998)	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request
Supporting habitat: structure/ function	**Habitat quality - waterway habitat**	Restore the quality of supporting waterways habitat features. Otters occur in and near the River Itchen with suitable cover. Optimal habitat includes the river, streams and areas of marginal vegetation with secure lying-up places and breeding sites and good fish populations	Smaller tributaries of larger river systems (streams, becks etc.) are extremely important for otters and have been shown to have been used more frequently by otters than larger rivers (Kruuk *et al*., 1993). This is thought to be in part due to differences in fish density and preference for hunting in shallow water with areas of riffles and boulders.	NATURAL ENGLAND (2015). CSM Assessment Data available upon request

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat: structure/ function	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, within typical values for the supporting habitat	Soil supports basic ecosystem function and is a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with the supporting habitat of this Annex II feature.	
Supporting habitat: structure/ function	**Water flow**	Restore the natural flow regime of the river to that close to what would be expected in the absence of abstractions and discharges (the 'naturalised' flow).	Permanent or long-lasting reductions in flow may affect the availability and diversity of prey. This could lead to otters moving into new areas, increasing the likelihood of conflict with other otters. This may also alter they prey targeted by otters as they may hunt for low-preference food such as birds, rabbits, fish carrion or for frogs, depending on the time of year.	
Supporting habitat: structure/ function	**Water quality/quantity**	Restore water quality and quantity to a standard which provides the necessary conditions to support the feature Water quality data is found within the H3260 section of this document (Table 1)	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing and feeding habitats. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the SAC Conservation Objectives but in some cases more stringent standards may be needed to support the SAC feature. Further site-specific investigations may be required to establish appropriate standards for the SAC. The main impact of water chemistry on this feature is its effect on the food supply. For example, moderate levels of levels of eutrophication may increase certain fish populations, but excessive eutrophication can be detrimental. Excessive acidity in watercourses may also affect fish populations. Impacts from toxic pollutants can be devastating and were the major cause of otter population declines in the 50s, 60s and 70s.	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Adaptation and resilience**	Restore the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being high, taking into account the sensitivity, fragmentation, topography and management of its habitats and supporting habitats. This means that this site is considered to be the most vulnerable sites overall and are likely to require the most adaptation action, most urgently. A site based assessment should be carried out as a priority. This means that action to address specific issues is likely, such as reducing habitat fragmentation, creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species may be more or less vulnerable than their habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable.	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360].
Supporting processes (on which the feature and/or its supporting habitat relies)	**Air quality**	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	The supporting habitat of this feature is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition (including food-plants) and reducing supporting habitat quality and population viability of this feature. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			measures to tackle diffuse air pollution, within realistic timescales.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Connectivity within and to the site**	Ensure there are no significant artificial barriers to the safe passage and movement of otters into, within and away from the site	Barriers such as roads, weirs etc. can generally increase the risk of harm to animals as they traverse or avoid them. If these barriers are considered a problem then mitigating measures could be taken. Otter populations within the SAC are dependent on the integrity of sections of river channel, riparian areas, freshwater still-waters, floodplains and transitional and marine waters that lie outside of the site boundary. Headwater areas and tributaries may not fall within the site boundary, yet otters may use these areas for feeding and these will be critical for sustaining populations within the site. Boundaries to river SACs often follow the first break of slope on the bank, with the result that much of the riparian habitat will lie outside the SAC, particularly if the river channel is operating under natural processes and moves laterally over time within the floodplain. It is possible that holts of otters that form part of the population for a SAC may lie on the adjacent floodplain out with the boundary of the SAC.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Restore he management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	ENGLISH NATURE (2004), River Itchen SSSI, Views About Management NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water quality : Toxic chemicals**	Avoid the presence of pollutants affecting the site, which are potentially toxic to otters.	The major cause of the decline in otter populations in the 60s and 70s was toxic chemicals such as dieldrin and related pesticides. Contaminants that might have an effect on otters may have an indirect effect (e.g. on food supply - organic pollution, eutrophication, acidification from mine waste and acid rain), a mainly direct effect (e.g. oil spillage, radioactivity) or	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			effects of bioaccumulation (e.g. metals, especially mercury, cadmium and lead; pesticides and PCBs). PCBs, organo-chlorine pesticides and heavy metals all being seen as detrimental to otters, although the use of many of these is now banned.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Water quantity/quality**	Where the feature or its supporting habitat is dependent on surface water and/or groundwater, restore water quality and quantity to a standard which provides the necessary conditions to support the feature Water quality data is found within the H3260 section of this document (Table 1)	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed to reflect the ecological needs of the species feature. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.	Environment Agency & NATURAL ENGLAND, Test and Itchen and Alresford Pond Diffuse Water Pollution Plan (2018). Data may be available from both organisations upon request NATURAL ENGLAND (2018) Definition of Favourable Condition - River Itchen SSSI (Available from Natural England on request) NATURAL ENGLAND (2014), River Itchen SAC Site Improvement Plan
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: Attributes relating to coastal habitats have been removed as this is a river based site.				

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Appendix 5

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Emer Bog
Unitary Authority/County:	Hampshire
SAC status:	Designated on 1 April 2005
Grid reference:	SU394214
SAC EU code:	UK0030147
Area (ha):	37.50
Component SSSI:	Baddesley Common SSSI

Site description:
Emer Bog is an excellent example of an ungrazed valley bog with a rich flora and fauna which includes most typical bog species. The main elements of the bog vegetation include tall stands of common reed *Phragmites australis* and a shorter mixed association of sedges, especially white sedge *Carex curta*, bottle sedge *C. rostrata* and star sedge *C. echinata*, with notable quantities of marsh cinquefoil *Potentilla palustris* and bogbean *Menyanthes trifoliata*, together with marsh violet *Viola palustris* and southern marsh-orchid *Dactylorhiza praetermissa*. The bog grades downstream into mature alder carr and upstream into heathland, heavily invaded with pine, birch and scrub.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Transition mires and quaking bogs. (Very wet mires often identified by an unstable 'quaking' surface)

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030147
Date of registration: 14 June 2005
Signed: Trevor Salmon
On behalf of the Secretary of State for Environment, Food and Rural Affairs

European Site Conservation Objectives for Emer Bog Special Area of Conservation Site Code: UK0030147

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of the qualifying natural habitat**
- **The structure and function (including typical species) of the qualifying natural habitat, and,**
- **The supporting processes on which the qualifying natural habitat rely**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H7140. Transition mires and quaking bogs; Very wet mires often identified by an unstable `quaking` surface

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the “Habitats Regulations”). They must be considered when a competent authority is required to make a ‘Habitats Regulations Assessment’, including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term ‘favourable conservation status’ is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

European Site Conservation Objectives: Supplementary advice on conserving and restoring site features

Emer Bog Special Area of Conservation (SAC)
Site Code: UK0030147

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Date of Publication: 11 February 2019

About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Emer Bog SAC.

This advice should therefore be read together with the SAC Conservation Objectives available here.

You should use the Conservation Objectives, this Supplementary Advice and any case-specific advice given by Natural England, when developing, proposing or assessing an activity, plan or project that may affect this site.

This Supplementary Advice to the Conservation Objectives presents attributes which are ecological characteristics of the designated species and habitats within a site. The listed attributes are considered to be those that best describe the site's ecological integrity and which, if safeguarded, will enable achievement of the Conservation Objectives. Each attribute has a target which is either quantified or qualitative depending on the available evidence. The target identifies as far as possible the desired state to be achieved for the attribute.

The tables provided below bring together the findings of the best available scientific evidence relating to the site's qualifying features, which may be updated or supplemented in further publications from Natural England and other sources. The local evidence used in preparing this supplementary advice has been cited. The references to the national evidence used are available on request. Where evidence and references have not been indicated, Natural England has applied ecological knowledge and expert judgement. You may decide to use other additional sources of information.

In many cases, the attribute targets shown in the tables indicate whether the current objective is to 'maintain' or 'restore' the attribute. This is based on the best available information, including that gathered during monitoring of the feature's current condition. As new information on feature condition becomes available, this will be added so that the advice remains up to date.

The targets given for each attribute do not represent thresholds to assess the significance of any given impact in Habitats Regulations Assessments. You will need to assess this on a case-by-case basis using the most current information available.

Some, but not all, of these attributes can also be used for regular monitoring of the actual condition of the designated features. The attributes selected for monitoring the features, and the standards used to assess their condition, are listed in separate monitoring documents, which will be available from Natural England.

These tables do not give advice about SSSI features or other legally protected species which may also be present within the European Site.

If you have any comments or queries about this Supplementary Advice document please contact your local Natural England adviser or email HDIRConservationObjectivesNE@naturalengland.org.uk

About this site

European Site information

Name of European Site	Emer Bog Special Area of Conservation (SAC)
Location	Hampshire
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	1 April 2005
Qualifying Features	See section below
Designation Area	37.50 ha
Designation Changes	Not applicable
Feature Condition Status	Details of the feature condition assessments made at this site can be found using Natural England's Designated Sites System
Names of component Sites of Special Scientific Interest (SSSIs)	Baddesley Common SSSI. A small (c.1.5 ha) section on the southern edge of the SSSI is not part of the SAC.
Relationship with other European or International Site designations	None

Site background and geography

The site comprises an extensive valley bog together with associated damp acidic grassland, heathland and developing woodland over Bracklesham Beds in the Hampshire Basin. Emer Bog SAC is part of the South Hampshire Lowlands National Character Area (NCA 128).

Emer Bog is an excellent example of a valley bog with a rich flora and fauna which includes most typical bog species. The main elements of the bog vegetation include a mixed association of sedges, especially white sedge *Carex curta*, bottle sedge *C. rostrata* and star sedge *C. echinata*, with notable quantities of marsh cinquefoil *Comarum palustris* and bogbean *Menyanthes trifoliata*, together with marsh violet *Viola palustris* and southern marsh-orchid *Dactylorhiza praetermissa*. The bog grades downstream into mature alder carr and upstream into heathland.

Emer Bog is not only unique in Hampshire, but unparalleled in lowland England as an example of a young ologotrophic /mesotrophic basin mire.

The invertebrate fauna of the bog and heath is of considerable interest and a very wide range of moths have been recorded.

To the south and west of Emer Bog, the site includes remnants of former common land, now acidic grassland dominated by purple Moor-grass *Molinia caerulea*, but with a rich flora, including petty whin *Genista anglica*, dwarf gorse *Ulex minor*, meadow thistle *Cirsium dissectum* and cross-leaved heath *Erica tetralix*.

About the qualifying features of the SAC

The following section gives you additional, site-specific information about this SAC's qualifying features. These are the natural habitats and/or species for which this SAC has been designated.

Qualifying habitats:

- **H7140 Transition mires and quaking bogs. (Very wet mires often identified by an unstable 'quaking' surface)**

The term 'transition mire' relates to vegetation that in floristic composition and general ecological characteristics is transitional between acid bog and H7230 Alkaline fens, in which the surface conditions range from markedly acidic to slightly base-rich. The vegetation normally has intimate mixtures of species considered to be acidophile and others thought of as calciphile or basophile. In some cases the mire occupies a physically transitional location between bog and fen vegetation, as for example on the marginal lagg of raised bog or associated with certain valley and basin mires. In other cases these intermediate properties may reflect the actual process of succession, as peat accumulates in groundwater-fed fen or open water to produce rainwater-fed bog isolated from groundwater influence. Many of these systems are very unstable underfoot and can therefore also be described as 'quaking bogs'.

Transition mires and quaking bogs can occur in a variety of situations, related to different geomorphological processes: in flood plain mires, valley bogs, basin mires and the lagg zone of raised bogs, and as regeneration surfaces within mires that have been cut-over for peat or areas of mineral soil influence within H7130 Blanket bogs (e.g. ladder fens).

Emer Bog lies in a wet infilled hollow on the developed eastern hinterland of the New Forest. Apart from scattered willow *Salix* scrub, it is largely open, and dominated by bottle sedge *Carex rostrata* and marsh cinquefoil *Comarum palustris*, with frequent common cottongrass *Eriophorum angustifolium*, and occasional pools with bogbean *Menyanthes trifoliata*. White sedge *Carex curta* and the bog-mosses *Sphagnum fimbriatum* and *S. squarrosum* become common at the edge of the bog, with the rushes *Juncus effusus* and *J. acutiflorus*. There are also patches of common reed *Phragmites australis*. The basin is surrounded by more mature willow *Salix* woodland and open heathland.

Qualifying Species:

None.

Table 1: Supplementary Advice for Qualifying Features: H7140. Transition mires and quaking bogs; Very wet mires often identified by an unstable `quaking` surface

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Restore the total extent of the feature on substrates capable of supporting the feature under natural hydrological conditions.	There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The extent of the Annex I habitat feature covers the sum extent of all of the component vegetation communities present and includes transitions and mosaics with other closely-associated habitat features particularly M6 *Carex echinata* - *Sphagnum recurvum*/*auriculatum* mire. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Some areas that were historically mire have been colonised by wet woodland and should be restored.	SANDERSON, N. 2005. *Vegetation Survey of Emer Bog Nature Reserve* This attribute will be periodically monitored as part of Natural England's site condition assessments.
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	Distribution includes the spatial pattern or arrangement of this habitat feature, and its component vegetation types, across the site. Changes in distribution may affect the nature and range of the vegetation communities present, the operation of the physical, chemical, and biological processes in the system and the resiliency of the site and its features to changes or impacts. The transition mire lies within unit 2 of Baddesley Common SSSI.	SANDERSON, N. 2005. *Vegetation Survey of Emer Bog Nature Reserve* This attribute will be periodically monitored as part of Natural England's site condition assessments.
Structure and function (including its typical species)	**Adaptation and resilience**	Restore the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of natural habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far	NATURAL ENGLAND. 2015. *Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England*. Available at: http://publications.naturalengland.org.uk/publication/4954594591375360

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being high, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means that this site is considered to be amongst the most vulnerable sites overall and is likely to require the most adaptation action, most urgently. A site based assessment should be carried out as a priority. This means that action to address specific issues is likely, such as reducing habitat fragmentation, creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species may be more or less vulnerable than their habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable. Restoring the condition and extent of the mire and its surrounding habitats will improve its resilience to environmental change.	
Structure and function (including its typical species)	**Exposed substrate**	Maintain a low cover of exposed substrate of below 10% across feature.	For this wetland habitat type, maintaining some continuous extent of exposed, open ground surface is required to support the establishment and supply of those component species which often rely on wet and sparsely-vegetated conditions. High levels of bare ground are unlikely to be desirable, considering the small size of the mire.	This attribute will be periodically monitored as part of Natural England's site condition assessments.
Structure and function (including its typical species)	**Hydrology**	At a catchment level Restore natural hydrological processes to provide the conditions necessary to sustain the feature within the site.	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. Wheeler *et al.* (2009) provide range	ALLEN, R. 2002. *Ecohydrological appraisal of Emer Bog cSAC* ALLEN, R. 2003. *Surface water quality and ecohydrological regime of Emer Bog cSAC* ALLEN, R. 2017. *Emer Bog And Baddesley Common Hydrological Desk Study*.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			and mean for summer & winter water levels for those wetland NVC types constituting Annex 1 habitats. This provides a rough guide to appropriate levels, but it is critical that individual sites and their needs are considered as there is considerable variation within the NVC communities listed and recorded water levels. Site hydrology needs to be restored to address the issue of high nutrient levels in the mire.	Above studies available from from: https://www.testvalley.gov.uk/planning-and-building/planningpolicy/evidence-base/evidence-base-environment WHEELER, B.D., SHAW, S.C. & TANNER, K.A. 2009. *Wetland Framework for Impact Assessment at Statutory Sites*. EA Science report. MCBRIDE, A., DIACK, I., DROY, N., HAMILL, B., JONES, P., SCHUTTEN, J., SKINNER, A. & STREET, M. (Eds.) 2011. *The Fen Management Handbook*. Scottish Natural Heritage, Perth. Available at: https://www.nature.scot/sites/default/files/Publication%202011%20-%20Fen%20Management%20Handbook.pdf
Structure and function (including its typical species)	**Hydrology**	Maintain a high piezometric head and permanently high water table (allowing for natural seasonal fluctuations).	Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. Some examples of H7140 may be wholly or partly groundwater dependent. Others have a greater dependence on surface water or rain water inputs. It is critically important to understand the ecohydrological context of all sites.	
Structure and function (including its	**Invasive, non-native and/or introduced**	Ensure invasive and introduced non-native species are either rare or absent, but if present are	Invasive or introduced non-native species can be a serious potential threat to the structure and function of these habitats, because they are able to exclude, damage or suppress the	This attribute will be periodically monitored as part of Natural England's site condition

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
typical species)	**species**	causing minimal damage to the feature	growth of their associated typical species, reduce structural diversity of the habitat and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides).	assessments.
Structure and function (including its typical species)	**Presence/ cover of woody species**	Restore a low cover (<10% of the area) of scrub or trees within stands of H7140.	Native trees and shrubs occur naturally on bog and fen surfaces but an abundance of scrub and trees on bogs and fens is sometimes regarded as detrimental because they are indicators and perpetrators of drying out and may cause damage to vegetation structure through shading effects. Birch, pine, willow and rhododendron (an invasive non-native species) are the main species of concern. The seeds of most invasive woody species are wind dispersed, so trees are able to establish on raised bog and fen surfaces. Currently the mire contains a large quantity of highly persistent scrub and needs to be restored to a low scrub cover.	NATURAL ENGLAND, 2015. *Emer Bog SAC – Site Improvement Plan*. Available at: http://publications.naturalengland.org.uk/publication/6367668705689600 This attribute will be periodically monitored as part of Natural England's site condition assessments.
Structure and function (including its typical species)	**Supporting off-site habitat**	Restore the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature	The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary. Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species. This supporting habitat may be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment. The SAC contains numerous other habitats including lowland fen, reed-bed, purple moor-grass and rush pasture, acid grassland, dry heath, wet heath, ponds, running water, and wet woodland. A number of these habitats extend beyond the boundary of the SAC and are joined by other habitats including neutral grassland. These habitats support wider populations of the flora and fauna that characterise the transition mire and need to be well managed to support the mire's diversity and resilience.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			The above habitats are hydrologically linked with the SAC in addition to other habitats and land of lower conservation value including semi improved and improved grassland and built up areas and gardens. All such areas will need to be managed and maintained in such a way as to avoid negative impacts on the mire hydrology. Currently not all of the surrounding habitats are in good condition and the mire is also receiving high levels of nutrients.	
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Restore the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat: The constant and preferential plant species for the M5 and S27 NVC communities in addition to white sedge *Carex curta* and fringed bogmoss *Sphagnum fimbriatum* which are characteristic of the M5 community on this site.	Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; • **Structural** species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available. Botanical diversity needs restoring as some species have	SANDERSON, N. 2005. *Vegetation Survey of Emer Bog Nature Reserve* This attribute will be periodically monitored as part of Natural England's site condition assessments.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			declined or disappeared, most likely as a result of high nutrient levels.	
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types: M5 *Carex rostrata - Sphagnum squarrosum* mire S27 *Carex rostrata - Potentilla palustris* swamp	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. M6 *Carex echinata - Sphagnum recurvum/auriculatum* mire also forms part of the transition mire feature on this site although it is only the M5 and S27 communities that enable the mire to be defined as a H7140 transition mire.	
Structure and function (including its typical species)	**Water chemistry**	Restore the surface water and groundwater supporting the hydrology of the bog to a low nutrient status.	UKTAG (2012) provides threshold values for nitrate concentration in groundwaters for different wetland types. The threshold values will mainly be used in the characterisation of GWDTE status for the WFD, primarily as a risk screening tool, to assess if sites are 'at risk' or 'not at risk' from groundwater mediated nutrient pressure. Due to the complex cycling of nutrients within many GWDTE, these threshold values are less well suited for application within sites but rather just to groundwater that is directly feeding the site. The Levels of Nitrate and Phosphate in the mire are currently extremely high and are likely principal the cause of the continuous degradation of the mire vegetation of this SAC.	ALLEN, R. 2002. *Ecohydrological appraisal of Emer Bog cSAC* ALLEN, R. 2003. *Surface water quality and ecohydrological regime of Emer Bog cSAC* ALLEN, R. 2017. *Emer Bog And Baddesley Common Hydrological Desk Study*. Above studies available from from: https://www.testvalley.gov.uk/planning-and-building/planningpolicy/evidence-base/evidence-base-environment NATURAL ENGLAND, 2015. *Emer Bog SAC – Site Improvement Plan*. Available at: http://publications.naturalengland.org.uk/publication/636766870568

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				9600 UKTAG. 2012. *Technical report on groundwater dependent terrestrial ecosystem (GWDTE) threshold values.* Available at: http://www.wfduk.org/resources%20/groundwater-dependent-terrestrial-ecosystem-threshold-values
Supporting processes (on which the feature relies)	**Air quality**	Restore as necessary, the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	This habitat type is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated with it. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH_3), oxides of nitrogen (NO_x) and sulphur dioxide (SO_2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. Target set to Restore because the current levels of nitrogen and acid deposition (APIS accessed 31 January 2019) exceed the critical loads for H7140 feature.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting	**Conservation**	Restore the management	Active and ongoing conservation management is needed to	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
processes (on which the feature relies)	**measures**	measures within and outside the site boundary which are necessary to Restore the structure, functions and supporting processes associated with the feature	protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. This habitat requires ongoing cutting or grazing maintain its open character. Additionally, other habitats along with land outside the site boundary will need to be managed in such a way as to reverse the current negative impacts to the water chemistry and hydrology of the mire and prevent further issues occurring. Surrounding habitats should also be managed to support the wider populations of the flora and fauna of the mire.	
Version Control: N/A				
Variations from national feature-framework of integrity-guidance: N/A				