

# **Shapwick Heath National Nature Reserve (NNR) Management Plan**

**2018 - 2023**

## Site Description

### 1: Description

#### 1.1: Location

		<b>Notes</b>
<b>Location</b>	Shapwick Heath NNR lies between the villages of Westhay and Shapwick. Its central entrance lies on Shapwick Road, which intersects the site, approx. 7 km west of the town of Glastonbury.	12 km from M5 Junction 23
<b>County</b>	Somerset	
<b>District</b>	Sedgemoor and Mendip District Councils	
<b>Local Planning Authority</b>	Somerset County Council: Sedgemoor District Council and Mendip District Council	
<b>National Grid Reference</b>	ST430403	Centre of site

See Appendix 1: Map 1 Avalon Marshes

## 1.2: Land Tenure

	<b>Area (ha)</b>	<b>Notes</b>
<b>Total Area of NNR</b>	530.40	
<b>Freehold</b>	421.93	Declared an NNR in 1961 and acquired in stages: 1964/ 1984/ 1995 / 2006.
<b>Leasehold</b>	108.47	Leased from Wessex Water plc
<b>S 35 Agreement</b>	0	
<b>S16 Agreement</b>	0	
<b>Other Agreements</b>	137.81	A 10 year grazing licence with Mrs E R Whitcombe is in place until 30 <sup>th</sup> April 2021. This includes use of farm buildings and infrastructure. This land is also subject to a Higher Level Stewardship agreement expiring on the same date.
<b>Legal rights of access</b>		See Map 2 – Shapwick Heath NNR Landholdings Access rights granted to Natural England by the Environment Agency
<b>Other rights, covenants, etc.</b>		Natural England own access, mineral, sporting and timber rights over all freehold land
<b>Notes</b>		Copies of leases and conveyances are held at 14-16 The Crescent Taunton TA1 4EB

See Appendix 2: Map 2 Shapwick Heath NNR Landholdings

### 1.3: Site Status

Designation	Area (ha)	Date	Notes
Special Area of Conservation (SAC)	0		
Special protection Area (SPA)		Designation: 1995	Part of the Somerset Levels & Moors SPA
Ramsar		Designation: 1995	Part of the Somerset Levels & Moors Ramsar site
NNR	452.4	Declarations: No.1 1961 No.2 1964 No.3 1985 No.4 1995 No.5 2006	NNR and SSSI boundaries are similar but not the same. Areas of latest acquisition not yet declared.
Site of Special Scientific Interest (SSSI)	393.99	Notification (1981 Act): 1987	SSSI notified area covers most of NNR land.
GCR	0		
Other designations (site):	0		
Other designations Scheduled Ancient Monument (SAM):	n/a	Re-designated 13 June 1996	Site of Scheduled Ancient Monument the 'Sweet Track' a Neolithic timber trackway
Wider designations:			

See:

Appendix 3: Map 3 Shapwick Heath NNR Designations

Appendix 4: Map 4 Shapwick Heath NNR SSSI map

Appendix 5: Map 5 Shapwick heath NNR Management Units

## **1.4: Physical features**

### **Geology**

The reserve is predominantly acid peats, underlain by silty clays. There are no hard rock deposits. Sand burlles occur at the southern boundary and at Canada Farm.

### **Geomorphology**

The land surface varies between approximately 2-5m ODN.

### **Soils**

The soils belong principally to the Turbary series acid peats, modified in most areas by peat workings. Altcar series reed peats occur on the western fringe of the reserve. Evidence from boreholes indicates that the peats can be up to 4.5m deep and are underlain by mottled grey and brown silty clay. Several low, sandy hillocks (termed burlles) occur in the Canada Farm area and at Shapwick burtle along the southern boundary. These are estuarine or marine Ipswichian interglacial sand deposits. The site is of national archaeological importance for the prehistoric wooden trackways, dating back nearly six thousand years, which are preserved in the anaerobic conditions of the peat.

### **Hydrology & Hydrochemistry**

Shapwick Heath is a former raised bog in the basin of the River Brue and forms part of the Somerset Levels & Moors wetland. The hydrology of the reserve has been heavily influenced by historical drainage and peat-working. There are currently 15 bodies of open water on the NNR, mostly derived from this landscape history. The NNR is also criss-crossed by a complex system of ditches (maintained by riparian owner/site managers) and six larger 'viewed rhynes' controlled and maintained by the Axe-Brue Internal Drainage Board (IDB). These waterways are typical of the Somerset Levels & Moors National Character Area 142. The South Drain forms the main waterway through the centre of the reserve and divides the hydrology of the site into two distinct units. This waterway is managed by the Environment Agency who have permissive powers to control its water level to reduce the risk of flooding.

Water tables are typically close to the ground surface in the winter months, falling to 30-60cm in a typical summer. Some water drainage is currently undertaken in two locations on private land north of the South Drain.

### **Climate**

The Somerset Levels, along with the rest of south-west England has a temperate climate which is generally milder and wetter than the rest of the country. The annual mean temperature is 10°C and the annual rainfall is approximately 700mm. The average annual rainfall for the Brue Valley catchment area from 1999 to 2007 was 773mm.

### **References**

- BRITISH GEOLOGICAL SURVEY. 1992. Bristol and Gloucester region.  
ENGLISH NATURE. 1997. Somerset Levels and Moors Natural Area – A Nature Conservation Profile. S Parker. Bridgwater  
R A BRUNNING. 2006. Shapwick Heath NNR Heritage Management Plan.

NATURAL ENGLAND. 2013. National Character Area Profile 142. Somerset Levels & Moors (NE451)

MET OFFICE. 2010. Yeovilton Climate Data: 30-year average climate data for 1981-2010.

NATURAL ENGLAND. 2010. Shapwick Heath NNR Management Plan 2010–2015. Phil Holms

PLYMOUTH UNIVERSITY. 2014. Surface Hydrology of Shapwick Heath National Nature Reserve Somerset – Final Report. K Solman, School of Geography, Earth and Environmental Sciences.

## 1.5: Climate Change

### Predicted Impacts of Climate Change on the Somerset Levels and Moors

- Intense rainfall in summer months is likely to occur resulting in summer flooding events, as seen in 2012, with resultant impacts on fodder crops, grass ley and wildlife, notably ground nesting birds, invertebrates and soil flora and fauna. While not the product of single intense summer storms, as predicted in many climate change models, increased unpredictability of weather patterns will challenge the planning and management of this landscape.
- Winter and summer flooding are longstanding events in the Somerset Levels and Moors; however, prolonged periods of high rainfall will result in longer periods of floodwater coverage and associated impacts on towns, villages and transport infrastructure. Among other impacts, increased soil erosion and reduction in soil quality may result.
- Conversely, summer droughts may lead to demands for increased water abstraction for irrigation of crops; and lead to desiccation, oxidisation and erosion of peat soils.
- Sea level rise will make the continued drainage of the area increasingly difficult. Combined with increased storminess, storm-surges and intense rainfall events, existing pumping mechanisms may be unable to maintain current drainage levels.
- Species migration and range expansion of species (new colonists) may bring both increases in biodiversity, as seen with the successful breeding of great white egret since 2012, as well as more pests, diseases and some loss of marginal habitat.

### References:

NATURAL ENGLAND. 2013. National Character Area Profile: 142: Somerset Levels and Moors - Landscape change: Drivers of change: Climate change.

See Appendix 6: Climate Vulnerability Assessment

## 1.6: Biological Features

Shapwick Heath NNR forms part of the Avalon Marshes area of the Somerset Levels & Moors wetland. It is a former raised bog lying below 5 metres ODN in the basin of the River Brue. Much of the site consists of species-rich grassland, fen and mire habitats with scattered wet woodland. Small fields, criss-crossed with ditches and rhynes are typical of the Somerset Levels & Moors National Character Area profile. Reedbeds and open water habitats have been created following the cessation of peat extraction in the early 1990s. These new wetland habitats are rapidly developing a substantial nature conservation interest.

Shapwick Heath NNR is within the Somerset Levels & Moors Ramsar and SPA designations for important assemblages of wintering waders and wildfowl. The SSSI is cited for its breeding bird assemblage, species-rich neutral grasslands, wet woodlands, remnant areas of mire, and rich plant and invertebrate assemblages in ditches. The site supports over 30 associated Section 41 species that utilise many different niches within the mosaic of wetland habitats. The now well-established reedbed network, along with the wetland habitats of the suite of nature reserves of the Avalon Marshes forms one of the largest wetland areas in the country.

An important assemblage of bats utilise the reserves including lesser and greater horseshoe and brown long-eared bat. Other important mammals include otter, water vole and water shrew. The wetland mosaic is also an important place for amphibians to complete their life-cycles.

Large areas of the reserve are grazed under Higher Level Stewardship agreements utilising stock from rare breeds, including red devon and highland cattle and a small herd of Britain's only lowland goat, the Bagot.

### References:

BRITISH GEOLOGICAL SURVEY. 1992. Bristol and Gloucester region.

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## **1.7: Cultural Features**

### **Landscape Character**

#### Joint Character Area 142 - Somerset Levels and Moors

The Character Area Profile describes the Somerset Levels and Moors landscape as dominated by an extensive grassland plain forming a natural drainage basin, with many areas lying below the level of high tides, giving it an inherent feeling of wetness. Elevated sea defences and river banks, wide drains and a network of wet rhynes and ditches; together with splashy fields and winter flooding, emphasize the importance of centuries of water control in creating the present landscape from a natural marshland. The contrasting landscapes of reed swamps and open water, together with a series of small peaty fields and tall tree-lined boundary hedges which comprise the NNR therefore represent one of the few remaining areas of a landscape that, although still existing in parts in the locality, has now been largely modified. Although not typical of much of its wider surroundings, there are still strong links between landscape and past land use and Shapwick Heath provides a good example of a historic agricultural landscape.

See Appendix 7: Aerial Photo of Shapwick Heath National Nature Reserve 2014

### **Archaeological and Historical Features**

Shapwick Heath NNR contains historical features of considerable archaeological importance. Evidence of Neolithic and Mesolithic human occupation of the area is found in the many wooden trackways preserved within the water-saturated peat. The 'Sweet Track', a Scheduled Ancient Monument, is the oldest of these, being dated as almost 6,000 years old, and is believed to be one of the earliest man-made timber trackways in Europe. There are six separate trackways in total, with three of these being discovered on the NNR. Other important prehistoric finds include an iron-age dugout canoe, a toy or religious offering small replica axe and a jadeite axe head. These finds are displayed in The Museum of Somerset in Taunton.

See Appendix 8: Map 6 Shapwick Heath NNR Archaeology

### **Land-Use History**

The wetlands of the Somerset Levels and Moors have been tamed and drained as far back as Roman times. The character area profile seen today was created by draining marshland to form small fields, pastures and hay meadows for farming and peat was hand-cut as a source of fuel for centuries. Eras of particularly intensive drainage and development were the middle ages, under the influence of the Abbey at Glastonbury, and the land enclosure acts of the 18<sup>th</sup> century. Shapwick Heath remained as commonly grazed open moorland until parliamentary enclosure at the end of the 18<sup>th</sup> Century created the regular field pattern we see today.

The 19<sup>th</sup> century saw the arrival of the industrial age with the creation of the Glastonbury to Highbridge canal in 1833, superceded by a railway line along the same route in 1854. The route of the old railway line is now the main footpath through the reserve, since being closed in the Beeching cuts of 1966. Post-war intensification of farming was avoided to a large extent and the species-rich meadows that dominate the Canada and Brickyard Farm areas of the reserve are a result of the traditional low-input farming system that was typical of the area pre-war.

The 1960's however brought with it the mechanisation of peat processing, enabling it to be harvested on a grand scale. The development of plastics, used to bag it, and developments in the horticultural trade created a large market for the product. This unprecedented scale of extraction created the voids which have been reclaimed to create open water and reedbed habitats on the reserves of the area today.

### **Socio-Economic Use**

Shapwick Heath NNR, as the central and largest reserve of the Avalon Marshes, is at the core of what is fast becoming one of the top wildlife tourism destinations in the country. This stimulates much business in the area, from local B&Bs and campsites, to wildlife tour operators and new developments in eco-tourism 'glamping' sites. This eco-business growth generates wider benefits for local shops and businesses. Natural England's Avalon Marshes Centre provides office and workshop facilities for the other conservation bodies with reserves that make up the Avalon Marshes, which includes Somerset Wildlife Trust, the RSPB and the Hawk & Owl Trust. The site also acts as a key location in orientating visitors to the landscape providing a wealth of information, leaflets and maps at the visitor information point. The site also accommodates the South West Heritage Trusts new historical reconstructions that will soon be used for demonstration and education purposes, hosts an Art Gallery where local artists showcase and sell their work, and an independent cafe/ catering business. An education building and garden area hosts many local groups, provides educational facilities and meeting rooms for a range of both commercial and community-orientated activities.

Grazing agreements on Shapwick Heath NNR and the herd of red devon cattle bred for beef provides income for local farmers. The reserve itself stimulates employment via its management with a number of permanent staff employed, as well as contractors and suppliers undertaking specific specialised works.

Shapwick Heath NNR, and indeed all the reserves of the Avalon Marshes, are much loved and used by local people as a place that contributes to their health and wellbeing. They also attract many visitors such as birdwatchers, wildlife enthusiasts and volunteers, who help with wildlife monitoring, practical tasks and to develop their knowledge of natural history.

### **Education**

There is currently a formal field-teaching scheme 'Schools on Reserves', funded jointly by Natural England and the RSPB, running across both organisations reserves, Shapwick Heath NNR and Ham Wall NNR. There is also a jointly funded engagement officer working across both reserves, delivering family-orientated nature activities. These include larger partnership showcase events - 'Wild Days Out' - delivered at the Avalon Marshes Centre, that act as a first point of contact to engage with families and help them to access the reserves of the area.

Shapwick Heath NNR also plays host to many self-led visits or short guided tours by Universities and other establishments of further and higher education. A 'Young Wardens' scheme is co-ordinated by Natural England with local conservation partners to provide extra-curricular activities for the 12-17 year-old age group and Natural England also gives support to the volunteer recording group 'RoAM' (Recorders of the Avalon Marshes) which aims to attract, develop and mentor those interested in developing natural history skills.

### **Research Use**

An extensive hydrological study of the NNR was undertaken by Plymouth University in 2014, from which improvements to the sites hydrology are to be planned. Internal monitoring is currently being undertaken on the areas of mire restoration, which will inform an eco-hydrological advisory report into improvement works for this priority habitat.

In line with the new NNR Joint Strategy of 2017, more scope exists for use to be made of the NNR for research use, by attracting Universities to plan study elements for undergraduate, MSc and PhD students.

### **Demonstration**

Occasional demonstration use is made of the NNR in the areas of habitat and species management, as well as workshops looking at innovative ways of working such as crowd-funding and small-scale income-generation projects.

There is more scope for the NNR to be used for demonstration purposes.

### **References:**

R A BRUNNING. 2006. Shapwick Heath NNR Heritage Management Plan.

NATURAL ENGLAND. 2013. National Character Area Profile 142. Somerset Levels & Moors (NE451)

RA BRUNNING. Various publications covering the history of the Somerset Levels and Moors

NATURAL ENGLAND. 2017. Joint Strategy for England's National Nature Reserves.

## **1.8: Access & Visitor Facilities**

### **Visitor Appeal and Suitability for Access**

With its attractive mosaic of wetland landscapes and mixed range of attractions, Shapwick Heath NNR has high visitor appeal throughout the year. Local walkers, joggers, cyclist, families and those with restricted mobility are able to access a range of footpaths with good level access and a number of differing habitats year round. More specialist user groups are attracted by the birdlife, range of invertebrates, reptiles, amphibians, mammals, flora and heritage of the reserve, and will visit at different times of year to enjoy these interests.

A steady stream of visitors come to the NNR during the April - September period, generally considered the main walking and leisure season, with the reserve attracting visitors from across the south-west and beyond. From the cuckoo's first call, arrival of the passerines, dragonflies and hunting hobbies, a plethora of nesting heron species and reedbed specialists, to the flowering meadows with attendant butterflies and bumblebees there is much for visitors to appreciate and enjoy.

However, as the birds migrate in Autumn again, through the flocks of winter waders & wildfowl, the large starling murmurations, Spring bird migrations and bittern booming in early march, the NNR is well-visited during the colder months of the year as well.

The main access route through the reserve – the old railway line running alongside the South Drain - makes the NNR easily accessible. At the Shapwick Road entrance at the western end of the reserve paths lead quickly off along the Sweet Track footpath, where visitors can experience some of the Neolithic heritage and then pass through a number of wetland habitats out to Decoy Hide, looping back on a circular route to the main path.

At the eastern entrance on Ashcott Road there is an easy-access walkway and relatively short walks to nearby hides overlooking lakes and reedbeds. These both provide good access for visitors whilst also enabling a central area of the NNR to remain largely undisturbed. A dog-ban is in place here to prevent disturbance to wildlife.

The Canada Farm section of the NNR, with its working farm and meadows and one small hide, tends to attract lower numbers of visitors and provides a differing experience. This section of the reserve has a public footpath, which does provide access for dog-walkers and connects to a circular route through neighbouring Shapwick Moor Reserve.

See Appendix 9: Map 7 Access

### **Access Provision**

The reserve is easily accessible by car from the M5 motorway and towns and villages in the area. Free car-parking is provided at the Avalon Marshes Centre 200 yards from the Shapwick Road NNR entrance and a small fee-paying car park provided at the Ashcott Road entrance. There is limited off-road parking at the entrance to the Canada Farm section of the reserve.

The closest railway station is Castle Cary (19 miles) or Bridgwater (12 miles). Unfortunately there are currently no bus services directly linking local towns or villages to the NNR.

The old railway line and main footpath along the South Drain runs on eastwards through neighbouring Ham Wall NNR and nearly as far as Glastonbury, where it joins the local road network and Sustrans Route 3. This is well-used by walkers, joggers and cyclists. The footpath is owned by the Environment Agency and is a permissive route only, as are the other footpaths within the NNR. A single public footpath runs through the Canada Farm section of the reserve, joining a permissive route onto the adjoining Shapwick Moor Reserve. The area and terrain as a whole allows for easy, level access for many different groups of users.

The site as a whole has been dedicated for open access although some restrictions are in place due to hazards of open water and reedbed areas, wildlife disturbance and farm operations.

### **Visitor Facilities**

The Avalon Marshes Centre provides free car-parking, public toilets, a visitor information point with leaflets and information, a café and an art gallery. It is the central orientation point for the Avalon Marshes area and network of nature reserves. The Centre is also home to a number of historical reconstructions from different time periods, owned and maintained by the South West Heritage Trust. The toilets, café and art gallery are all accessible for those with limited mobility. The Centre is also the location of the NNR workbases and offices for Natural England, Somerset Wildlife Trust, the RSPB and the Hawk & Owl Trust.

The Ashcott Road end of the reserve provides a small fee-paying car park and bicycle racks. It is adjacent to RSPB Ham Wall which provides a larger fee-paying car-park, information and public toilets. Refreshments can be found at the nearby Railway Inn.

Limited off-road parking is available at the entrance to Canada Farm, but a circular route can be followed into the Hawk & Owl Trust's Shapwick Moor Reserve which has a small, free car-park.

Information boards containing NNR information and event news and a leaflet dispenser are in place at both entrances to the South Drain footpath. There are a range of interpretation panels across the reserve giving information on the habitats and heritage of the reserve and of the Avalon Marshes area. There are six hides on the NNR, two of which have full access for those with limited mobility.

The Avalon Marshes website [www.avalonmarshes.org](http://www.avalonmarshes.org) provides information on Shapwick Heath NNR and the other reserves of the area, and provides news, information, staff contacts and events listings. A leaflet outlining dog-walking access across the Avalon Marshes Reserves can be downloaded from the website or accessed at the Avalon Marshes Visitor Information Point. A 'Friends of Shapwick Heath NNR' facebook page provides a weekly 'Wardens Blog' round-up of work on the reserve, weekly wildlife sightings, news, public notices and a space for the public to comment.

See Appendix 9: Map 7 Shapwick Heath NNR Access

## **2: Evaluation, Formulation of Vision and Site Objectives**

### **2.1: Site management policy**

Shapwick Heath NNR lies within the Ramsar and SPA designations of the Somerset Levels and Moors and is comprised of a suite of wetland Sites of Special Scientific Interest (SSSI's), along with a number of other National Nature Reserve's (NNRs) in the Brue Valley. The area is now known as the Avalon Marshes. Shapwick Heath NNR, at approximately 530 hectares, forms the largest most central part of this landscape which, as a whole, covers approximately 1,500 hectares, one of the largest areas of lowland wetland in the UK. Natural England requires these features to be maintained at, or working towards, favourable condition as outlined in the NNR Management Standards. Current UK policy is to treat Ramsar sites at the same level of importance as Natura 2000 sites, protecting core breeding and nesting sites for rare and threatened species, and protecting rare natural habitat types in their own right.

Working beyond the NNRs borders and on a landscape scale plays a central part in the approach to managing Shapwick Heath. Partnerships with local stakeholders and other conservation bodies active in the area to work at this scale are key; in terms of habitats, species, community involvement, visitor management and to promote the natural capital and socio-economic potential of the area. The strength of the area in terms of size, giving it a robustness with opportunities for species to move around the landscape and find a range of niches, is key to continuing development and improvement of this area as an exemplary resilient landscape.

To maintain Shapwick Heath NNR's important populations of wintering waders and wildfowl and assemblage of breeding birds it is essential to manage the open water and reedbed habitat, intervening to prevent succession into wet woodland. This involves the rotational cutting of reeds and management of scrub with specialist equipment. Maintenance of water levels is key and water control infrastructure determines that some of these rotations are on a relatively long timescale (between 5 – 20 years).

The nationally important species-rich grasslands of Shapwick are also a significant landscape character feature of the site and support a specialist flora and fauna. Maintenance of this interest requires a regime of low-intensity grazing, traditional hay-cutting and aftermath grazing. This is currently achieved through Higher Level Stewardship (HLS) prescribed options, agreed with local graziers.

Further restoration of the remnant mire features of the site is necessary in working towards favourable condition for these units. Scrub control needs to be continued and further hydrological control gained to achieve this. Grazing with native breeds as part of the HLS agreements is also necessary, along with use of specialist wetland cut & collect machinery.

The ditches and rhynes of Shapwick Heath NNR are also important SSSI and landscape character features of the site, which support their own specialised flora and fauna. A wholesale restoration of some ditches has been necessary, with scrub clearance and re-profiling, of which a programme continues. For restored ditches, a programme of rotational ditch maintenance is required on an approximately 3-5 year cycle.

The SSSI featured wet woodlands of the site add another dimension to Shapwick Heath's wetland mosaic. They provide important habitat for woodland bird species and essential cover and flight-lines for bats. For these reasons areas of connective corridor need to be retained across the site and Shapwick is less open than some other grassland sites on the Somerset Levels.

Appropriate management of each wetland habitat type provides for the niches required by species special to the reserve. With over 30 Section 41 and European Protected Species using the site there can be instances where specific management for different protected species and habitats can conflict with each other. This is where the maintenance of a mosaic of habitats is key and where individual species may have specific measures for them outlined in their feature management section or in an associated project.

Shapwick Heath's unique pre-historic heritage is preserved with a high water table and the anaerobic conditions of the peat they are buried in. Maintenance of this hydrological level is essential to prevent peat wastage, desiccation and decomposition, which would lead to damage or loss of the feature. A pumping system is in place to protect the 'Sweet Track', a Scheduled Ancient Monument. This is as recommended by Somerset County Councils Historic Environment Service (now South West Heritage Trust) in the Shapwick Heath NNR Heritage Management Plan 2005-2010. Occasionally new finds from the industrial period are found, and are referred to the South West Heritage Trust for advice on preservation on a case-by-case basis.

The 'Avalon Marshes Partnership' whose key partners include Natural England, Somerset Wildlife Trust, the RSPB, Hawk & Owl Trust and South West Heritage Trust is of vital importance in maintaining the integrity of this substantial area of wetland for the benefit of all stakeholders. These organisations are committed to working together to manage the variety of wetland habitats on a landscape scale, to work positively with local communities, create a valuable volunteer base, provide co-ordinated visitor management and to develop the economic potential of the area as a 'wildlife destination'. Close links are also kept with the Environment Agency and the Axe-Brue Internal Drainage Board on hydrological issues and Historic England on the historic environment.

The Avalon Marshes is now an important visitor destination and is broadly able to absorb what is presently an average of 120,000 visitors per annum. The starling murmurations in winter are a particular pressure and need to be managed in a co-ordinated manner, with the provision of the 'Starling Hotline' of great importance. Arrivals of rarities or new breeding species can also cause large numbers of visitors to aggregate in one small area. There are times when car-parking to access Shapwick Heath NNR can become an issue and this needs to be addressed in the long-term. Each reserve of the area lends itself well to offering differing visitor experiences and Shapwick Heath, as the largest and most central, is able to zone a large part of its reserve as restricted access to limit wildlife disturbance. With continuing maintenance and development of good visitor access, provision of hides in key locations and quality visitor information provided off-site, visitors can have a rich experience at Shapwick Heath whilst also ensuring the wildlife is well-protected.

Natural England's 'Conservation 21' Strategy seeks to put people at the heart of nature conservation and this is central to the Shapwick Heath NNR team's commitment to being accessible to all, and to providing as many opportunities for community engagement,

volunteering, education (both formal and non-formal), scientific projects and citizen science initiatives as possible. Working in partnership with other conservation organisations and many local groups makes this possible. Provision of guided walks and talks, support to local natural history groups, field-teaching facilities for schools, engagement with colleges and universities, regular events at the Avalon Marshes Centre, engagement with a range of external projects, and positive relations with an active 'Friends of Shapwick Heath NNR' group are some of the many ways this is achieved.

As the Avalon Marshes becomes an increasingly popular wildlife destination the importance and development of the Avalon Marshes Centre is key. As a central point of orientation, information, maps, leaflets, guidance, basic visitor services, including visitor information personnel, it is vital, not just for visitor management, but also for its associated socio-economic benefits. The on-site Somerset Crafts gallery gives an important platform for local artists and on-site café provides employment; with the wider area - from B&B and campsite bookings, to shops, pubs and other local businesses and services - gaining economic stimulation and benefit.

#### **References:**

NATURAL ENGLAND. 2013. National Character Area Profile 142: Somerset Levels & Moors.

NATURAL ENGLAND. 2008. Conservation objectives and definitions of favourable condition for designated features of interest. Somerset & Dorset Team.

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JNCC. 2008. Ramsar Information Sheet UK11064 Somerset Levels and Moors

NATURAL ENGLAND. 2013. Higher Level Stewardship Environmental Stewardship Handbook Fourth Edition.

NATURAL ENGLAND. 2014. S41 Priority Species Action Spreadsheet.

<http://publications.naturalengland.org.uk/publication/4958719460769792>

SOMERSET COUNTY COUNCIL. 2005. Shapwick Heath NNR Heritage Management Plan. Dr. Richard Brunning.

## 2.3: Vision

### A 50 Year Vision for Shapwick Heath National Nature Reserve

Shapwick Heath National Nature Reserve (NNR) sits at the heart of the much larger Avalon Marshes NNR, now internationally recognised as one of the most iconic and important wetland sites in the UK. At over 2000 hectares and incorporating other well-known nature reserves such as Ham Wall, Catcott, Westhay Moor, Westhay Heath and Shapwick Moor reserves, the NNR consists of a connected, thriving and diverse network of reedbeds, lakes, fens, mires, wet woodlands and grasslands. Expansion of the reserves over the last 50 years has been chiefly through restoration of peat voids and provides an extended array of wetland habitats for birds, mammals, amphibians, reptiles, insects and plants. The Avalon Marshes in turn are only a small piece of a much bigger ecological network linking directly to the wider Somerset Levels, Severn Estuary and Mendip Hills AONB through a mosaic of connected water bodies, grassland and woodland habitat.

#### Visitor feedback: Early May 2069:

*"I've visited Shapwick Heath several times in the last five years using the VR drone app via my tablet, but this is the first time I've ever actually been to Somerset. To visit in person was something special and definitely worth it. I cycled in from Glastonbury to arrive at dawn, as I wanted to experience the booming bittern wake-up call I've heard so much about. There was a spring chill to the air and with the sun just peeking over the horizon, I heard at least six separate bittern calling around me, some near and some far, and as I listened closely I picked up lots of other birdcalls like water rail, cuckoo and cetti's warbler... what I can only describe as a cacophony of sound enveloped me... A lone male night heron flew overhead on its way back to its roost site, and as dawn broke I watched a mixed flock of glossy ibis, cattle egret and little egret head out to feed in the cattle-grazed fields. As the sun finally rose and the low lying mist evaporated I began to notice the buzz of bees and hoverflies feeding along the vibrant strips of flower rich meadow I passed through, stretching out along either side of the footpath before me. I'm pretty sure I even saw a lone dog otter, pike in mouth as it crossed the track in front of me! After an early breakfast I headed back, visiting several of the wonderful hides that offered fantastic views across open lakes teeming with wildfowl. At one stage I heard the majestic trumpeting of a crane, hidden, calling from somewhere in the vast reedbeds that seem to stretch for miles. As if by magic, and to complete my visit, a majestic osprey dived, just feet from me, into the water, it too after an early morning snack I thought! This is one of the most well-known places to watch wildlife in the country but it felt like I had the place to myself, I felt privileged to be here..."*

#### Wildlife and Farming

As well as the wilder landscapes of lakes and reedbeds of the NNR, the species-rich grasslands of the area, managed through time-honoured and traditional farming methods of low-intensity cattle grazing and summer hay-cuts, have been retained both on the NNR and in the Somerset Levels & Moors more widely. The wildlife that has adapted over so many centuries to inhabit

the small flower-rich fields, rhynes and ditches, so typical of the farmed landscape of the area, are nationally supported and hugely valued, with farmed products from the area highly prized.

Across parts of the more recently acquired Avalon Marshes NNR, large areas of land are extensively farmed with traditional cattle and sheep breeds, alongside herds of Konik and Exmoor pony and native deer species. These extensively grazed areas create an ever changing semi-wild mosaic of wetland habitats. This means that many species of bird and insect have returned to the area with populations of songbird, for example the rare nightingale, returning in good numbers and the area a stronghold for butterfly, bumblebee and dragonfly species.

## **Ecotourism Economy**

Shapwick and the wider Avalon Marshes NNR play a major part in adding to Somerset's economy. With its large water-bodies full of birds and its traditional farmed landscapes teeming with wildlife, easily accessible viewing hides, extensive network of cycle routes, walkways and water tours, and availability of friendly experienced guides; over 400,000 people a year now visit the reserves network. This in turn brings in millions of pounds annually, supporting a thriving local ecotourism economy.

As a result of this well-established industry, and by working with the Avalon Marshes Partnership, many of the surrounding local farms have taken opportunities to diversify into providing accommodation and recreation, including B&B, eco-lodges and wild camping. The Avalon Marshes NNR now has close links with many local towns via excellent public transport links, welcoming people from regional towns and cities such as Taunton, Bridgwater, Bath and Bristol. Using well-established cycle hire venues in Glastonbury, Street and Wells, visitors are able to access the reserves in a greener, healthier way, without placing pressure on small local roads. The expanded NNR, with its high quality online, virtual reality and face-to-face visitor information, means the reserve can be easily accessed through many different routes, enabling the increased visitor numbers to be absorbed, whilst retaining the spacious and tranquil atmosphere so valued by people.

## **Benefits of the Natural World and its Habitats.**

For many years the benefits of the natural world to provide clean air, clean water, flood prevention, carbon capture, as places for exercise and health activities, and places for relaxation and peace and quiet have been well known. Since its establishment in the 1960's, Shapwick Heath NNR has been at the forefront of demonstrating the importance of this. With the NNRs expansion (Shapwick itself now sits at over 750 hectares) extensive trials led by Natural England in former peat diggings have shown the critical importance of wetland sites for both flood and water storage, alongside water quality improvements using natural processes, in a world experiencing a changing climate and more frequent extreme weather events.

The Avalon Marshes Partnership now work closely with former peat producers across the area supporting a strong local wetland economy. The use of Somerset reed for commercial use in thatching and building, growing sphagnum as a medicinal and gardening product, providing biofuel to local bio-digester plants and growing locally-sold sustainable firewood are businesses

that all thrive alongside traditional farming and eco-tourism, and show how the needs of local economy can be met as a result of maintaining a healthy and beautiful natural environment.

## **Health and Wellbeing**

Since the early 2000's many people from the local community have contributed tens of thousands of volunteer hours each year to support the practical management, survey and monitoring, species protection, events co-ordination and visitor welcome across the Avalon Marshes NNR. This brings not just huge social and health benefits to the volunteer's themselves but contributes positively to the thriving wildlife of the area and the fantastic experience the many visitors to the area enjoy.

Shapwick Heath has also been a leading site in the development of the health and wellbeing agenda in Somerset. Patients and visitors at local hospitals can now spend time immersed in virtual reality tours and soundscapes of the reserve, and by working with local health bodies and Public Health England a programme of externally-operated mindfulness tours, guided health walks and events are prescribed as part of 'progressive care' packages supported by local GP's. Over 500 people a month now regularly attend these workshops and events, with its positive impact on the health and mental wellbeing of local communities in Somerset being widely recognised.

## **The Avalon Marshes Centre**

At the western edge of Shapwick Heath is the Avalon Marshes Centre, one of a number of visitor hubs in the area, attracting around 100,000 visitors a year, and only a few minutes' walk by footpath to Shapwick Heath itself. The Avalon Marshes Centre is an exemplar of sustainable design, with a mix of environmentally-friendly building materials and carbon-neutral energy generation on site.

The centre has a large car park, well-used by electric vehicles that utilise the hook-up points provided, but generally visitors access the reserves via the many cycle and walking routes that connect directly to Glastonbury, Highbridge and Street or by using the electric 'Hydrogen Bus' routes that run daily, widely linking the reserves to local villages and main towns across the area.

The Avalon Marshes Centre is a popular destination not just for up-to-date information via the latest interactive, virtual reality and webcam technology but also for visitors to visit the award-winning café that sells locally-sourced produce, alongside Somerset Crafts a long-established gallery run by local artists and inspired by the wildlife and heritage of Somerset.

## **Science and Heritage**

The Avalon Marshes Centre is also well known as the base for the renowned Avalon Marshes Archaeology Park and Avalon Marshes Science School.

The vibrant Avalon Marshes Archaeology Park houses a series of reconstructed historical buildings, and uses objects and activities including virtual reality and hands-on experiences to provide people with the opportunity to learn about and immerse themselves in local prehistoric, Roman and medieval archaeology. There are often resident archaeologists or scientific researchers on site bringing an exciting 'buzz' of learning to the centre and this has encouraged the development of many community- based citizen science projects across the reserves network.

This citizen science approach has been a key element in the success of the reserves in establishing the many local volunteer recording groups based here, providing the much-needed and critically important monitoring information needed to measure the health of the habitats and species within the Avalon Marshes and wider Somerset. With the Avalon Marshes Science School as its base, the facilities provide a modern and innovative venue for study, with a well-equipped lecture theatre, laboratory and classroom facilities. The centre provides the perfect base for studies across Shapwick Heath and the Avalon Marshes NNR, used also by over 3000 local primary and secondary school students taking part in organised education schemes and extensive use by universities from across the south-west of the UK and beyond.

## **Feature List**

Feature: 1 - Wintering Waders and Wildfowl

Feature: 2 - Breeding Waterfowl and Wetland Birds

Feature: 3 - Remnant Raised-Bog and Mire

Feature: 4 - Fen Grassland

Feature: 5 - Species-Rich Neutral Grasslands/ Mesotrophic Pastures

Feature: 6 - Reedbeds and Open Water

Feature: 7 - Ditches and Rhynes with Associated Invertebrate Assemblages

Feature: 8 - Carr Woodlands

Feature: 9 - Drovers and glades

Feature: 10 - Breeding Otter

Feature: 11 - Breeding Water Vole

Feature: 12 - Bat assemblage

Feature: 13 - Reptiles

Feature: 14 - Great Crested Newt

Feature: 15 - Lesser Silver Water Beetle

Feature: 16 - Argent & Sable Moth

Feature: 17 - Dragonflies and Damselflies

Feature: 18 - Bumblebees and other Pollinators

Feature: 19 - National Character Area 142

Feature: 20 - Prehistoric Timber Trackways and Artefacts

Feature: 21 - Industrial and Agricultural Heritage

Feature: 22 - Public Access

Feature: 23 - Education and Public Engagement

Feature: 24 - Science and Research

Feature: 25 - Demonstration

Feature: 26 - Community Involvement

Feature: 27 - Economic Use

Feature: 28 - Buildings and Infrastructure

## Feature: 1 - Wintering Waders and Wildfowl

### **Feature description**

As part of the Somerset Levels & Moors Special Protection Area (SPA) and Ramsar designations, Shapwick Heath supports an internationally important assemblage of wintering wader and wildfowl species. These include: wigeon, gadwall, shoveler, teal, pintail, golden plover, lapwing, snipe, water rail, marsh harrier, hen harrier, bittern, merlin, peregrine falcon and short-eared owl.

Other overwintering birds that the habitat is important for include the large murmurations of starlings that use the reedbeds of the area to roost safely in at night.

These species are primarily dependent on the habitats of open water, reedbed and wet grassland.

References:

JNCC. 2018. <http://jncc.defra.gov.uk/default.aspx?page=2026>

JNCC. 2008. Ramsar Information Sheet UK11064 Somerset Levels and Moors

NATURAL ENGLAND. 2008. Definitions of Favourable Condition for Designated Features of Interest: Shapwick Heath NNR – Consultation Draft. Liz McDonnell & Steve Parker

### **Objective description**

Maintain 530ha of designated site within the NNR in favourable condition.

### **Rationale**

Maintaining populations of the wintering bird assemblage is dependent on management of reedbed, open water and wet grassland habitats. Water level management is critical and is controlled through a system of water control structures. A programme of interventions to maintain a range of successional habitats must also be in place – rotational cutting of reedbeds to maintain open water, cutting and controlling scrub within reedbeds, and cutting reedbeds in order to achieve a variation in age-structure. Timing of operations is critical to avoid disturbance.

References:

RSPB. 2011. Reedbed Management. C J Hawke 7 P V Jose.

## Feature: 2 - Breeding Waterfowl and Wetland Birds

### **Feature description**

Shapwick Heath SSSI supports a nationally important assemblage of breeding waterfowl and wetland birds, including mallard, gadwall, shoveler, pochard, teal, reed warbler, reed bunting, sedge warbler, garden warbler, grasshopper warbler, Cetti's warbler, Savi's warbler, bearded tit, water rail, gargany, spotted flycatcher, common bullfinch, song thrush, kingfisher, marsh harrier, bittern, cuckoo and barn owl.

Shapwick Heath is also a key feeding site for species on migration such as: black-tailed godwits, terns, linnets, lesser redpoll, yellowhammer, hobbies, hirundines and osprey. The site, as a part of the Avalon Marshes area as a whole, is also becoming an increasingly important habitat attracting new colonists such as: great white egret, cattle egret, little bittern, night heron, glossy ibis and spotted crane.

These species are primarily dependent on the habitats of open water, reedbed, wet grassland, woodland and scrub.

The SSSI historically supported species such nightjar and nightingale, when larger expanses of the site were comprised of wet heath habitat. These species were lost due to habitat changes following industrial peat extraction.

#### References:

NATURAL ENGLAND. 2008. Definitions of Favourable Condition for Designated Features of Interest: Shapwick Heath NNR – Consultation Draft. Liz McDonnell & Steve Parker  
Sebastian Allen-Mepham. 2017. Shapwick Heath & Westhay Heath Breeding Bird Survey report 2017 (Unpublished).  
RSPB. 2018. Avalon Marshes Breeding Bird Survey. Andre Blacker.  
NCC. 1955. Old Management Plans (Unpublished).

### **Objective description**

To maintain population limits based on the known fluctuations of the populations for the site, taken from Breeding Bird Survey data and other specialist surveys. This currently includes monitoring of bearded tits, marsh harrier, bittern and great white egret.

### **Rationale**

The key to maintaining populations of these species is managing the habitats upon which they depend, namely reedbed, open water, wet grassland, woodland and scrub. To achieve this, the hydrology of the site must be monitored and controlled when necessary through a system of water control features. A programme of interventions to maintain a range of successional habitats must be in place – cutting reedbeds to maintain open water, cutting and controlling scrub within reedbeds and cutting reedbeds to maintain a variation in age-structure. Maintenance of wet grassland features through appropriate grazing and traditional hay-cuts and retention of areas of wet woodland. Timing of operations are key to avoid disturbance – no

mechanical operations between March - August.

New colonisers are important to monitor as their story unfolds. Bittern and great white egret data currently feeds into national data-sets and it is important to continue to contribute to this long-term monitoring project along with other partners (RSPB and Somerset Wildlife Trust).

References:

RSPB. 2011. Reedbed Management. C J Hawke & P V Jose.

## Feature: 3 - Remnant Raised-Bog and Mire

### Feature description

M16 Wet Heath (*Erica tetralix* – *Sphagnum compactum*)

M25 Mire (*Molinia caerulea* – *Potentilla erecta*)

Another SSSI feature of Shapwick Heath is the remnant of raised bog interspersed with ditches and old peat cuts called the **Ashcott Plot** (Unit 54 and parts of Unit 55) contains both wet heath and mire communities. From approximately 2000 this area has been subject to substantial restoration work to restore the habitat through clearing scrub, grazing and improving hydrology.

Plant species of particular interest include five different species of *Sphagnum* and IUCN Red list species: common heather *Calluna vulgaris*, cross-leaved heath *Erica tetralix*, tormentil *Potentilla erecta*, round-leaved sundew *Drosera rotundifolia*, marsh cinquefoil *Comarum palustris*, marsh fern *Thelypteris palustris*, ivy-leaved bellflower *Wahlenbergia hederacea*, lesser butterfly orchid *Platanthera bifolia*, milk parsley *peucedanum palustris*, star sedge *Carex echinata*, flea sedge *Carex pulicaris*, marsh pennywort *Hydrocotyle vulgaris*, lousewort *Pedicularis sylvatica* subsp. *sylvatica*, marsh stitchwort *Stellaria palustris* and creeping willow *Salix repens*. Also of interest are bog pimpernel *Anagallis tenella*, bogbean *Menyanthes trifoliata*, floating club-rush *Eleogiton fluitans*, fragrant orchid *Gymnadenia conopsea* and southern marsh orchid *Dactylorhiza praetermissa*.

Areas of degraded mire habitat on **The Lows** (Units 43a and 43b) are currently undergoing restoration through scrub clearance, grazing and hydrological improvement. Some of the above plants of interest are present but in much lower number: At least one species of *Sphagnum* (*palustre*), common heather *Calluna vulgaris*, cross-leaved heath *Erica tetralix*, round-leaved sundew *Drosera rotundifolia*, marsh cinquefoil *Comarion palustris*, marsh fern *Thelypteris palustris* and lesser spearwort *Ranunculus flammula*. It is also a stronghold for England red-list species bog myrtle *Myrica gale*.

Recent records for oblong-leaved sundew *Drosera intermedia*, white-beaked sedge *Rhynchospora alba*, bog ashopdel *Narthecium ossifragum* exist. However, low water levels in the mire may have resulted in an apparent loss of these species.

There are also some small pockets of mire habitat within other habitats most notably in the **Seventy Acres** reedbed (Unit 52), related to the course of an old drove, that is higher than the surrounding ground, that was mechanically dug for peat.

#### References:

- NATURAL ENGLAND. 2010. Shapwick Heath NNR Management Plan 2010-2015. Phil Holms  
NATURAL ENGLAND. 2008. Definitions of Favourable Condition for Designated Features of Interest: Shapwick Heath NNR – Consultation Draft. Liz McDonnell & Steve Parker  
Melvin Yeandle. 2008. Personal records.  
RoAM/ Julie Merrett. 2017. Personal records.

## **Objective description**

No reduction of area from baseline data (2010)

Return to favourable condition

## **Rationale**

To ensure no reduction in area from baseline data it is necessary to improve the hydrological control of these units to ensure water levels do not fall below 5cm from ground level. This is not currently achievable as the drainage, peat extraction and peat shrinkage of the surrounding land has left areas of remnant mire perched higher than surrounding land with water running off them, and networks of drainage channels and water control features in poor condition, with flows not fully understood.

A proposal to install a membrane around the Ashcott Plot (Unit 54) was considered but in conclusion was deemed too expensive and not providing good value for money. Cofferdams have been installed on some ditches on the Ashcott Plot which have improved water retention on the site, with more to be installed. Historical scrub is still being cleared from both sites but continuing invasion needs to be tackled annually. A programme of scrub clearance is in place to address this and grazing is in place on both sites. Highland cattle on the Ashcott Plot and 70 Acres have proved very effective.

A hydrological study of Shapwick Heath NNR was undertaken by Plymouth University in 2014, with recent installations of new penstocks on The Lows stemming from its recommendations proving effective. This has allowed a summer water-supply to be re-instated and grazing animals re-introduced to the site.

Grazing is currently undertaken with a combination of highland and red devon cattle, but so far grazing pressure has not been ideal and needs to be looked at in more depth. A soft-rush problem has developed in 2018 which will be tackled with increased grazing and soft-rush cutting in late summer.

A monitoring project was initiated in 2016 with vegetation transects, dipwells and water quality testing in place to inform decision-making.

Scoping projects are proposed to investigate the eco-hydrology of these sites and give advice on possible hydrological works and alternative grazing regimes.

## References:

JNCC. 1988. The peatland management handbook (bogs). T.O. Rowell  
NATURAL ENGLAND. 2015. Shapwick Heath NNR Monitoring Strategy for Mire Restoration project on Selected SSSI Units. Hanna Etherington  
PLYMOUTH UNIVERSITY. 2014. Surface Hydrology of Shapwick Heath NNR Final Report. K Solman

## Feature: 4 - Fen Grassland

### **Feature description**

M27 Mire/ Fen Meadow (*Filipendula ulmaria* – *Angelica sylvestris*)

Two small areas of this fen meadow community have existed in the mosaic of wet grasslands and mire communities on Shapwick Heath. One is a small area on Unit 43a in **The Lows**, and the other is a field in Unit 47a, known as the **Fen Field**. These areas are exceptionally wet and appear to be slowly succeeding to a reed-swamp community. Records of the fen field area getting wetter date from the 2003 Management Plan, where it is noted that its proximity to the raised water area of the Sweet Track is likely to be causing this.

References:

NATURAL ENGLAND. 2003. Shapwick Heath NNR Management Plan 2003-2008. Robin Prowse/ Phil Holms

NATURAL ENGLAND. 2010. Shapwick Heath NNR Management Plan 2010-2015. Phil Holmes

NATURAL ENGLAND. 2008. Definitions of Favourable Condition for Designated Features of Interest: Shapwick Heath NNR – Consultation Draft. Liz McDonnell & Steve Parker

### **Objective description**

No reduction in area from baseline data – However, this may not be achievable due to the pumping of water for the Sweet Track.

### **Rationale**

As described in the 2003 Shapwick Heath NNR Management Plan, the area of fen meadow close to the Sweet Track seems to have developed due to its proximity to this Scheduled Ancient Monument and the pumping system that keeps the water table artificially high to ensure its preservation. The high water level maintained now seems to be causing the tall fen vegetation to succeed into reedbed-swamp. The area in The Lows seems to be following a similar pattern, but here resulting from a suspected leak in the bund to the South Drain. However, this high water level is, on the whole, positive for the mire community that is intended to be restored to the unit.

Monitoring will continue, in conjunction with the responsible officer for the site, to ascertain whether it is possible/ desirable to address this change in habitat.

Management of the fen field will continue with softtraking once every 3 years (or 1 third per year) and clearance of willow scrub that has established.

Management of the Unit 43 pocket will be managed as part of the mire it sits within, with scrub clearance and grazing. It is not currently possible to access this pocket with the softtrak.

References:

SCOTTISH NATIONAL HERITAGE. 2011. The Fen Management Handbook. Edited by Andrew McBride

## Feature: 5 - Species-Rich Neutral Grasslands/ Mesotrophic Pastures

### Feature description

MG5 Neutral grassland (*Cynosurus cristatus* – *Centaurea nigra*)

MG8 Neutral grassland (*Cynosurus cristatus* – *Caltha palustris*)

M22 Fen-meadow (*Juncus subnodulosus* – *Cirsium palustre*)

M23 Rush pasture (*Juncus effuses/acutiflorus* – *Galium palustre*)

M24 Fen-meadow (*Molinia caerulea* – *Cirsium dissectum*)

A variety of grassland communities have developed in the unimproved pastures and hay meadows of Shapwick Heath and are an important SSSI feature of the site. There are good examples of the nationally rare and threatened species-rich fen-meadow type species characterised by common sedge *Carex nigra*, carnation sedge *Carex panicea*, meadow thistle *Cirsium dissectum* and Devil's-bit scabious *Succisa pratensis*. Drier grasslands include common knapweed *Centaurea nigra*, crested dog's-tail *Cynosurus cristatus*, meadowsweet *Filipendula ulmaria* and quaking grass *Briza media*.

IUCN Red list species include: Quaking grass *Briza media*, common eyebright *Euphrasia nemorosa*, eyebright sp. *Euphrasia arctica* subsp. *Borealis*, marsh fragrant orchid *Gymnadenia densiflora*, marsh ragwort *Senecio aquaticus*, ragged robin *Silene flos-cuculi*, Devil's-bit scabious *Succisa pratensis*, marsh valerian *Valeriana dioica*, heath speedwell *Veronica officinalis*, marsh speedwell *Veronica scutellata* and frog orchid *Coeloglossum viride* (one location on Canada Farm only).

Fields in Units 47 a&b are substantially wetter due to their proximity to the raised water level area around the Sweet Track and these fields grassland communities reflect this with the front fields of Unit 47a known as the **cotton grass fields** for their populations of IUCN Red list species *Eriophorum angustifolium*.

References:

NATURAL ENGLAND. 2010. Shapwick Heath NNR Management Plan 2010-2015. Phil Holmes

NATURAL ENGLAND. 2008. Definitions of Favourable Condition for Designated Features of Interest: Shapwick Heath NNR – Consultation Draft. Liz McDonnell & Steve Parker

### Objective description

No reduction of area from baseline data

Retain in favourable condition

### Rationale

To maintain the floral interest of the range of wet grassland NVC communities within this feature it is necessary to continue with a traditional regime of grazing and annual hay-cuts. The waterlogged nature of these habitats, particularly during the winter months, means that summer

grazing by traditional rare breed cattle is the preferred method of management. Maintaining appropriate water table levels by controlling the system of surface drainage ditches is also essential.

In general, the peaty meadows should be managed as hay meadows, with hay being cut in the latter part of the hay-making season, after the plants have set seed around the middle of July. This should be followed by aftermath grazing. However, the wet nature of the site and the vagaries of the weather mean that some years, hay may not be able to be cut. Derogation to cut earlier can be requested from the Rural Payments Agency, to balance years when it has not been possible to cut. A 'hay-cut map' is also devised each year in consultation with the grazier, which leaves some refuge areas and margins as invertebrate refuges, on rotation. Aftermath grazing by cattle should generally follow from mid-August to the end of October. Stock may need to be removed or moved to higher ground or yarded earlier if wet ground conditions start to cause poaching. Heavy grazing should be discouraged as this has an adverse effect on the grassland communities. Occasional applications of well-rotted farmyard manure can be tolerated in the hay meadows to maintain yields, at a rate not exceeding 3 tonnes per hectare per 5 years. No other inputs of fertilizer or herbicides are permitted as the system is fully organic. Shading of the community by overhanging branches should be prevented by appropriate hedgerow boundary management.

Details of the grazing agreement are set-out in Mrs E R Whitcombe's Higher Level Stewardship grazing agreement, which is in place until 2021.

References:

Natural England Technical Information Note TIN147

NATURAL ENGLAND. 2010. Shapwick Heath NNR Management Plan 2010-2015. Phil Holmes

NATURAL ENGLAND. 2013. Higher Level Stewardship, Environmental Stewardship Handbook, Fourth Edition.

## Feature: 6 - Reedbeds and Open Water

### **Feature description**

S4 Swamp and reedbeds (*Phragmites australis*)

Open Water

The reedbeds and lakes of Shapwick Heath resulted from the sites industrial history of large-scale peat digging. Reedbeds and open water are not notified features of the SSSI in their own right. However, they are an essential supporting habitat for the wintering and breeding bird assemblages associated with the site. They also contribute to the specific Avalon Marshes section of the Somerset Levels & Moors National Character Assessment (NCA).

References:

NATURAL ENGLAND. 2013. National Character Area Profile: 142: Somerset Levels and Moors

NATURAL ENGLAND. 2010. Shapwick Heath NNR Management Plan 2010-2015. Phil Holmes

NATURAL ENGLAND. 2008. Definitions of Favourable Condition for Designated Features of Interest: Shapwick Heath NNR – Consultation Draft. Liz McDonnell & Steve Parker

### **Objective description**

No reduction in total combined extent of this wetland feature in relation to established baseline – circa 150-200ha, approximately 40-45% of whole site area.

No more than 5% of scrub

### **Rationale**

Although not a notified feature in its own right, this habitat is essential to support the notified wintering and breeding bird assemblages. They also contribute to the specific Avalon Marshes section of the Somerset Levels & Moors National Character Assessment (NCA).

Due to the history of drainage in the area and water levels in the surrounding countryside now being set to accommodate a range of differing needs (agriculture, flood control), without management of these early successional habitats the area would quickly succeed to wet woodland. The Avalon Marshes now constitutes 10% of UK reedbed therefore it is of national significance.

To achieve this, the hydrology of the site must be monitored and controlled when necessary, through systems of pen-stocks, flat-boards, flap-valves and mobile pumps. A programme of interventions to maintain a range of successional habitats must be in place – clearing reedbeds to maintain open water, cutting and controlling scrub within reedbeds and cutting reedbeds to maintain a variation in age-structure. Timing of operations to avoid disturbance of the notified feature must be observed – no mechanical operations between October – March (wintering birds) and between March – August (breeding birds) without detailed consultation with the responsible officer as to the exact operation, its location and its potential to cause disturbance.

Due to imperfect control of large hydrological units of this habitat (associated with their

conversion from post-industrial site to nature reserve) which cannot be rectified it is necessary to undertake scrub and reedbed management operations with large, expensive, specialist machinery. To carry-out these operations most efficiently these areas are left to succeed and then have interventions undertaken on rotations of 7-20 years. This is achieved by contracting in a Truxor aquatic reedbed cutter to clear areas of open water approximately every 7 years and a specialist reedbed scrub cutting machine every 20 years.

Within these units there are also small areas of wet grassland and remnant mire communities situated on old droves that ran through the areas cut for peat, such as on Meare Heath (Unit 66) and on 70 Acres (Unit 52). The plant communities on 70 acres are particularly rich, including *Sphagna spp.* and round-leaved sundew *Drosera rotundifolia*. It is beneficial to graze these areas for short periods each year with a small herd of highland cattle.

References:

SCOTTISH NATIONAL HERITAGE. 2011. The Fen Management Handbook. Edited by Andrew McBride

PLYMOUTH UNIVERSITY. 2014. Surface Hydrology of Shapwick Heath National Nature Reserve Somerset – Final report. K Solman.

## Feature: 7 - Ditches and Rhynes with Associated Invertebrate Assemblages

### **Feature description**

The ditches and rhynes of Shapwick Heath are an important element the Ramsar designation for the site due to their specialist invertebrate assemblages. Ditches and rhynes are also typical of the Somerset Levels and Moors and are an important landscape character feature.

Red List plant species include: Lesser marshwort *Apium inundatum* and fen pondweed *Potamogeton coloratus* (cotton grass field ditch), water whorl-grass *Catabrosa aquatica* and water violet *Hottonia palustris* (ditches on the Lows), frogbit *Hydrocharis morsus-ranae* (scattered), re-introduced greater water parsnip *Sium latifolium* (Discovery trail) and rootless duckweed *Wolffia arrhiza*.

Important invertebrates include: Water beetles *Hydaticus transversalis*, *Dytiscus dimidiatus*, *Hydrophilus piceus* and *Hydrochara caraboides*. Also the raft spider *Dolomedes fimbriatus*.

References:

NATURAL ENGLAND. 2010. Shapwick Heath NNR Management Plan 2010-2015. Phil Holmes

NATURAL ENGLAND. 2008. Definitions of Favourable Condition for Designated Features of Interest: Shapwick Heath NNR – Consultation Draft. Liz McDonnell & Steve Parker

EUROPEAN COMMISSION. 2000.

[http://ec.europa.eu/environment/nature/natura2000/index\\_en.htm](http://ec.europa.eu/environment/nature/natura2000/index_en.htm) JNCC. 2008. Ramsar

### **Objective description**

No reduction in area (current extent circa 10km)

Maintenance of ditches in a range of successional stages to support habitat requirements for a range of mammals, amphibians, aquatic fauna and wetland and aquatic flora.

### **Rationale**

The ditch network needs to be maintained for a variety of purposes: as a key SSSI and Ramsar feature, as a landscape character feature in its own right, to act as wet fencing to keep livestock in, to conduct water around the site and as a specialist habitat supporting a number of important species of flora and fauna.

The water control structures of the existing ditch network are in a mixed state of repair, therefore condition of individual ditches vary in quality. Many of the grassland ditches have been restored and are now maintained on a rotational basis by the site grazier. Others, including many with wooded boundaries, are in need of wholesale repair. A number of particularly sensitive ditches such as the 'Sweet Track ditch' running through Unit 59, the 'cotton grass field ditch' in Unit 47a and remnants of hand-cut peat furrows on the Ashcott Plot on Unit 54 are restored and cleared by hand by reserve staff and volunteers.

A detailed report on the ditch work and remedies necessary are contained in the 2014 'Surface Hydrology of Shapwick Heath National Nature Reserve' Final Report by Plymouth University.

This should be used as the basis for planning a programme of ditch restoration works, as funds allow. This also needs to be planned in careful consultation with the responsible officer for the site so key sites for specialist species and micro-habitats are taken into account.

References:

PLYMOUTH UNIVERSITY. 2014. Surface Hydrology of Shapwick Heath National Nature Reserve Somerset – Final report. K Solman.

## Feature: 8 - Carr Woodlands

### **Feature description**

W2 Wet woodland (*Salix cinerea* – *Betula pubescens*)

W4 Wet woodland (*Betula pubescens* – *Molinia caerulea*)

W5 Wet woodland (*Alnus glutinosa* – *Carex paniculata*)

W10 Wet woodland (*Alnus glutinosa* – *Urtica dioica*)

Stands of wet woodland are another important SSSI feature of the site, forming another aspect of the wetland mosaic and providing ecological niches for a range of species, most importantly Royal fern *Osmunda regalis*, Marsh fern *Thelypteris palustris* and greater-tussock sedge *Carex paniculata*. This habitat also provides important nesting and feeding habitat for woodland birds, and flight-lines for bats. There are also a number of veteran oaks on site.

A balance must be kept between these functions and the invasion of secondary woodland on to previously species-rich grassland habitats that have dried-out and scrubbed over due to other land-use factors in the area.

#### References:

NATURAL ENGLAND. 2010. Shapwick Heath NNR Management Plan 2010-2015. Phil Holmes

NATURAL ENGLAND. 2008. Definitions of Favourable Condition for Designated Features of Interest: Shapwick Heath NNR – Consultation Draft. Liz McDonnell & Steve Parker

### **Objective description**

To have no reduction in extent of wet woodland in key area of Units 59 (Sweet Track woods), area on edge of Unit 48 (Decoy Woods) small area in Unit 66 (around Meare Heath Hide) and Units 55 & 56 (surrounding the Ashcott Plot), maintaining native species composition, along with specialist understorey and ground-flora species.

To retain veteran oaks for their natural life course.

To clear areas of secondary woodland that have invaded species-rich grasslands and remnant mire habitats in Units 42 (Brickyards meadows), 43 (The Lows) & 54 (The Ashcott Plot).

### **Rationale**

The wet woodland to be maintained is largely treated as a non-intervention area, with occasional clearing of glades (leaving deadwood lying) to maintain butterfly interest and the maintenance of the 'Sweet Track footpath' through Unit 59, which provides for the addressing of a range of other objectives in this unit, including maintenance of the scheduled ancient monument, maintenance of an important and species-rich historical ditch-line, creation of micro-climate/ glade conditions suitable for populations of key butterfly species and an important walkway to communicate interpretation to the general public about key heritage and habitat features of the reserve.

The woodland area approaching Decoy Hide in Unit 48 has a number of large veteran oaks, the origin of which is not entirely clear, they now have a number of falling and splitting limbs but

are being left to age undisturbed. There are a number of other veteran oaks across site and these should be recorded and mapped.

An annual programme of winter scrub clearance is undertaken by staff, volunteers and contractors to continue to restore wet grassland and mire areas that have been invaded by secondary woodland. This is then maintained by subsequent grazing operations.

## Feature: 9 - Droves and glades

### **Feature description**

Although not a notified feature in themselves, there are a series of historical droves through Shapwick Heath which are landscape character features of the NNR, create a series of woodland glades and act as important access routes across the reserve. Glades have also been created in woodland in order to provide an important microclimate and niche habitat for butterflies and other invertebrate assemblages.

Butterfly species of particular importance include the White Admiral *Limenitis camilla* , silver-washed fritillary *Argynnis paphia* and purple hairstreak *Neozephyrus quercus*.

References:

John Burrell. 2009. Butterflies of Somerset 1999 - 2009

### **Objective description**

Retaining historical droves as landscape features

Maintenance of droves as access features and their association with ditch-lines

Creating and maintaining micro-climatic conditions of glades and droves for invertebrate species especially pollinators

### **Rationale**

Droves are essential landscape character features along with ditches, where the ditches would act as wet fences and the droves as access paths between different fields or areas of peat-cutting. In this they have developed their own micro-climates and species niches.

Larger 'green lane' droves are maintained by mowing with tractor and topper or with soft-trak on more sensitive ground. They are also kept clear of over-hanging branches and encroaching woodland and scrub.

Glades are created by felling a small number of trees by hand, usually in association with creating or maintaining footpaths, or to create some deadwood within a woodland block, adding to the variety of sub-habitats within the woodland.

## Feature: 10 - Breeding Otter

### **Feature description**

Breeding otters are a cited SSSI feature of Shapwick Heath and the NNR provides extensive habitat for them with water-courses, lakes, reedbeds, wet grasslands and the ditch and drove network all being key areas for this species in the Brue Valley.

### **Objective description**

Maintain the areas of habitat used by otters (whole site).

### **Rationale**

The key to maintaining otter populations is to ensure that they have enough good quality habitat and accessible food sources. Otters use the full range of wetland habitat types across the reserve and so there are no specific management interventions for otter over or above those necessary for general habitat management and maintenance of non-disturbance areas of the reserve.

Monitoring is an important part of understanding otter movements and distribution across the site and this is undertaken by local members of the Somerset Otter Group. It is also beneficial to have an understanding of the food resource provided by the lakes and reedbeds of the reserve and to this end we endeavour to undertake a fish survey (or reedbed audit) every 5-10 years.

Otters have large territories it is important that Natural England work to have influence across the surrounding landscape, through the Avalon Marshes Landscape Partnership, ensuring that good quality habitat extends beyond our NNR boundaries. The Somerset NNR team work with the Somerset Otter Group to raise awareness of otters and promote them positively with the general public through communications, the annual Shapwick Heath Otter Day and by giving support to the annual Somerset Otter Survey.

A dog ban is in place on the main section of the Shapwick Heath site to reduce disturbance.

#### References:

SOMERSET OTTER GROUP. 2017. Two-Day Event Summary 2017.

NATURAL ENGLAND. 2016. Direction Notice: Restriction of Public Access Under The Public Rights of Way Act 2000, case no. 2015118004.

## Feature: 11 - Breeding Water Vole

### **Feature description**

Shapwick Heath has been identified as a National Key Site for the breeding water vole population in the south-west, with the NNR providing extensive habitat for water voles, via small water-courses, the ditch network and reedbed areas of refuge.

References:

ENGLISH NATURE. 2000. English Nature Research Reports: Halting the Decline: Refuges and National Key Sites for Water Voles. Paul Bright & Steve Carter, School of Biological Sciences, Royal Holloway University.

THE MAMMAL SOCIETY. 2016. The water Vole Mitigation Handbook – Fens for the Future. M Dean, R Strachan, D Gow, R Andrews

### **Objective description**

Maintain presence of water-voles on site monitored by May & September key sites survey

Maintain suitable habitats in necessary condition for water vole populations

Maintain control over invasive predator American mink that is a national threat to water-vole populations.

### **Rationale**

Water-voles are nationally under threat due to habitats loss and predation by American mink. To maintain Shapwick as a key stronghold for this species in the south-west it is necessary to address these two main factors.

Water-voles use the ditch network of the Somerset Levels National Character Area extensively, so appropriate ditch maintenance with a robust rotational programme of clearance will provide plenty of the mid-successional ditch habitat which is preferred by this species. Water-voles have also been shown to use the reedbeds and reedbed islands as refuges from disturbance, therefore also benefit from the ongoing management of these habitat features. Their use of these is however more difficult to monitor.

An annual programme of humane trapping is undertaken by trained reserve staff to control mink numbers.

References:

BASC. 2016. Mink Control – Guidance from BASC to promote best practice.

## Feature: 12 - Bat assemblage

### **Feature description**

Shapwick Heath NNR has a diverse range of bat species using the site including common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, nathusius pipistrelle *Pipistrellus nathusii*, serotine *Eptesicus serotinus*, barbastelle *Barbastella barbastellus*, brown long-eared *Plecotus auritus*, Daubenton's *Myotis daubentonii* and a breeding population of greater and lesser horseshoe bats *Rhinolophus ferrumequinum* and *Rhinolophus hipposideros*.

A strategy for protecting and enhancing the bat interest of Shapwick Heath has been developed with bat specialists the Vincent Wildlife Trust (VWT) and a lease secured by them on the Canada Farm farmhouse until 2028. The structure of the house has been restored by VWT with enhancement of conditions for bats, in principal for the rare lesser horseshoe bats, but now also containing significant populations of greater horseshoe bats.

Monitoring of these roosts and further bat surveys of the NNR are undertaken by the Somerset Bat Group.

References:

NATURAL ENGLAND. 2010. Shapwick Heath NNR Management Plan 2010-2015. Phil Holmes

SOMERSET BAT GROUP. 2015. Brue valley Big Bat Survey.

SOMERSET BAT GROUP. 2017. Canada Farm/ Shapwick Heath/ Loxtons Survey Reports

### **Objective description**

Provision of suitable habitat/ flight-lines

### **Rationale**

Shapwick Heath NNR provides plenty of natural habitat for bats including suitable roosting sites, tree cover along flight lines, and invertebrate food sources. There are also a number of dilapidated buildings on site originating from the reserves industrial past that now serve as suitable roosting locations for bats. Site staff ensure these buildings are left undisturbed and liaise with the Somerset Bat Group and the Vincent Wildlife Trust who provide monitoring support and advice.

## Feature: 13 - Reptiles

### **Feature description**

Shapwick Heath NNR is home to populations of grass snake *Natrix natrix*, slow worm *Anguis fragilis*, and small localised populations of common lizard *Lacerta vivipara* and adder *Vipera berus*, including some key hibernacula sites for this species in the area.

### **Objective description**

Presence of all named reptile species

Maintenance of suitable mosaic of habitats

### **Rationale**

The main management focus for reptiles on Shapwick is on adders, but this management is also beneficial to the other reptile species. In the Brue valley adders are present only in small isolated populations, with generations of adders showing great fidelity to hibernacula sites. Adders are dependent on sufficient areas of a mosaic of open woodland, heathland, moor, damp meadows and bog with areas of tussocky grassland and longer swards necessary. Connectivity between these habitats is important and footpaths, roads and disturbance issues can be a problem.

A joint investigative and monitoring project was undertaken in 2013-15 by Natural England, Somerset Wildlife Trust and the RSPB to look at the population, distribution and hibernacula sites across the Avalon Marshes nature reserves and key recommendations have been taken from this report and implemented by all partners. A re-survey should be planned for 3-5 years' time.

Key management actions are the protection of hibernacula sites (keeping these free from disturbance), maintenance of tussocky areas in grassland, and a mosaic of varied habitat to maintain connectivity between sites wherever possible. Care must be taken when maintaining water control structures on droves, whose north sides are favourable areas for adder hibernacula, with surveys to be carried out before implementation of works.

#### References:

RSPB/SWT (Unpublished). 2015. Brue Valley reserves Reptile Survey 2015. Phil Thorpe & Andre Blacker.

RSPB. 2016. RSPB Ham Wall Species Action Plan: Adder. Andre Blacker.

ANDRE BLACKER (Unpublished). 2016. Species specific Considerations for Managing Habitat for Adders on Shapwick Heath.

## Feature: 14 - Great Crested Newt

### **Feature description**

Shapwick Heath NNR has a number of records of great crested newts breeding in the ditch systems of the reserve. The species is on the edge of its range in this location, therefore it is important to maintain these small pockets of habitation.

### **Objective description**

Presence

Maintenance of suitable ditch habitat – early succession ditches

Provision of/ maintenance of overwintering habitat

### **Rationale**

Wetland sites such as Shapwick Heath provide a range of damp habitats for a number of amphibian species which are critical to the food-cycle and ecology of the wetland ecosystem. Great crested newts preferred habitat are medium-sized ponds but they can also make good use of shallow areas of water within reedbeds, ditches and 'scrapes'. These are the main habitats available for the species on Shapwick Heath, and the maintenance of ditches suitable for great crested newts is key, as the species is sensitive to silting and shading of them. Therefore the rotational clearing of ditches, and maintenance of a proportion of ditches in early succession is important.

Another key factor is the availability of over-wintering sites for the species, such as piles of wood near scrapes or ponds, for this specific purpose. These are created or maintained in suitable locations or where there are records of the species.

Training has been undertaken by staff and volunteers to aid understanding of disturbance issues and legal obligations and a programme of monitoring in place.

References:

FROGLIFE. 2001. Great Crested Newt – Conservation Handbook. Tom Langton, Catherine Beckett and Jim Foster.

## Feature: 15 - Lesser Silver Water Beetle

### **Feature description**

The ditches and rhynes of Shapwick Heath and surrounding wetlands of the Avalon Marshes area hold a key breeding population of the endangered aquatic invertebrate *Hydrochara caraboides*. This species is listed in the Ramsar citation for the Somerset Levels & Moors and requires specialist management. The Somerset Levels has the largest known population of the species.

References:

ENGLISH NATURE. 2004. English Nature Research Reports – Number 591 – A Study of the distribution and ecology of the lesser silver water beetle *Hydrochara caraboides* on the Somerset Levels. D C Boyce.

NATURAL ENGLAND. 2010. Shapwick Heath NNR Management Plan 2010-2015. Phil Holmes

NATURAL ENGLAND. 2008. Definitions of Favourable Condition for Designated Features of Interest: Shapwick Heath NNR – Consultation Draft. Liz McDonnell & Steve Parker

EUROPEAN COMMISSION. 2000.

[http://ec.europa.eu/environment/nature/natura2000/index\\_en.htm](http://ec.europa.eu/environment/nature/natura2000/index_en.htm) JNCC. 2008. Ramsar Information Sheet UK11064 Somerset Levels and Moors

### **Objective description**

No decline in species abundance

Maintenance of suitable habitat – late succession ditches and swampy woodland

### **Rationale**

In 2004 detailed research was carried out by English Nature on the species key sites on the Somerset Levels and a report identifying the species' habitat requirements, giving management recommendations was produced. Management of the species on the NNR is based on the information collected in this report and its recommendations.

Key habitat requirements for *Hydrochara caraboides*:

- still, or very slow-flowing water
- shallow, often seasonally inundated waterbodies
- leafy or detritus-rich substrates
- clear water, without excessive growth of floating duckweeds
- abundant invertebrate prey, especially small crustacea and *Asellus aquaticus*
- mats of floating sweet-grass *Glyceria fluitans*

On the Somerset Levels, the above combination of habitat requirements are most often met with in seasonally inundated, late-successional ditches with at least some shading from trees, or in areas of wooded swamp. The following summary aims to pick up the habitat requirements of *Hydrochara* and translate them into management recommendations that will maintain and enhance the breeding colonies of the beetle at its Somerset sites:

- Ensure that the ditch clearing rotation allows for the development of late-successional ditches with shallow water and a deep detritus layer.
- Maintain at least partial tree cover along late-successional ditches within breeding areas.
- Manage water levels to ensure that there is suitable shallow water (less than half a metre) within breeding areas from March through to July.
- Maintain areas of seasonally flooded swamp woodland within the Somerset peat moors. Create new areas of habitat by raising water levels to depths of less than half a metre in woodland between March and July.
- Avoid clearance of ditches within breeding areas between May and August inclusive, when egg cocoons and larvae are in the water, or when pupae are present in ditch banks.

From the report it appears that *Hydrochara* occurred more widely on the Somerset Levels in the past in open ditches. Eutrophication and the concomitant increase in floating duckweeds are cited as the most likely cause of its disappearance from such areas. It has been suggested that finding ways to limit the growth of *Lemna spp.* on previously suitable ditches would be desirable, however, this has been explored and a solution has not been found.

References:

ENGLISH NATURE. 2004. English Nature Research Reports – Number 591 – A Study of the distribution and ecology of the lesser silver water beetle *Hydrochara caraboides* on the Somerset Levels. D C Boyce.

## Feature: 16 - Argent & Sable Moth

### **Feature description**

Shapwick Heath NNR contains important breeding population of Section 41 and nationally scarce species the Argent & Sable moth. The species is now found only very locally in southern England.

References:

BUTTERFLY CONSERVATION. 2018. <https://butterfly-conservation.org/51-1063/argent-sable.html>

### **Objective description**

No decline in population

Increase population distribution by facilitating its re-colonisation of nearby sites where possible

### **Rationale**

Identification of suitable habitat and recommendations for its management have been based on consultations with Butterfly Conservation's Head of Moth Conservation Mark Parsons.

Recent adult moth counts show continuing presence, especially in areas where winter management work has produced areas of young birch growth and mixed-age bog myrtle stands, giving reason to believe that our management techniques are working well.

A land corridor has been identified between Argent & Sable populated areas of Shapwick Heath NNR and former areas of the species range at the Catcott Complex of reserves managed by Somerset Wildlife Trust Reserve. A joint monitoring programme has now been agreed with Somerset Wildlife Trust as a pre-cursor to investigations as to whether a suitable habitat corridor can be created between the two sites.

A new monitoring methodology based on adult flight counts has been developed by Mark Parsons of Butterfly Conservation and Natural England Reserves staff and is currently being trialled on both sites.

References:

Julie Merrett & Mark Parsons (Unpublished). 2017. Argent & Sable Adult Flight Count Monitoring Methodology.

## Feature: 17 - Dragonflies and Damselflies

### **Feature description**

Shapwick Heath NNR has 23 recorded species of dragonfly and damselfly including nationally important and near-threatened species the variable damselfly *Coenagrion pulchellum* and Scarce chaser *Libellula fulva*, and uncommon species the hairy dragonfly *Brachytron pratense*.

References:

British Dragonfly Society <https://www.british-dragonflies.org.uk/>

RoAM records. 2015-18. Unpublished

### **Objective description**

Provide extensive habitat for breeding Odonata species

### **Rationale**

The wetland nature of Shapwick Heath NNR makes it a key site for Odonata species, which rely on aquatic habitats to complete their life-cycles.

Monitoring of the species could contribute to national recording schemes and broader understanding of species distribution.

## Feature: 18 - Bumblebees and other Pollinators

### **Feature description**

Shapwick Heath NNR has recorded 19 species of the 24 British bumblebee species on site within the last 10 years, including small populations of Section 41 bumblebee species *Bombus muscorum* and *Bombus ruderatus* as well as number of other less common species including *Bombus jonellus* and *Bombus soroensis*. The Somerset Levels was also formerly home to a small population of endangered bumblebee species *Bombus sylvarum* but from extensive recent studies it seems to have virtually disappeared from its Avalon Marshes sites due to habitat change.

References:

James Riall. Avalon Marshes Bumblebee Records 2013 -2018 with associated reports (Unpublished).

Julie Merrett. 2015. Undergraduate dissertation on Shrill carder bee *Bombus sylvarum* distribution in the Avalon Marshes.

### **Objective description**

Maintenance of range of bumblebee species and presence/ absence of rarities.

No loss of numbers or distribution within annually fluctuating parameters (Based on James Riall's BBCT Beewalk data).

Maintenance of critical habitats – species-rich grasslands, hedgerows, pockets of scrub (gorse, bramble), early-flowering tree species on meadows (willow, birch).

### **Rationale**

As the range of plant species different bumblebees pollinate, and the diversity of parasitic and commensal organisms that depend on them is so large, bumblebees are considered a 'keystone' pollinator species. Populations of keystone species are vital to keep intact, to maintain the functionality of a natural ecosystem. Habitat management for bumblebees will also benefit the other pollinator groups that are part of that ecosystem.

The key for maintaining pollinators in the landscape is to provide nectar sources from early Spring when species are emerging, right through to late Autumn when they are building- up reserves to see them through the winter hibernations. This is based on the most recent recommendations from the Natural Environment research Council (NERC) and consultation with Bumblebee Conservation Trust.

Along ditch-lines and in grassland restoration areas key patches of willow and gorse are left available as early-season nectar sources. For mid-season continuity a hay-cut map is agreed with the site grazer each year, leaving some fields uncut and some fields with buffer zones, as invertebrate refuge areas. Hedges and bramble patches are key at this time. In late Autumn

these refuge areas are then grazed as late flowers such as Devils-bit scabious *Succisia pratensis* emerges in cut fields, along with ivy flowering in trees and hedges providing necessary Autumn nectar-sources.

The creation and maintenance of woodland glades and rides and open droves, with slightly warmer micro-climates, and nectar sources within them, are particularly important for butterfly species.

References:

JOURNAL OF APPLIED ECOLOGY. 2011. Translating research into action: bumblebee conservation as a case study.

<https://besjournals.onlinelibrary.wiley.com/doi/pdf/10.1111/j.1365-2664.2010.01929.x> Dave

Goulson, Pippa Raynor, Bob Dawson & Ben Darvill

James Riall. Avalon Marshes Bumblebee Records 2013 -2018 with associated reports (Unpublished).

Julie Merrett. 2015. Undergraduate dissertation on Shrill carder bee *Bombus sylvarum* distribution in the Avalon Marshes.

NERC. 2016. Habitat Creation and Management for Pollinators. M Nowakowski & R f Pywell.

## Feature: 19 - National Character Area 142

### **Feature description**

The Somerset Levels & Moors National Character Area Profile describes a landscape dominated by an extensive lowland grassland plain forming a natural drainage basin, with many areas lying below the level of high tides, with an inherent feeling of wetness. Elevated sea defences and river banks, wide drains and a network of wet rhynes and ditches, together with splashy fields and winter flooding, emphasize the importance of centuries of water control in creating the present landscape from a natural marshland.

The Brue river catchment, which constitutes the area of the Avalon Marshes, also contains many examples of small peaty meadows with 'wet fence' ditches, often tree-lined, including with pollarded willows. The historical digging of peat has also influenced the landscape substantially, including the large areas dug mechanically in the post-war period, giving rise to new landscapes of open water and reed swamps which comprise large parts of the NNRs.

The character area also includes historical landscapes with important pre-historical archaeology and industrial heritage (treated in separate sections).

References:

NATURAL ENGLAND. 2013. National Character Area profile: 142: Somerset levels and Moors.

### **Objective description**

- Retaining flower-rich meadows
- Retaining ditches in cycles of succession
- Maintaining corridors of trees along ditch-lines
- Retaining historical pollarded willows
- Retaining high water levels
- Retaining historical features and interpreting them for the public where possible
- Retaining areas of reedbed & open water
- Restoration of peat voids in adjoining areas within landscape
- Recreating & enhancing priority habitats within landscape

### **Rationale**

As part of Natural England (NE)'s responsibilities as set out in the Natural Environment White Paper, Biodiversity 2020, and the European Landscape Convention, the National Character Areas (NCA's) have been developed as areas that have distinctive landscape characteristics, following natural lines in the landscape rather than administrative boundaries, making them a good decision-making framework for the natural environment. One of the functions of NCA's is to support the planning of conservation initiatives at a landscape scale, by providing information on a landscapes natural and cultural features, how these have changed over time, and where opportunities lie in their development.

The NCA framework and function continues to stand within NE's Conservation 21 Strategy (Creating Resilient Landscapes & Growing Natural Capital) and Defra's 25 Year Environment Plan (Enhancing beauty, heritage and engagement with the natural environment). Therefore retaining existing historical landscape features, undertaking agricultural and estate work practices that maintain this landscape (i.e. retention of hay meadows, maintenance of ditch network, pollarding of willows) and developing the site in sympathy with the NCA characteristics is essential.

References:

DEFRA. 2011. The Natural Choice: Securing the Value of Nature.

[www.official-documents.gov.uk/document/cm80/8082/8082.pdf](http://www.official-documents.gov.uk/document/cm80/8082/8082.pdf)

[www.official-](http://www.official-documents.gov.uk/document/cm80/8082/8082.pdf)

DEFRA. 2011. Biodiversity 2020; A Strategy for England's Wildlife and Ecosystem Services.

[www.defra.gov.uk/publications/files/pb13583-biodiversity-strategy-2020-111111.pdf](http://www.defra.gov.uk/publications/files/pb13583-biodiversity-strategy-2020-111111.pdf)

COUNCIL OF EUROPE. 2000. European landscape Convention.

<http://conventions.coe.int/Treaty/en/Treaties/Html/176.htm>

NATURAL ENGLAND. 2016. Conservation 21: Natural England's Conservation Strategy for the 21<sup>st</sup> Century. <https://www.gov.uk/government/publications/conservation-21-natural-englands-conservation-strategy-for-the-21st-century>

DEFRA. 2018. A Green Future: Our 25 Year Plan to Improve the Environment.

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/693158/25-year-environment-plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf)

## Feature: 20 - Prehistoric Timber Trackways and Artefacts

### **Feature description**

Shapwick NNR is situated in an area of immense heritage significance, with some of the most well-known and important wetland archaeological finds discovered in the UK.

With over 88 separate finds registered in the Somerset Historic Environment Record, there is much evidence from the NNR showing that Neolithic people have been living and making use of the wetlands since approximately 6,000 years ago. This evidence includes flint tools, whetstones, pottery, bronze axes and wooden items such as pitchforks and bows. However the most important archaeological finds are the wooden trackways found preserved within the anaerobic conditions of the water-saturated peat.

There are approximately 11 different groups of trackways in the area, many of which have not survived the history of peat digging and desiccation in drained farmland. The two best preserved trackways are those that run through the NNR, the Scheduled Ancient Monuments 'The Sweet Track', dated 3806 BC and the 'Post Track', dated 3838 BC. Prehistoric wooden trackways are very rare in the UK and the majority of those known no longer exist *in situ*. The two trackways on Shapwick Heath are especially important because of the early date of their construction and the wide variety of Neolithic finds along their course. These include a miniature replica axe and a jadeite axe-head from the Alps. It is believed that both of these may have been left as ceremonial offerings, which would make the Sweet Track the earliest ceremonial structure in the UK. The protection of these trackways in-situ, via non-disturbance and the maintenance of high water tables within the NNR gives a rare opportunity for their preservation. Many more archaeological finds may be lying undisturbed within the NNR. Another trackway, the Bronze Age 'Meare Heath Track' has potential for further investigation, preservation and interpretation.

Other important prehistoric finds include an iron-age dugout canoe, in a location near to the main entrance gate. The finds are displayed in The Museum of Somerset in Taunton and a section of the Sweet Track resides in The British Museum. The sand burlles within the reserve have also yielded many signs of pre-historic occupation and the peat and clay deposits of the NNR represent an excellent body of data concerning past landscape change via pollen records, plant and beetle remains, ostracods, diatoms and foraminifera.

References:

ENGLISH NATURE & SOMERSET COUNTY COUNCIL. 2005. Shapwick Heath NNR Heritage Management Plan 2005-2010. Dr. Richard Brunning

### **Objective description**

Preservation of Sweet Track and Post Track in situ via non-disturbance and hydrological control.

Condition checks on Meare Heath Post Track and investigation into whether pro-active management is needed.

Interpretation of pre-historic archaeology, public engagement and education.

A longer term aspiration to secure favourable management of scheduled monument outside of the NNR.

### **Rationale**

Prehistoric wooden trackways still survive in the peat of the NNR but are extremely vulnerable to destruction from desiccation that leads to shrinkage, splitting and decay of organic matter. Root damage from trees growing in wooded areas of trackways route are also a threat. The Sweet Track is kept in the anaerobic conditions necessary for its preservation by maintaining an artificially high water level year-round, through a pump and irrigation system. It is probably the most successful scheme in the country for protecting such a wetland archaeological site.

The significance of the trackway structures in heritage terms is huge but it has been difficult to share this with the public as the structures are underground and cannot be seen. Interpretation has traditionally focussed on guided walks, information boards, leaflets, guides and a range of books are available at the Avalon Marshes Centre. Developments in mobile digital media are opening up new possibilities in terms of interactive interpretation and should be explored.

A footpath has been created along a section of the route of the Sweet Track, through woodland, meadow and reedbed, along which two reconstruction trackways which have been built by South-West Heritage Trust volunteers. The footpath also acts an important glade through the woodland and its proximity to the ditch line under which the Sweet Track runs gives rise to a specialist flora and fauna and creates a 'primeval' feel adding another dimension to the features interpretation. Specialist species that can be seen by the public along this route include marsh fern *Thelypteris palustris*, Royal fern *Osmunda regalis*, greater tussock sedge *Carex paniculata*, and butterflies white admiral *Limenitis Camilla* and silver-washed fritillary *Argynnis paphia* and raft spider *Dolomedes fimbriatus*).

Further projects to improve the interpretation of the trackway features and other elements of the pre-historic archaeology, such as further reconstructions, including at the location of the iron-age dug-out canoe, represent a great opportunity to increase the public's understanding of this unique heritage site. This however has to be carefully balanced with the physical preservation of the features and visitor management.

This rationale is based on English Nature/ Somerset County Council's Shapwick Heath National Nature Reserve Heritage Management Plan 2005-2010 by Dr. Richard Brunning.



## Feature: 21 - Industrial and Agricultural Heritage

### **Feature description**

This feature includes major drainage channels, canals, railways, agricultural and peat-working heritage from c17<sup>th</sup> Century onwards.

The South Drain waterway is a major feature of the reserve, with the two main NNR entrance gates at its junction on Station Road and Ashcott Road. The route of the railway line that ran alongside this waterway comprises the main footpath across the NNR. The South Drain is also a major drainage feature of the Somerset Levels, being constructed in the early 1800s as part of the Brue Drainage Act 1801. However, it wasn't until the construction of the Hunspill River in the 1940's that it began to function for its intended purpose, to drain the moors with a direct outlet to the sea, which has been an essential part of eliminating flooding in the southern part of the Brue Valley. The drain is owned and controlled by the Environment Agency (EA) and as well as its importance as a water control feature, it is also an important connective feature, ecologically linking the NNR to the wider landscape, most significantly to the EA's Hunspill River NNR.

There was also a canal that ran along the other side of the railway line/ main footpath through the reserve, which linked up with the South Drain in parts. Called the Glastonbury to Highbridge Canal, it opened in 1833 and parts of it remain to the side of the footpath, with a section of lock at the far end of the South Drain overlooking Canada Lake. The canal was unfortunately little-used and was soon superseded by a railway built by Somerset Central Railway in 1854 on the original canals tow-path. Extensions were built as far as Wells-Burnham and Edington-Bridgwater by 1890, by then in the ownership of the Somerset & Dorset Railway. The line closed as part of the Beeching cuts in 1966. A narrow-gauge railway for transporting carts of peat across the moors also existed, crossing the main line at the Bridge across the South Drain which now leads to Meare Heath Hide.

Redbrick farm buildings are in evidence at Canada and Brickyard Farms, dating from the 19<sup>th</sup> Century, with Canada Farm still standing and now being leased to the Vincent Wildlife Trust for protection of resident rare bat species.

There is also substantial heritage dating from the peat-cutting era, from the lakes and reedbeds of the NNR which are the voids created by large-scale peat-digging, to many examples of corrugated-iron peat-cutters huts, storage huts and 'shooters lodges'. These peat-era constructions are all examples of local vernacular architecture, although do not represent much of architectural importance. However, the retention or reconstruction/interpretation of these features such as the remains of the peat-workers canteen and narrow-gauge railway sidings at Meare Heath, and the peat factory at Loxton's Plot on Ashcott Road, represent a significant opportunity to interpret the peat heritage of the area which should be explored.

References:

ENGLISH NATURE & SOMERSET COUNTY COUNCIL. 2005. Shapwick Heath NNR Heritage Management Plan 2005-2010. Dr. Richard Brunning

### **Objective description**

Improve interpretation of industrial and peat heritage of the moors.

### **Rationale**

The industrial heritage of the peat moors has been a huge part of shaping the current landscape and its particular part of the National Character Area. Without the voids left by industrial peat-digging the lakes and reedbeds of the NNR would not have been created and it is important to tell the story of this part of the areas landscape evolution. To this end a number of renewed interpretation boards and soundscapes have been installed as part of the Heritage Lottery-funded Avalon Marshes Partnership scheme. The story is also shared through a number of guided walks each year.

Some of the buildings, although not architecturally important, do add to the National Character Area and can lend themselves well to the telling of the peat moors story. They can also provide important habitat for bat and bird roosts e.g. Canada Farmhouse and Dairy, with the tin peat-cutters shed also providing much potential habitat.

The South Drain has great potential to connect to the wider landscape both ecologically and for visitors/ cyclists accessing the reserves, as it runs through the adjoining Ham Wall NNR and on to Glastonbury to the east and runs through the Gold Corner pumping station and into the Huntspill River NNR, ultimately reaching the Bridgwater Bay NNR in the west.

## Feature: 22 - Public Access

### **Feature description**

#### Visitor Appeal and Suitability for Access

With its attractive mosaic of wetland landscapes and mixed range of attractions Shapwick Heath NNR has high visitor appeal throughout the year. Local walkers, joggers, cyclist, families and visitors with mobility issues are able to easily access a range of footpaths with good level access and a number of differing habitats year round. More specialist user groups are attracted by the birdlife, range of invertebrates, reptiles, amphibians, mammals, flora and heritage of the reserve, and will come at different times of year to enjoy these interests.

A steady stream of visitors come to the NNR during the period April - September, generally considered the main walking and leisure season, with the reserve attracting visitors from across south west England and beyond. From the cuckoo's first call, the arrival of the hirundines, dragonflies and hunting hobbies, a plethora of nesting heron species and reedbed specialists, to the flowering meadows with attendant butterflies and bumblebees there is much for visitors to enjoy.

However, as the birds migrate in Autumn again, through the flocks of winter waders and wildfowl, the large starling murmurations, and through to Spring bird migrations and bittern booming in early march, the NNR is well-visited during the colder months of the year as well.

The main access route through the NNR – the old railway line running alongside the South Drain - makes the reserve easily accessible. At the Shapwick Road entrance at the western end paths lead quickly off along the Sweet Track footpath for visitors to experience some of the reserves Neolithic heritage and pass through a number of wetland habitats and out to Decoy Hide, looping back on a circular route to the main path.

At the eastern entrance on Ashcott Road there is an easy-access walkway and relatively short walks to nearby hides overlooking lakes and reedbeds. These both provide good access for visitors and allow easy zoning to enable a central area of the NNR to remain largely undisturbed. A dog-ban is in place here to prevent disturbance to wildlife.

The Canada Farm section of the NNR, with its working farm and meadows and one small hide, tends to attract lower numbers of visitors and provides a differing experience. This section of the reserve has a public footpath, which does provide access for dog-walkers and connects to a circular route through neighbouring Shapwick Moor Reserve.

See Appendix 9: Map 7 Access

#### Access Provision

The reserve is easily accessible by car from the M5 motorway and towns and villages in the area. There is free car-parking provision at the Avalon Marshes Visitor Centre 200 yards from the Shapwick Road entrance to the reserve and a small fee-paying car park at the Ashcott Road entrance. There is limited off-road parking at the entrance to the Canada Farm section

of the reserve.

The closest railway station is Castle Cary (19 miles) or Bridgwater (12 miles). Unfortunately there are currently no bus services linking local towns or villages directly to the NNR.

The old railway line and main footpath along the South Drain runs on eastwards through neighbouring Ham Wall NNR and nearly as far as Glastonbury, where it joins the local road network. This is used substantially by walkers, joggers and cyclists. This footpath is owned by the Environment Agency and is a permissive route only, as are the other footpaths within the NNR. A single public footpath runs through the Canada Farm section of the reserve, joining a permissive route onto the adjoining Shapwick Moor Reserve. The area and terrain as a whole allows for easy, level access for many different groups of users.

The site as a whole has been dedicated for open access, although some restrictions are in place to protect the public from hazards associated with open water and reedbed areas and farm operations, and also to prevent wildlife disturbance.

### Visitor Facilities

The Avalon Marshes Centre provides free car-parking, public toilets, a visitor information point with leaflets and information, a café and an art gallery. It is the central orientation point for the Avalon Marshes area and network of nature reserves. The Centre is also home to a number of historical reconstructions from different time periods, owned and maintained by the South West Heritage Trust. The toilets, café and art gallery are all accessible for those with limited mobility. The Centre is also the location of the NNR workbases and offices for Natural England, Somerset Wildlife Trust, the RSPB and the Hawk & Owl Trust.

The Ashcott Road end of the reserve provides a small fee-paying car park and bicycle racks. It is adjacent to RSPB Ham Wall which provides a larger fee-paying car-park, information and public toilets. Refreshments can be found at the nearby Railway Inn.

Limited off-road parking is available at the entrance to Canada Farm, but a circular route can be followed into the Hawk & Owl Trust's Shapwick Moor Reserve which has a small, free car-park.

Information boards containing NNR information and event news and a leaflet dispenser are in place at both entrances to the South Drain footpath. There are a range of interpretation panels across the reserve giving information on the habitats and heritage of the reserve and of the Avalon Marshes area. There are six hides on the NNR, two of which have full access for those with limited mobility.

The Avalon Marshes website [www.avalonmarshes.org](http://www.avalonmarshes.org) provides information on Shapwick Heath NNR and the other reserves of the area, and provides news, information, staff contacts and events listings. A leaflet outlining dog-walking access across the Avalon Marshes Reserves can be downloaded from the website or accessed at the Avalon Marshes Visitor Information Point. A 'Friends of Shapwick Heath NNR' facebook page provides a weekly 'Wardens Blog'

round-up of work on the reserve, weekly wildlife sightings, news, public notices and a space for the public to comment.

### **Objective description**

Provide infrastructure to safely park visitors to the reserve at both the Shapwick Road and Ashcott Road ends of the NNR.

Provide infrastructure to orientate visitors in the landscape from the Avalon Marshes Centre  
To develop the wider visitor management strategy for the area, working in co-ordination with partners.

To provide and maintain good quality footpaths and viewing-hides for a quality visitor experience.

Provide high quality information boards, leaflets and guides to the NNR to inform visitors.

To provide quality 'short walk' experiences on the edges of the reserve to provide a quality experience, absorb visitor pressure and protect core non-disturbance areas for wildlife.

Long-term objective to provide a safe off-road walkway from the Avalon Marshes Centre to the NNR and/or car-parking closer to the Shapwick Road NNR entrance.

To support continuation of the Avalon Marshes website, and in the future a national NNR website, to provide quality visitor information and orientation to the site and wider landscape.

Provision of 'Friends of' facebook page, newsletter and e-mail updates to regular visitors.

Provision of programme of engagement events to inform and educate visitors.

### **Rationale**

The accessibility of the NNR, the facilities at the Avalon Marshes Centre, and the close partnership of other conservation bodies in the area provides a fantastic opportunity for Shapwick Heath to be utilised as a site for public engagement, education, scientific research, community involvement and demonstration.

Information from visitor number counters installed with Heritage Lottery-funding as part of the Avalon Marshes Landscape Partnership show that Shapwick Heath receives approximately 80,000 visitors per annum, part of approximately 120,000 who visit the suite of reserves as a whole. This number is rising as the profile of the area continues to build.

Safety of visitors on roads and parking is paramount and to this end as much parking as possible is provided and any opportunities for more areas for parking are always investigated. 'Starling season' is the time when very large groups of visitors can congregate in any one destination on any of the reserves, or in privately owned areas of the landscape. Parking, safety and disturbance to the local community can all be serious issues and need to be tackled with a co-ordinated approach from all the partner organisations. Annual planning meetings are held and a 'Starling Hotline' is in operation to direct visitors safely. Some control is exercised over

media promotion of the spectacle where possible.

Good quality footpaths, hides and interpretation are maintained in carefully zoned parts of the NNR, mostly on the edges of the reserves and from the South Drain. Natural England's objective is to provide a good quality visitor experience whilst also containing people in manageable areas, thus allowing large parts of the NNR to remain undisturbed to benefit wildlife. A dog ban is maintained on Shapwick Heath as research shows that they pose a significant disturbance threat to wildlife, and Shapwick Heath, as the core of the Avalon Marshes reserves, is able to act as this refuge area within the landscape.

With an increasing number of visitors it is vital that the provision of suitable walkways and hides in appropriate zones is expanded, as well as providing a great opportunity to engage, educate and provide nature connections for the general public. The development of the Avalon Marshes Centre is vital to this overall objective as it provides parking, visitor information and orientation for the whole landscape. It also provides a location for local businesses to provide from and is a source of income to support the management of the NNR. Wildlife tourism is a growing part of the local economy and an important one to engage with, both to generate further income for the reserves, and to maintain quality of experience and control disturbance issues. The Avalon Marshes Website is also an important provider of information and orientation, and a visitor information officer is increasingly needed to manage visitors to the site.

Large free events held at the Avalon Marshes Centre act as a first point of contact and community engagement opportunity, and the programme of guided walks and specialist group provision aims to provide some form of engagement for every age-group and interest.

The lack of public transport to the site is an issue. Links are being developed with the Glastonbury Tourism Forum to develop cycle routes and information to encourage more sustainably transported visits to the reserve.

These provisions reflect Principle 5 of Natural England's NNR Management Standards and the aspirations of the Conservation 21 Strategy, putting people at the heart of environmental conservation.

References:

NATURAL ENGLAND. 2016. Direction Notice: Restriction of Public Access Under The Public Rights of Way Act 2000, case no. 2015118004.

NATURAL ENGLAND. 2013. NNR Management Standards. Liz Newton

NATURAL ENGLAND. 2016. Conservation 21: Natural England's Conservation Strategy for the 21<sup>st</sup> Century.

## Feature: 23 - Education and Public Engagement

### **Feature description**

A formal field-teaching scheme 'Schools on Reserves' is currently jointly funded by Natural England and the RSPB operating across both organisations reserves, Shapwick Heath NNR and Ham Wall NNR. There is also a jointly funded informal engagement officer working across both reserves delivering family-orientated nature activities. These include larger partnership showcase events 'Wild Days Out', delivered at the Avalon Marshes Centre, that act as a first point of contact for families to access the reserves of the area and engage with them through a range of hands-on environmental games and activities. Smaller, more in-depth, bookable family- sessions include 'Forest School for All the Family' which are learning-through-play sessions on the reserve, which includes den-building, bug-hunting, craft and camp-fire activities with a trained leader.

A programme of public, bookable guided walks and talks is on offer, generally covering topics regarding some of most popular species of the NNRs such as birds, otters and butterflies, as well as a range of walks looking at Shapwick Heath's pre-historic and industrial heritage. The Avalon Marshes Open Day at the Avalon Marshes Centre is a very important annual event where Natural England hosts many of the partner organisations of the area to showcase our joint work across the landscape and engage with local communities.

Shapwick Heath also plays host to many self-led visits or short guided tours for Universities and other establishments of further and higher education. A Young Wardens Scheme is co-ordinated by Natural England with local conservation partners to provide extra-curricular activities for the 12-17 year old age group and supports the volunteer recording group. Natural England provides some administrative support to the local volunteer recording group 'RoAM' (Recorders of the Avalon Marshes) to attract, develop and mentor those interested in developing natural history skills and provide volunteer assistance with survey and monitoring work.

A number of student work placements are provided annually from week-long Year 10 student placements, to day-a-week year-long placements for FE and HE students, right up to dissertation and Masters Projects and potential for PHD studies. In the last 5 years a number of apprenticeships have been in place through the Heritage Lottery-funded project and latterly through centrally-funded placements through the National NNR team.

A Visitor Engagement Officer post is currently supported at the Avalon Marshes Centre, in partnership with Somerset Wildlife Trust. This is a key role in orientating visitors new to the landscape, enabling them to access local reserves and other amenities. The growing public profile of the area is making this ever more essential.

### **Objective description**

To continue developing the field teaching scheme, working with other key partners in the

landscape (Somerset Wildlife Trust, South West Heritage Trust, Hawk & Owl Trust) to encompass the Avalon Marshes suite of NNRs as a whole, as well as the historical reconstructions at the Avalon Marshes Centre.

Building and running a of a new education building at the Avalon Marshes Centre.

Development of Avalon Marshes Centre and the Visitor Engagement post.

Developing and expanding the range of opportunities for families and young people to engage with the NNRs, either directly or by working with third parties.

Expanding links with Universities and recorder groups, with provision of laboratory facilities in the new education building.

Continuing to build relationships with Universities and specialist groups

### **Rationale**

The accessibility of the NNR, the facilities at the Avalon Marshes Centre and the close partnership of other conservation bodies in the area provides a fantastic opportunity for Shapwick to be utilised as a site for public engagement, education, scientific research, community involvement and demonstration.

Engagement with the public, involvement of local communities and providing educational opportunities to understand the natural environment are a key part of what NNRs should provide to the public. This is underpinned by Principle 5 of Natural England's NNR Management Standards, Conservation 21's 'People at the Heart' theme and the 2017 NNR Joint Strategy.

The Visitor Engagement post at the Avalon Marshes Centre is an important part of linking the provision of this public engagement on NNRs with connections to the wider landscape.

References:

NATURAL ENGLAND. 2013. NNR Management Standards. Liz Newton

NATURAL ENGLAND. 2016. Conservation 21: Natural England's Conservation Strategy for the 21<sup>st</sup> Century.

NATURAL ENGLAND. 2017. National Nature Reserve Joint Strategy

## Feature: 24 - Science and Research

### **Feature description**

Shapwick Heath NNR, with the accompanying facilities of the Avalon Marshes Centre holds huge potential as a scientific and research hub for natural history and heritage and is undergoing continual development.

In terms of the NNR, an extensive hydrological study of the reserve was undertaken by Plymouth University in 2014, from which improvements to the hydrology and management of habitats can be planned. More focussed internal monitoring of the mire habitats has since been undertaken by NNR staff, with the support of the Floodplain Meadows Partnership and Nottingham Trent University.

A long-term citizen science project 'RoAM' (Recorders of the Avalon Marshes) is in development, to improve species recording across the Avalon Marshes area. Part of this project is also working with Somerset Environmental Records Centre (SERC) to develop a shared recording database for the area, to provide accessible biological data, which is the evidence that underpins management work. This project very much aims to engage the public and also act as a catalyst in establishing the Avalon Marshes and the Avalon Marshes Centre as the above-mentioned biological recording and scientific 'hub', with many sub-groups studying specialist areas as well as workshops aimed at the general public and 'beginner' recorders.

Surveying and monitoring of habitats and species on the reserve relies heavily on volunteers and these relationships and resource support for them is incredibly important. Much of the data collected feeds in to national data-sets e.g. WeBs counts, otter surveys, bittern surveys.

Opportunities to host external research projects are always taken where possible, such as the 2017/2018 WetlandLIFE project using Shapwick Heath NNR being as a case study into how local people use and value their wetlands. This includes a link with Public Health England (PHE) to monitor mosquito's in the wetland environment.

Links with Bridgwater College and the University of the west of England (UWE) are being developed to increase student participation in scientific study and research. A list of suitable project areas are on offer as dissertation, master and PhD research subjects.

#### References:

PLYMOUTH UNIVERSITY. 2014. Surface Hydrology of Shapwick Heath National Nature Reserve, Somerset – Final Report. K Solman

### **Objective description**

Put a range of long-term monitoring and surveying projects in place.

Species records to be entered and held in RoAM database to be used as scientific evidence base for NNR management planning & decision-making.

Scientific study developed from these long-term datasets by outside researchers or students

which give tangible results and benefits that can be put into practice on the ground. Engagement with the scientific community, recording groups and development of the area and the Avalon Marshes Centre as a hub for this, and for drawing in and educating new recorders.

Development of links with Universities to provide field skills training.

Continuing development of Citizen Science project RoAM

### **Rationale**

The accessibility of the NNR, the facilities at the AMC and the close partnership of other conservation bodies in the area provides a fantastic opportunity for Shapwick to be utilised as a site for public engagement, education, scientific research and community involvement.

The developing RoAM project serves the purpose of engaging with specialists from the recording community, provides a structure to mentor those new to field-recording, allowing development of this human resource. The creation of an easily-accessible scientific evidence base for management, working across NNR borders and organisations.

Utilisation of existing groups of recorders e.g. Somerset Bat Group, Otter group, Butterfly Conservation, and the bird-recording community, also provides much important evidence and generates specialist advice. Student studies have been a little more opportunistic in nature but a list of study areas has been compiled to refer to when opportunities arise. Increased provision and structure would be desirable. The building of a formal link with the University of the West of England (UWE) is designed to address this gap.

Scientific research, engagement with the public, involvement of local communities and providing educational opportunities to understand the natural environment are a key part of what NNRs were established to provide to the public. This is underpinned by Principle 5 of Natural England's NNR Management Standards, Conservation 21's 'People at the Heart' theme and the 2017 NNR Joint Strategy.

Provision of scientific, research and training workshops from the Avalon Marshes Centre facilities could be a future source of income generation for Natural England's Somerset, Avon and Wiltshire area team. E.g. Natural England Field Unit provision of chargeable external training courses.

### References:

NATURAL ENGLAND. 2013. NNR Management Standards. Liz Newton

NATURAL ENGLAND. 2016. Conservation 21: Natural England's Conservation Strategy for the 21<sup>st</sup> Century.

NATURAL ENGLAND. 2017. National Nature Reserve Joint Strategy

## Feature: 25 - Demonstration

### **Feature description**

The accessibility of Shapwick Heath, along with the facilities available at the Avalon Marshes Centre enable the NNR to be well-placed to promote demonstration of best practice on conservation, land management and landscape scale functions, innovative technology and new ways of working.

Presently, occasional use is made for management demonstration events, centred on habitat and species management techniques; also demonstration of innovative ways of working such as crowd-funding, starting small-scale income generation projects (e.g. Shapwick Heath NNR Firewood project), and utilising new technology to improve efficiency (e.g. Collector Infrastructure and Tree Safety Survey app).

There is much potential to develop the demonstration potential of the site and promote Shapwick Heath as a location for habitat and species management courses, such as recent NE Field Unit 'Floodplain Meadows Management' training. The development of a conservation farming demonstration area in the wintering yard, showcasing best practice in water quality and flood management, is another promising potential project.

There is also potential to assess and quantify natural capital, eco-system services, the wider economic benefits for the area, effects on health and wellbeing, potential for use of net gain to improve landscape surrounding NNRs and alternative methods of funding.

### **Objective description**

Develop exemplary management status of site by more use and provision of training courses for conservation professionals.

Pursuit of opportunities to be used as a case study for net gain and natural capital assessment.

Development of wintering yard facility as conservation farming demonstration area/ biofuel demonstration, water quality, floodwater management.

### **Rationale**

The accessibility of the NNR, the facilities at the Avalon Marshes Centre and the close partnership of other conservation bodies in the area provides a fantastic opportunity for Shapwick to be utilised as a site for public engagement, education, scientific research and community involvement and demonstration. The range of wetland habitats on Shapwick is a great resource for demonstrating exemplary management techniques.

As funding becomes more of a challenge for all bodies in the sector, innovative ways of working and funding are an important area to explore and share. Including background rationales for these such as quantifying our natural capital and eco-system services, as well as demonstrating

social and economic benefits such as improvements to health and wellbeing, and economic benefits to the area arising from becoming a 'wildlife destination'.

Shapwick Heath's centre of farming operations, the 'wintering yard' needs physical improvements as a priority and holds great potential for providing a space to demonstrate exemplary farm management, improvements in farm water-quality management that should be exploited.

## Feature: 26 - Community Involvement

### **Feature description**

The closest communities to the NNR are the villages of Westhay, Meare, Ashcott and Shapwick, along with a number of small, isolated farmsteads. Natural England always seeks to maintain good relationships within the community, informing people of our activities, consulting them on issues that will affect them and making the NNR an accessible place for them to enjoy. A number of consultations took place during the development of the Avalon Marshes Centre, and much discussion and work has taken place around the management of visitors during starling season, which has a significant impact on rural roads. Links are maintained with Parish Councils to inform and consult on ongoing developments and links to local schools to encourage them to use the NNR as a resource. Attendance to local events and the giving of guided walks and talks for local groups is also taken up whenever possible.

Links are in place with local Tourist Information Centres in the towns of Glastonbury and Wells to encourage the use of the NNR by the urban populations of the area. The development of the relationship with Glastonbury is a particular at present, with projects to develop the physical link, via the South Drain Railway line footpath, for access by urban communities without the use of cars.

Volunteer groups are a huge part of the management the NNR and how a substantial amount of our work is accomplished. From practical estates work-groups, to specialist recording groups, to those that help with education, events and visitor information. These groups are an incredibly important human resource and also powerful advocates for the NNR. Valuing them and supporting their continued development is vitally important.

Other important community user groups include: specialist wildlife enthusiasts, adults with learning disabilities, disabled access facility users, health & wellbeing, exercise (cyclists/joggers), families, photographers, artists, church groups.

The annual Avalon Marshes Open Day in June, which showcases the work of all the conservation and heritage organisations in the area, is an important opportunity to converse with and update our local community. The Avalon Marshes website, Friends of Shapwick Heath facebook page and NNR newsletter are also important means of communication with these groups.

### **Objective description**

To maintain excellent relationships with people living in the local community.

To inform and provide opportunities for consultation on management of the reserve and development of the Avalon Marshes Centre.

To provide a wide range of volunteering opportunities, building and maintaining excellent relationships with these groups.

To continue to develop links with local urban communities.

## **Rationale**

The accessibility of the NNR, the facilities at the AMC and the close partnership of other conservation bodies in the area provides a fantastic opportunity for Shapwick to be utilised as a site for public engagement, education, scientific research, community involvement and demonstration.

Engagement with the public, involvement of local communities and providing educational opportunities to understand the natural environment are an important part of what NNRs should be providing. This policy is underpinned by Principle 5 of Natural England's NNR Management Standards, the theme of 'people at the heart' of environmental conservation advocated by the Conservation 21 Strategy and the by the 2017 NNR Joint Strategy.

The growth in 'wildlife visitors' to the area has a significant impact on rural infrastructure and to the atmosphere of the area. It is important to inform and consult with local people and make changes where necessary to accommodate their feelings and requirements. It is hoped that local people feel a sense of pride and ownership of the area and benefit from its continuing development, whether it be enjoying the resource for personal recreation or by benefitting economically through running related small business ventures.

Volunteers are highly valued for the contribution they make to NNRs. When registering with Natural England volunteers sign-up to the 'Volunteer Promise', a set of rules and behaviours that both parties are committed to, and ensures they are properly covered by Natural England's health and safety procedures and clearly valued for what they do. A trial day is always undertaken before formal registration so there is clear agreement on the nature of tasks any volunteer is committing to.

Links with local urban communities are currently largely based around attendance to events, guided walks and talks and school visits. Natural England aspire to develop more sustainable transport links, wider understanding of the heritage and wildlife of the area and clearer opportunities for new users to utilise the NNR resource for health & wellbeing benefits.

### References:

NATURAL ENGLAND. 2013. NNR Management Standards. Liz Newton

NATURAL ENGLAND. 2016. Conservation 21: Natural England's Conservation Strategy for the 21<sup>st</sup> Century.

NATURAL ENGLAND. 2017. National Nature Reserve Joint Strategy

## Feature: 27 - Economic Use

### **Feature description**

Shapwick Heath, as the largest and most central reserve of the Avalon Marshes, is at the core of what is fast becoming one of the top wildlife tourism destinations in the country. This stimulates significant business in the area from local B&Bs and campsites, to wildlife tour operators and new developments in eco-tourism 'glamping' sites. This actively supports and enriches opportunities for local shops, businesses and suppliers.

Natural England's base at the Avalon Marshes Centre host offices for the other conservation bodies with reserves that make up the Avalon Marshes, these include the RSPB, the Somerset Wildlife Trust and the Hawk & Owl Trust. The site also hosts the South West Heritage Trusts historical reconstructions that will soon be used for demonstration and education purposes, an Art Gallery where local artists showcase and sell their work and a cafe/ catering business. An education building and garden area is available for use by many local groups, education and meeting facilities are provided for a range of activities both professional and community-orientated. Use of the NNR and Avalon Marshes Centre to encourage and support proactive management of the reserves of the area, enable cost recovery for management activities and to support local business ventures is also key.

Grazing agreements on Shapwick Heath and a herd of red devon cattle bred for beef provide income for local farmers. The NNR itself stimulates employment in the form of Natural England staff managing the reserve, as well as employment of contractors and suppliers. Provision of work placements, apprenticeships and work experience opportunities contributes to the economic prospects of those who take part in them.

### **Objective description**

Continuing development of the Avalon Marshes Centre and income-generating opportunities that it provides for both Natural England and private businesses.

Development of an appropriate charging policy that allows for cost-recovery but is not detrimental to relationships with local communities (e.g. car-parking, event charging).

Development of income generation opportunities from NNR activities to support NNR management (e.g. firewood, FSC Guides).

Tackle issues and develop opportunities arising from 'wildlife tourism'.

Planning to benefit the area from 'net gain' opportunities.

Investigating the opportunities to benefit from 'natural capital' funding opportunities.

## **Rationale**

It is of great importance to maintain the delicate balance between the need for cost recovery on operations and need to generate income to support the management of the NNR; with the need to provide a public and community resource that is already being supported by the taxpayer, acting as an engagement and education facility for people to learn about and value the natural environment. This means there must be a clear division between charges designed as cost recovery for provision of a public/community good (e.g. general guided walks, family and young people's groups, school visits, annual parking passes) to commercially chargeable income-generating operations (e.g. firewood, FSC Guides, wildlife tour operations).

These charges are discussed and carefully set in agreement with partner organisations of the area at the Avalon Marshes Steering Group. The aim is to have a unified charging policy, and for organisations to work with each other, not in competition with each other, for 'customers' to events or car parks. Avalon Marshes Landscape Partnership (AMLPL) legacy work includes the utilising of the AMLPL legacy fund, and drawing in further joint funding, to support the work of an Avalon Marshes Visitor Information Officer, to continue to manage visitors to the area and maximise economic opportunities arising from this. 'Wildlife Tours' are becoming an increasingly important area to tackle as external, private operators are now making profits from touring the reserves without a mechanism for them to contribute to the cost of managing the NNRs. This needs to be addressed by the Avalon Marshes Partnership as a whole.

Payments from Higher Level Stewardship agreements to land managers and graziers of the suite of NNRs of the area is vital in maintaining this part of their management.

External funding needs to be sought whenever possible to continue developing visitor facilities, and partnership projects across the landscape.



## Feature: 28 - Buildings and Infrastructure

### **Feature description**

Shapwick Heath NNR has an amount of built infrastructure within it and associated with it.

This includes:

- Avalon Marshes Centre: Office, Workbases, Classroom/ Meeting room, Arts & Crafts Gallery, polytunnel/covered area, Café, Public toilets, historical reconstructions (belonging to South-West Heritage Trust), pond & wildlife garden area, ex-Peat Moors Centre site and car park – Managed by Natural England (NE) separately from NNR.
- Ashcott Road car-park and car-parking meter – Managed by NE as part of NNR
- Six bird-hides (See Map 7: Access) – Managed by NE as part of NNR
- Pedestrian footpaths and footbridges – Managed by NE as part of NNR
- South Drain footbridge and vehicular bridge – Owned by the Environment Agency who are responsible, but can delegate maintenance works of footpath to NE.
- Canada Farm working farm buildings (leased to grazier) – Managed by NE and grazier as part of NNR
- Canada Farmhouse bat roost – Leased to and managed by Vincent Wildlife Trust
- Wintering yard facilities including: cattle shelter, hay barn, bio-fuel barn, old peat-cutters shed (bat roost) - Managed by NE and grazier as part of NNR

### **Objective description**

Continuing development of Avalon Marshes Centre as visitor, community, volunteer and business hub.

Maintaining office and workbase, central to operational delivery and management of Somerset NNRs.

Provide necessary public car-parking for NNR access.

Provision of quality footpaths and hides for good visitor experience.

Provide necessary infrastructure to enable grazier to deliver Higher Level Stewardship commitments to habitat management.

Maintenance of buildings relating to bat usage.

### **Rationale**

The Avalon Marshes Centre acts as the central point for orientating visitors in the Avalon Marshes landscape, also providing public facilities and local business opportunities. The office and workbases form the basis of the physical partnership between the conservation organisations operating in the area and enable all operational delivery.

Car-parking and access routes, and provision of on-reserve facilities are key to visitor management and zoning. Farm building and wintering yard are essential to farm management of habitats.

NNR staffs prime consideration of buildings is public safety and six-monthly inspections, programmes of repairs and audits are in place to ensure this.

## Project Register

### MG++/1 GRAZING

Grazing on Shapwick Heath is currently undertaken by Mrs ER Whitcombe under a 10-year Natural England (NE) Higher Level Stewardship (HLS) Agreement which is in place until 2021. The necessary infrastructure for this operation is provided by NE with a barn at Canada Farm (Unnumbered unit between 44 & 45), and a covered area, yard and hay barn at the 'wintering yard' (Unit 60). A metered water supply feeds troughs, and rainwater collection butts on buildings are in place. Fencing and gates of field units are the responsibility of NE, whereas wet fences (ditches) are incorporated into the HLS agreement.

A closed herd of approximately 80 red devon cattle grazes the organic grasslands of Canada Farm, along with a small herd of approximately 12 Bagot goats. Stocking densities and hay-cutting dates are stipulated in the HLS agreement and discussed and agreed with NE ground staff, HLS advisor and Responsible Officer (RO) as necessary. A small herd of approx. 12 highland cattle are utilised to graze mire and reedbed units, as well as 28 days permitted on Canada Farm (as this herd does not hold organic status).

A number of meadows per year are closed for hay and cut and collected in the traditional manner, as per the HLS agreement. A 'hay-cut map' is agreed annually by the grazier, reserve staff and HLS advisor; this is to incorporate areas kept as refuge for invertebrates, pollinators, reptiles and harvest mice during the main cutting season. Post hay-cut meadows are opened for aftermath grazing.

With potential changes to the hydrology of the mires a review of grazing animals needs to be undertaken to ensure they are grazed sufficiently, with other animals and breeds considered.

Project planning:

F/Y 2018/19: Annual grazing and hay-cut

F/Y 2019/20: Annual grazing and hay-cut/ Grazing Review

F/Y 2020/21: Annual grazing and hay-cut/ Implementation of review

F/Y 2021/22: Annual grazing and hay-cut

F/Y 2022/23: Annual grazing and hay-cut

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### MH5/1 REEDBED MANAGEMENT

A reedbed is a mid-successional habitat that needs regular mechanical interventions to maintain. To support the mosaic of open water, reedbed in various stages of maturity, along with small areas of scrub (but not dominating); it is necessary to have in place a rolling programme of cutting and clearing to keep areas of water open, successional stands of reed and limit areas of scrub.

To maintain areas of water open a Truxor is employed on contract to undertake cutting of required areas on rotation (see re-plan intervals). Lowering water levels to cut areas of reed on regular rotation, to create different age stands, is difficult on Shapwick as imperfect hydrological

control is exercised over different reedbed units. The case is the same for accessing reedbeds to manually control scrub growth. To this end the use of specialist contractors with large-scale machinery to cut and clear areas of scrub on a 7-10 year cycle (see re-plan intervals) is employed. This work is only carried out between the end of August and the end of October.

Reedbeds that have been created from voids left by historical peat-digging are constructed with clay bunds around the outside to isolate these raised water-level areas and ensure control of the unit. In some of Shapwick's reedbed units these bunds have not been constructed at the most desirable topography for wildlife. It is an aspiration that at some point if the funds became available, re-profiling of these bunds would be undertaken.

References:

RSPB. 1996. Reedbed Management: For Commercial and Wildlife Interests. C J Hawke and P V Jose.

Project planning:

Winter 2018: Truxor Roughet (Units 46 & 50)

Winter 2019: Truxor Meare Heath, the scrape & Loxtons (Units 66a, 66b & 70)

Winter 2020: Truxor Noah's (Unit 51)

Winter 2021: Truxor Canada Lake (Unit 41)

Winter 2022: Truxor Decoy (Unit 48)

Specialist reedbed scrub control completed on 70 Acres and Meare Heath (Units 66a & 52) Winter 2017 so next needs to be planned into the cycle 2023-28 with Roughet (Units 46 & 50) priority.

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**ME/3      HYDROLOGICAL MANAGEMENT**

Shapwick Heath, with its history of drainage and peat extraction, and imperfect control over its water control features (WCFs) is a complex hydrological system to manage. In 2014 a comprehensive report of the reserve's surface hydrology was undertaken by Plymouth University, producing hydrological maps, an inventory of WCFs, water quality analysis, and recommendations for remedial works. This now forms the basis of continuing hydrological improvement works on the NNR.

A number of the recommended priority remedial works have been undertaken under the last management plan cycle and now a new list of priorities needs to be drawn up for the next cycle of works to be planned. Planned works will take into account the location of each WCF and will be undertaken in the correct time-frame to avoid any adverse effects on designated features as required by Habitat Regulations Assessments.

Water levels and water control on the mire restorations are a priority, as improvements to hydrology for these SSSI units are essential to bringing them back into favourable condition. Advice from an eco-hydrologist is being sought as part of the mire restoration project pertaining to The Lows (Unit 43) and based on this advice a scoping project and funding for subsequent work will be sought.

References:

PLYMOUTH UNIVERSITY. 2014. Surface Hydrology of Shapwick Heath National Nature Reserve, Somerset: Final report. K Solman

FY 2019/20: Eco-hydrologist to advise on priority work on mire restorations

FY 2020/21: Scoping project for any major WCF work

FY 2021/22: WCF remedial work

FY 2022/23: New WCFs operational

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**MH/4 MIRE RESTORATION**

A vital element in restoring the desired plant communities to the degraded mire habitats of Shapwick Heath depends on creating the correct hydrological conditions. As the units sit within a drained landscape, are criss-crossed with ditch features important in their own right and controlled by hydrological structures that are in a mixed state of repair this is currently not achievable. The next step in restoration is to obtain the services of an eco-hydrologist to provide advice on the capital works that need to be put in place to achieve favourable condition targets.

Other work necessary to restore these habitats such as scrub clearance, ditch management and grazing are contained in the projects associated with these subjects.

Other features that need to be taken into account within the mire restoration are: areas of rougher, dryer grassland to be maintained for adders and harvest mice which are present, the need for droves and water control features to be surveyed for adder hibernacula before any works are carried out, some scrub (such as gorse, willow and birch) to be retained to provide early nectar sources for pollinators and the retention of bog-myrtle as an important species in Somerset in its own right and as a food-plant of the Argent & Sable moth.

References:

PLYMOUTH UNIVERSITY. 2014. Surface Hydrology of Shapwick Heath National Nature Reserve, Somerset: Final report. K Solman

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**MH++/3 DITCH MANAGEMENT**

The ditch network across the Somerset Levels & Moors are an essential part of the functioning of the landscape. Moving water around the landscape, draining fields, holding water in others and acting as 'wet fences' to contain livestock. They are an essential part of the National Character Area profile and are SSSI features in their own right. Maintenance of ditch networks on the NNR affect the functioning of the network across the landscape and so need to be maintained as a statutory duty and essential part of health and safety.

To maintain these functions and the range of specialist habitats they provide it is necessary to have an annual programme of ditch maintenance. Ditches should be cleared on a rotation of 3-5 years so each ditch progresses through its stages of succession, providing differing habitat niches in different years and ensures there is always a mix of successional stages on the site as a whole in any one year.

Ditch-side vegetation should be flailed and then the ditch cleared-out with a mechanical ditching bucket. This should be carried-out either one side per year only or both sides but staggered, so that there are sections left undisturbed between cleared sections. Ditching works are carried out between August and October only.

Fields under the Higher Level Stewardship (HLS) agreement are the responsibility of the grazier and ditches within the non-HLS areas of the reserve are the responsibility of Natural England (NE). A 'ditching map' is agreed annually with advice from the sites Responsible Officer (RO) and HLS advisor. This is then undertaken by the grazier or other contractors with the necessary specialist equipment. Particular species niches and needs to bear in mind are great crested newt *Triturus cristatus* which relies on early successional ditches, breeding water-vole *Arvicola amphibious* populations that rely on mid-successional ditches with 45 degree sides suitable for burrows, and lesser silver water beetle *Hydrochara caraboides* which relies on late successional ditches and seasonally inundated wet woodland.

Some ditches have become very overgrown and/or need further remedial work associated with water control features (WCFs) and these are restored separately from the annual ditching programme. Once restored they can be put into the work planning for the annual programme. A focus for this management plan cycle is the ditch network surrounding the cotton grass field (Unit 47a) and is to enable the spread of rare plants from the central ditch further into the network. (See Appendix 10: Map 8 Cotton Grass Field Ditch Restoration Programme).

Further to this there are a number of very fragile, species-rich ditches in particularly wet fields that need specialist attention. NE retains the ditching in the cotton grass field's central ditch (Unit 47a) and clears the Sweet Track ditch (Unit 59) and shallow hand-cut ditches on the Ashcott Plot (Unit 54) by hand.

#### References:

FROGLIFE. 2001. Great Crested Newt – Conservation Handbook. Tom Langton, Catherine Beckett and Jim Foster.  
THE MAMMAL SOCIETY. 2016. The water Vole Mitigation Handbook – Fens for the Future. M Dean, R Strachan, D Gow, R Andrews.

#### Project planning:

FY 2017/18: Annual rolling programme of maintenance/ Sweet Track restoration ditch 1 & 2  
FY 2018/19: Annual rolling programme of maintenance/ Sweet Track restoration ditch 2 & 3  
FY 2019/20: Annual rolling programme of maintenance/ Sweet Track restoration ditch 3  
FY 2020/21: Annual rolling programme of maintenance/ Sweet Track restoration ditch 4  
FY 2021/22: Annual rolling programme of maintenance/ Sweet Track restoration ditch 5

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Areas of established wet woodland are an important feature of the mosaic of wetland habitats on Shapwick Heath. Glades within these woodlands are important areas for invertebrates and there are a number of interesting veteran trees. Tree safety in Zones 1 & 2 of publicly accessible areas are also a key part of our management (See Appendix 11: Map 9 Tree safety Zones).

Management falls broadly into four main areas:

- Glade creation for butterfly and groundflora species within woodland blocks – This is particularly important for butterfly species white admiral *Limenitis camilla* which relies on patches of honeysuckle and bramble within oak stands, and silver-washed fritillary *Argynnis paphia* that relies on oaks near the larval food-plant of dog-violet. The royal fern *Osmunda regalis* needs patches of light to thrive and the vascular plant assemblage through the woods of the ‘Sweet Track footpath’ hold a unique flora due to the ‘edge’ effect between a number of different wetland habitat types (see Sweet Track conservation project). Small glades are created when necessary in blocks of woodland in the Sweet Track woods (Unit 59), woods around Meare Heath Hide (Unit 66a) or occur naturally, or are created by being combined with a footpath. This is undertaken by reserve staff during the winter season.
- Footpath maintenance and tree safety work in Zones 1 & 2 – Many footpaths are maintained as glades (also known as rides), footpaths need to be kept in repair by building up with lengths of cord-wood and topped up with woodchip annually (arising from scrub-work on other parts of site). Encroaching vegetation needs to be cleared back with the use of mowers and brushcutters to keep routes accessible. Formal tree safety surveys are undertaken along publicly accessible routes every six months and ongoing monitoring, and work to keep public routes safe is part of daily maintenance. This is undertaken by reserve staff and specialist arboricultural contractors when necessary.
- Recording and monitoring of veteran trees – There are a number of old oaks on site that would benefit from being compiled into an inventory. The veteran oaks in Decoy Woods (Unit 71) are losing large limbs and the footpath is kept well away from this area. This will be added to the student project list.
- Clearance of secondary woodland encroaching into grassland and mire – This is dealt with in the scrub clearance project.

Project planning:

FY 2017/18: Sweet Track woodland footpath-glade widening/ Footpath maintenance/ Tree safety works

FY 2018/19: Veteran oak inventory/ Footpath maintenance/ Tree safety works

FY 2019/20: Possible Meare Heath woodland glade creation/ Footpath maintenance/ Tree safety works

FY 2020/21: Footpath maintenance/ Tree safety works

FY 2021/22: Footpath maintenance/ Tree safety works

FY 2022/23: Footpath maintenance/ Tree safety works

## **MH14/1 SCRUB MANAGEMENT**

Grassland and mire units that have not been retained as open grassland in the past have become subject to scrub encroachment. Drainage of surrounding land and imperfect hydrological control of the NNR continue to contribute to this. Grassland and mire units need to be cleared from scrub, made accessible for grazing and scrub clearance maintained to maintain favourable condition.

SSSI units that are not yet in favourable condition can attract SSSI funding and contractors can be employed to concentrate on key areas, or deal with areas where tree size is considerable. Other areas that have smaller scrub or regeneration, are dealt with by reserve staff and volunteers. Large scrub is controlled by removal with chainsaws and hand-tools. Smaller scrub is dealt with by soft-traking or brushcutting. Once the correct hydrology and grazing regime is re-established fully within a unit, manual clearance of scrub should become unnecessary.

Bog-myrtle and birch scrub on The Lows (Unit 43) is managed specifically for the Argent & Sable moth by staff. A mixed-age bog-myrtle stand is retained by soft-traking these fields in late Summer/ early Autumn in a random pattern, to maintain a mosaic, and an amount of young birch re-growth is cut each winter to ensure supplies of early birch re-growth the following Spring, which is necessary for the species to complete its life-cycle.

Scrub management within reedbeds is treated separately, under reedbed management.

Key areas of focus within this management cycle are the continuance of scrub clearance on the Ashcott Plot (Unit 54), on The Lows (Unit 43) and the fen field (Unit 47a) to return to favourable condition.

FY 2017/18: Ashcott Plot scrub clearance/ A&S work

FY 2018/19: Ashcott Plot scrub clearance/ A&S work

FY 2019/20: The Lows scrub clearance/ A&S work

FY 2020/21: The Lows scrub clearance/ A&S work

FY 2021/22: The Lows scrub clearance/ A&S work

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## **ME/4 DROVE/ FOOTPATH MANAGEMENT**

Droves and footpaths need to be maintained for public use and access, with many also acting as important glades through sections of woodland.

Stoned trackways need occasional pot-hole filling work. Small sections can be repaired by staff and volunteers with larger stretches needing specialist contractors and equipment brought in.

Access droves (green lanes) need to be kept topped by staff during Spring/ Summer. Those with public access also need to be strimmed so vegetation does not encroach into the pathway. This is undertaken by staff and volunteers. Occasional repairs can be undertaken by staff but major repairs need specialist contractors brought in.

Woodchip footpaths need to be kept in repair by building up with lengths of cord-wood and topped-up with woodchip annually (resource arising from scrub-work on other parts of site). Encroaching vegetation needs to be cleared back with the use of mowers and brushcutters to keep routes accessible. This is undertaken by reserve staff and volunteers.

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**MS30/1 SPECIES MANAGEMENT PLAN: BATS**

The main bat-roost on Shapwick Heath is Canada Farmhouse, which is leased and managed by the Vincent Wildlife Trust (VWT) until 2028. Various adaptations to make it suitable for bats are in place, but keeping the greater horseshoe bats from displacing the lesser horseshoes bats has proved unachievable. Lesser horseshoes seem to be finding other smaller roosting sites on site and in the wider landscape, but may need help with securing additional roosting habitat.

An important site in recent years has been a corrugated-iron peat-cutters hut, but this structure needs improvements made to it to improve insulation and conditions for the bats. External funds for this should ideally be sought. Further to this additional habitat creation is proposed in the 'Peat Canteen' Project and the 'Peat-Cutters Huts for Bats' Project.

Survey and monitoring of bat populations on Shapwick Heath is undertaken by staff and volunteers from VWT and the Somerset Bats Group. Populations and population fluctuations are difficult to extract from monitoring records as weather conditions on survey nights, and bat movement across site, are so changeable and unpredictable.

**Project Planning:**

FY 2018/19: Annual monitoring/ Wintering yard tin hut restoration planning

FY 2019/20: Annual monitoring/ Wintering yard tin hut restoration works

Fy 2020/21: Annual monitoring/ Peat Canteen & Peat-Cutter Huts for Bats works

FY 2021/22: Annual monitoring/ Promotion of improvement works

FY 2022/23: Annual monitoring

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**MS30/2 SPECIES MANAGEMENT PLAN: HARVEST MOUSE**

The harvest mouse is a Section 41 species known to use tussocky grassland areas of the site, within grasslands and mire. Areas of these units are left long and tussocky in corners, and along ditch-lines allowing the species to retain their niche habitat as part of the wetland mosaic.

Monitoring of the species is undertaken annually by RoAM volunteers by looking for abandoned summer nests in December/January, as per the Harvest Mouse Handbook methodology. These surveys establish presence/ absence on site.

**References:**

Natural England. 2012. Harvest Mouse Surveys Volunteers Handbook – Shapwick Heath NNR. Amended by Shelley Saltman

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**MS50/1 SPECIES MANAGEMENT PLAN: ADDER**

Populations of adders are present in the Brue valley but in small, isolated groups. There is one known hibernacula on Shapwick with others possible. Caveats to grassland management are in place to ensure there is suitable rough, tussocky habitat for adders, stacks of brash (habitat piles) are in place and surveying for hibernacula is undertaken if works to droves and/or water control features is necessary.

A 2-year survey and report was undertaken by ecologist Andre Blacker in 2013-2016 and management recommendations are based on this. A re-survey is proposed for 2020.

References:

RSPB/SWT (Unpublished). 2015. Brue Valley reserves Reptile Survey 2015. Phil Thorpe & Andre Blacker.

RSPB. 2016. RSPB Ham Wall Species Action Plan: Adder. Andre Blacker.

ANDRE BLACKER (Unpublished). 2016. Species specific Considerations for Managing Habitat for Adders on Shapwick Heath.

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**MS50/2 SPECIES MANAGEMENT PLAN: GREAT CRESTED NEWT**

Surveys for great crested newts (GCN) in 2012-2015 identified small populations present on the NNR.

Rotational ditch management ensures there is a proportion of early-succession ditches available annually, over-wintering 'habitat piles' have been provided near to shallow open water. Scrubwork is not undertaken in sensitive habitats during the breeding season and any work halts if evidence of overwintering GCNs are found during winter work. Sites suitable for or created for over-wintering are not disturbed.

Monitoring of know sites, or additional surveys of possible sites, is carried out under licence by trained staff every 2-3 years.

Next survey due: 2019/20

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**MS80/1 SPECIES MANAGEMENT PLAN: ARGENT & SABLE MOTH**

The Argent & Sable moth is present on Canada Farm, mainly in 'The Lows', recorded mainly in Units 43 a&b and the adjoining section of Unit 42. Records exist also in parts of Somerset Wildlife Trust's Catcott Lows, which has some connectivity to the Shapwick Heath locations.

The Argent & Sable moth is a 'bog-edge' species and requires mixed-aged stands of bog-myrtle and young birch re-growth to complete its life-cycle. Its management requirements are met through caveats to the grassland and scrub management of mire units on The Lows.

Monitoring is overseen by Butterfly Conservation, historically by larval counts in early summer, but more recently by adult moth counts during the peak flying season in late May/ early June. These are undertaken by reserve staff and RoAM volunteers and entered onto the RoAM/SERC database. Annual peak counts can be compared and presence/absence and population fluctuations ascertained from this.

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**MS80/2 SPECIES MANAGEMENT PLAN: BUTTERFLIES/ BUMBLEBEES**

Year-round nectar and pollen sources for pollinators are maintained on Shapwick Heath by: the maintaining of early-flowering tree and shrub species such as gorse, willow and birch along ditch-lines, woodland edge and within grassland and mire units; traditional grassland/meadow management with refuges left at hay-cut; maintenance of late-nectar sources such as devils-bit scabious in refuge fields and strips; and scrub such as brambles and ivy maintained along ditch-lines and woodland edge.

Niche habitat for butterflies is maintained through woodland glade, footpath and drove maintenance. Important species in woodland rides for key species purple hairstreak, white admiral and silver-washed fritillary are oak, dog-violet and honeysuckle and alder buckthorn for brimstones. These areas are cleared and retained by reserve staff.

Monitoring of species is carried out by Butterfly Conservation (BC), Bumblebee Conservation Trust (BBCT) and RoAM volunteers via transects and occasional records of other species collected by RoAM and entered into the RoAM/ SERC database. Butterfly data is collated in an annual BC Somerset report, Bumblebee data collated and reported on by local BBCT volunteer. These are looked at and discussed annually and inform management.

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**MS80/3 SPECIES MANAGEMENT PLAN: LESSER SILVER DIVING BEETLE**

Rotational ditch management ensures there is annually available late-successional ditch habitat for this species and areas of seasonally-flooded wet woodland retained. Ditches are not cleared between May – August when egg cocoons and larvae are present in the water.

Ditch surveys for a range of beetles, carried out by specialist members of RoAM, have recorded the species. Licences are now sought for specific surveys to record the beetle across the reserve to monitor populations.

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**MS++/1 SPECIES MANAGEMENT PLAN: MINK, CORVIDS AND DEER**

Humane mink trapping is necessary to control this invasive species and reduce its detrimental impacts on water vole and breeding bird populations. Control is undertaken by reserves staff with firearms awareness certification and adhering to trapping and control methodologies in 'Mink Control – Guidance from BASC to Promote Best Practice', BASC, 2016.

Humane corvid control is undertaken under licence by a specialist contractor to reduce the number of this species and its impact on ground-nesting birds.

Deer-stalking is undertaken under licence by a specialist contractor to reduce the number of this species and its impacts on regenerating woodland.

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**AI00/1 HABITAT MONITOTING: INTEGRATED SITE ASSESSMENTS**

Integrated Site Assessment's (ISA's) are Natural England's survey and assessment method to examine the condition of SSSI's and the effectiveness of Higher Level Stewardship (HLS) agreements.

ISA's are co-ordinated nationally and are carried out approximately every 3 years. Condition of features is judged with reference to: NATURAL ENGLAND. 2008. Definitions of Favourable Condition for Designated Features of Interest: Shapwick Heath NNR – Consultation Draft. Liz McDonnell & Steve Parker.

Condition of each SSSI habitat will be judged as Favourable, Unfavourable – Recovering, Unfavourable – No Change, Unfavourable – Declining, Partially Destroyed, Destroyed. Natural England objectives are to have all NNR units in Favourable or Unfavourable – Recovering condition by 2020.

ISA's were last completed on Shapwick Heath in 2012 and findings can be accessed on the Designated Sites System.

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**RB0/3 HABITAT MONITORING: MIRE RESTORATION**

In 2015 a specialist study was undertaken of Shapwick's mire units and a monitoring strategy drawn up (see reference below). From this an annual monitoring programme has been put in place and undertaken by staff and RoAM volunteers. The monitoring includes monthly dipwell readings and summer vegetation transects. This information is collated and will be used to inform management planning.

References:

NATURAL ENGLAND. 2015. Shapwick Heath NNR Monitoring Strategy for Mire Restoration project on Selected SSSI Units. Hanna Etherington

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**RA10/1 SPECIES MONITORING: BIRDS**

A number of important bird surveys are carried out on the NNR and many are part of joint monitoring programmes across the suite of nature reserves across the Avalon Marshes:

Wetland Bird Survey (WeBs) – Monthly WeBs counts are undertaken by skilled volunteers from March to October each year. These are fed into the WeBs database and co-ordinated by the British Trust for Ornithology (BTO) to estimate wintering bird populations on wetlands across the country. <https://www.bto.org/volunteer-surveys/webs/about>

Breeding Bird Surveys (BBS) – An Avalon Marshes-wide BBS is undertaken approximately every 5 years, usually co-ordinated by the RSPB. The survey gives a broad picture of species and numbers of breeding birds on the nature reserves of the area. The most recent survey was completed in 2018.

Bitterns – A co-ordinated approach to surveys of booming bitterns in Spring, and thereafter feeding flights by nesting birds, is undertaken by Natural England (NE), the RSPB and Somerset Wildlife Trust (SWT). The survey is undertaken by local volunteers overseen by reserve staff. The figures are co-ordinated by the RSPB nationally and a report is published annually.

Marsh harriers – Local volunteers record marsh harrier activities and numbers of mating pairs, nests and fledglings are estimated from this information, overseen by reserve staff.

Bearded reedlings – A co-ordinated Autumn survey is undertaken by NE, RSPB and SWT, utilising volunteers and overseen by reserve staff. It is possible to estimate population fluctuations year on year by comparing peak counts.

New colonists – A ‘new colonists’ monitoring project is run by the RSPB, co-ordinating volunteers from across the suite of nature reserves of the Avalon Marshes and private land where permission is granted. Great white egret activity is monitored and sightings of other potential new colonists such as cattle egret, purple heron, night heron, little bittern and glossy ibis reported. A small team of volunteers has been trained in the use of drones to monitor great white egret nesting activity. From this numbers of mating pairs and fledglings are estimated annually. Where possible and appropriate birds are ringed to aid further study of population dispersal.

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**RA90/1 SPECIES MONITORING: MAMMALS**

Otters – Regular bi-monthly surveys are undertaken on the reserve by members of the Somerset Otter Group. The NNR is also covered as part of the Somerset Otter Groups ‘2-day Event’ Survey in April each year, where co-ordinated surveys across the county are undertaken simultaneously over a weekend and numbers of otter territories established. From this otter populations can be estimated.

Water voles – Specialist water vole surveys are undertaken in May and September each year by reserve staff and RoAM volunteers (methodology referenced below). Originally undertaken as part of the ‘National Key Sites for Water Voles’ Monitoring Survey that was co-ordinated nationally by Royal Holloway University between 2001–2010 with a specific set of selected ditches. This study has now ceased but the monitoring put in place continues. Changing habitat has meant some of the original ditches selected for monitoring are no longer suitable, whereas other ditches are now prime spots. A set of ditches in different parts of the reserve are now

selected annually for monitoring and records entered onto the RoAM/ SERC database. Analysis of the records would be a good candidate for study if an opportunity arose.

References:

THE MAMMAL SOCIETY. 2016. The Water Vole Mitigation Handbook – Fens for the Future. M Dean, R Strachan, D Gow, R Andrews

Small mammals – Small mammal surveys with Longworth traps are undertaken every two years or so, usually as a public event, often with the assistance of the Somerset Mammal Society (SMS). Records are passed to SMS and from there to SERC or entered into the RoAM/SERC database.

Other mammals - Occasional records are of any type of mammal in the Avalon Marshes area are accepted from staff, volunteers and members of the public and entered onto the RoAM/SERC database. This is especially useful for picking up records of more uncommon mammals such as water shrew and invasive species such as muntjac deer.

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**RB0/2 SPECIES MONITORING: ROAM**

Recorders of the Avalon Marshes (RoAM) is a volunteer group formed in 2012 by the partnership of organisations working on the Avalon Marshes, initiated with a start-up grant from Defra secured by Somerset Wildlife Trust. The group is volunteer-led but relies on partner organisations to support it in terms of meeting rooms, storage of equipment, permission to survey on reserves and promotion of events. This is reciprocated with volunteer hours put in to surveying and monitoring key species on reserves when necessary. The aim of the group is to:

- Attract new species recorders for the area
- To welcome beginners and help them develop their skills through formal and informal training and mentoring.
- To generate species records for the area and capture them on a bespoke Avalon Marshes iRecord database that has been developed with Somerset Environmental Records Centre (SERC).
- For this database to be available for the public to see and increase engagement with species recording in the area.
- For land managers to have easy-access to the database and be able to utilise the records to inform management work.
- To help with monitoring and survey tasks identified as important on individual reserves.
- To increase independent recording across the Avalon Marshes landscape, not solely the nature reserves.

The group is financially supported occasionally, by the purchase of equipment by partner organisations necessary for specific monitoring projects. This equipment is held centrally at the Avalon Marshes Centre by Natural England.

With the continuing development of the Avalon Marshes as a visitor hub, and the growing focus of science and engagement with people on NNRs; RoAM's 'citizen science' approach to

developing species recording and aiding with surveying and monitoring on reserves and across the landscape, is of high priority to develop. A three-year project, with a dedicated RoAM officer to develop the group's activities across the reserves and partner organisations is sought. A funding source needs to be identified and bid developed.

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#### **RB0/1 REEDBED AUDIT WITH PARTNERS**

A reedbed audit of Noah's Lake and Meare Heath was undertaken as part of a joint survey of the newly created reedbeds of the Avalon Marshes nature reserves in 2009. Overall, a low to average fish population was recorded – consistent with expectations for a relatively new reedbed/ open water site at an early stage of succession. Six fish species were recorded as present: perch, roach, rudd, tench, pike and moderlieschen. It was noted that eel and three-spined stickleback were not recorded.

With 10 years of habitat succession, development and management now approaching it would seem timely that a second reedbed audit be undertaken, to aid understanding of the developing biodiversity of the site and sustainability of food surveys for Ramsar and SPA species dependent on them.

It will be necessary for an independent Reedbed Audit to be commissioned, with a survey of fish being an important part of this. It would be beneficial to include all the major reedbed and open water areas: Noah's Lake (Unit 51) and Meare Heath (Unit 66) as in 2009, as well as the Roughet (Units 46 & 60), Decoy Lake (Unit 48) and Canada Lake (Unit 41).

Ideally this would take place as a partnership project with the RSPB and Somerset Wildlife Trust, looking at the lakes and reedbeds of Ham Wall and Westhay Moor, as in the 2009 reedbed audit.

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#### **MC39/1 HERITAGE: SWEET TRACK CONSERVATION**

To preserve this Scheduled Ancient Monument *in situ* through the NNR, a glade needs to be retained open through the woods along its route to prevent damage from root growth and evapotranspiration. This needs to be checked yearly and an amount cleared approximately once every 5 years.

The high water-level needed to ensure the anaerobic conditions in which it is preserved is maintained through a dedicated pump system with an automatic timer feed. This system needs to be checked weekly by visual inspections of the Sweet Track ditches undertaken by reserve staff. In dry conditions the timer can be switched to automatic if necessary. The pump is fed from the Pump Pond, The Roughet, Decoy and Noah's which are connected by culverts to allow water to flow to the pump. There is also a culvert at the south-east corner of the hydrological unit which is able to evacuate excess water during times of heavy rain. These culverts need to be checked periodically to remove debris. The Sweet Track ditch needs to be hand-cleared annually in early autumn.

The acquisition of further areas of land containing sections of the Sweet Track is desirable, or agreements made to positively influence land management is desirable. Opportunities arising for this should be investigated as a matter of priority.

References:

ENGLISH NATURE & SOMERSET COUNTY COUNCIL. 2005. Shapwick Heath NNR Heritage Management Plan 2005-2010. Dr. Richard Brunning

Sweet Track glade/ footpath widening next due: Winter 2018/19

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**MC39/2 HERITAGE: SWEET TRACK DIGITAL INTERPRETATION PROJECT**

To develop a mobile-downloadable PDF with 360<sup>0</sup> visuals of the Sweet Track landscape circa 3806 BC to bring to life what the scene would have looked like for people to experience in situ.

To be developed in partnership with South West Heritage Trust (SWHT) from existing digital material. Scoping work to be undertaken and a joint external funding bid sought.

Project planning:

Yr 1: Scoping exercise/ Funding bid

Yr 2: Project completion and launch to public

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**MC39/4 HERITAGE: MEARE HEATH TRACK INVESTIGATION PROJECT**

An as yet un-investigated section of pre-historic trackway lies undisturbed through the woodland of Meare Heath. Considering the rarity of these trackways being preserved, and the likelihood that this section could be in good condition due to its location, gives rise to the opportunity for a rewarding exploratory investigation.

Discussions with South West Heritage Trust have identified this potential, and a joint funding bid will be sought for initial exploratory investigations.

If these investigations show that the track could benefit from pro-active preservation management, a glade could be created along its route to guard it from disturbance by tree-roots and evapotranspiration. If considered worthwhile further funds and licences could be applied for to open a section for further archaeological investigation.

Further to this a reconstruction of the trackway could be installed in situ to further improve interpretation of the pre-historic heritage feature and tie-in with the heritage interpretation project of the peat canteen and railway sidings.

These works will need to be carefully balanced with the management of this wet woodland habitat feature.

An external funding bid will be developed with South West Heritage Trust.

Project Planning:

Yr 1: Develop bid/ apply for funds

Yr 2: Gain funds/ undertake works

Yr 3: Promote feature

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**MC5+/1 HERITAGE: PEAT CANTEEN PROJECT**

In the woodland of Meare Heath, on the approach to Meare Heath Hide, are the remains of a peat-workers canteen dating from the era of industrial peat-digging. The building was dismantled in 2015 to comply with necessary health and safety regulations. Extensive drawings of the building were taken before its demolition, and further work was undertaken by volunteers to clear the base of the site and recover any industrial archaeological items of potential interest.

There exists a great opportunity here to re-construct the building in situ and use it as a focus for interpretation of the industrial and peat heritage of the site, of which there is clearly a lack. The building could potentially contain some of the recovered items and other interpretative information. Metal silhouettes of peat-workers could also be added to create ambience.

These interpretative works could tie-in with potential interpretative work on the old narrow-gauge peat-railway sidings of the same location and exploratory work on the Meare Heath Trackway.

An external funding bid will be developed with South West Heritage Trust.

There is also an opportunity to design the building so that it contains potential roosting habitat for bat. There is evidence that bats are roosting in the roofs of tin sheds of the area. Some match-funding could also be sought from a source supporting the creation of bat roosts.

These works will need to be carefully balanced with the management of the wet woodland habitat feature.

Project planning:

Yr 1: Develop bid/ apply for funds

Yr 2: Gain funds/ undertake works

Yr 3: Promote feature

**MH++/4 HERITAGE: PEAT CUTTERS HUTS FOR BATS**

Due to conflicts between lesser and greater horseshoe bats utilising the Canada Farmhouse bat roost, lesser horseshoes have been predated and are no longer breeding in this location. A new lesser horseshoe roost has been identified in an old tin peat-cutters shed in the wintering yard and potential roosts in nearby tin sheds in the surrounding landscape.

Therefore as a twin goal of retaining/ reconstructing peat-cutters sheds in the landscape to benefit the National Character Area and retain industrial heritage, and to create more potential bat habitat, a project to build a number of strategically placed peat-cutter hut reconstructions within the NNR is proposed.

An external funding bid will be developed with South West Heritage Trust with advice sought for from the Vincent Wildlife Trust regarding the creation of bat habitat. This would also compliment the peat canteen project.

Project planning:

Yr 1: Develop bid/ apply for funds

Yr 2: Gain funds/ undertake works

Yr 3: Promote feature

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**MC39/3 HERITAGE: IRON-AGE CANOE LAKES PROJECT**

To develop a design and bid to create a new visitor experience on the two small lakes to the right of the Shapwick Road entrance gate. A disabled access walkway would be created from the main South Drain footpath, with a foot-bridge across the old canal, onto the drove between the two lakes and forming a circular route around the inner lake. Views would be cleared and stopping points with benches, shelters and pond-dipping platforms installed. The edge of one of these lakes is the original location of the discovery of an iron-age dug-out canoe, now on display in The Museum of Somerset.

The project has the joint aim of creating a provision to soak up increased visitor pressure on the edges of the NNR, provide a quality 'short walk' experience for families and those groups with mobility access, and increase interpretation and public awareness of the heritage feature. The footbridge crossing the old canal would create the opportunity to develop interpretation to inform the public on this feature of industrial heritage, and a see-through viewing area installed into the decking with a reconstruction of the iron-age canoe to be seen in situ, would improve interpretation of this archaeological feature.

Monitoring of the ponds for winter bird usage would take place prior to project development to ensure compliance with Habitat Regulations. An external funding bid would be developed with South West Heritage Trust.

Project planning:

Yr 1: Develop bid/ apply for funds

Yr 2: Gain funds/ undertake works

Yr 3: Promote feature

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**MC7+1 HERITAGE: CANAL LOCK PRESERVATION PROJECT**

An investigatory project into the potential to clear and restore the remains of a canal lock

situated at the far end of the footpath of the South Drain towards Canada Lake. Evidence of the canal's existence is nearly lost and there is very limited interpretation of this part of the industrial heritage of the site. This location could hold an opportunity to interpret this facet of the sites industrial history.

An investigatory project would seek to explore this potential and also the suitability of the location in absorbing more visitors, carefully balancing this with potential wildlife disturbance issues. Monitoring would be put in place in prior to any bid to ensure this and comply with Habitats Regulations.

An external funding bid will be developed with South West Heritage Trust. The project has potential to compliment other proposed industrial heritage interpretation projects. Advice would be sought from the Canal & River Trust.

- Yr 1: Investigatory and monitoring work
- Yr 2: If project is sound develop bid/ apply for funds
- Yr 3: Gain funds/ undertake works
- Yr 4: Promote feature

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**ME10/1 VIEWING HIDES**

A programme of viewing-hide improvements has been under way since 2015. This has included the installation of the new crowd-funded Tower Hide overlooking 70 Acres and The Scrape, renovations and the addition of glazed windows in Meare Heath and Decoy Hide, the construction of a disabled-accessible viewing platform on the Discovery Trail and the re-building of a larger Noah's Hide and 70 Acres Hide to accommodate increased visitor numbers. Canada Lake Hide is awaiting improvements to the footpath and bridge leading to it.

Ongoing infrastructure and safety checks are undertaken weekly and repairs and improvements made as necessary. The hides are kept clean and made welcoming to visitors from expert birdwatchers to families with children.

A wildlife mural to encourage families participation is planned for the new Noah's Hide with funds sourced externally.

A possible future project, should the opportunity present itself, is for the construction of a joint Natural England/ Somerset Wildlife Trust viewing hide on the South Drain, overlooking both Canada Lake and Westhay Heath Reserve. The concept for this is to open up new views of these areas, causing minimal disturbance as visitor would not need to walk through the areas themselves, and would be a further way to soak up visitor pressure on the edge of the reserves. Any plans would need to go through full Habitat Regulation Assessments before being approved.

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**MG00/1 WINTERING YARD PROJECT**

Shapwick Heath NNRs wintering yard facilities for the sites grazier provide an opportunity to develop a demonstration area for best practice in farmyard management.

A discussion has begun with local Catchment Sensitive Farming officers regarding the development of this facility, as a demonstration area for best practice in farmyard nitrate management and linked to improving condition of the NNRs ditch network.

The design would aim to incorporate development of the covered area of the yard, with muck from hand-standing and run-off being dealt with most efficiently. The construction of a purpose-built, natural water filtration system could be used to demonstrate these principles.

An array of solar panels on barn roofs to generate income, and demonstrate ways farmers could generate income is also an option, with a small mobile pre-fab a possibility for a reception building. External funding for this project will be sought.

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#### **MH++/5 ZONING**

Map 9 Tree Safety Zones (see Appendix 11) shows the levels of access and use of different areas of the reserve. Public access Zones 1 and 2, which include visitor facilities, footpaths and viewing hides enable access to a variety of the NNRs habitats whilst enabling large areas of the reserve to remain undisturbed. The built infrastructure and trees along these routes receive regular safety surveys (weekly reserve checks, 6-monthly specific surveys) and are maintained in good condition.

Zone 3 is designated as public access via the CROW Act but visitor access is discouraged. This is primarily to prevent wildlife disturbance, prevent issues in cattle grazed areas, and for public safety in reedbed areas.

Zone 4 covers waterbodies where there is no public access allowed.

It is Natural England's policy to continue to develop high-quality visitor hides and access paths within Zones 1 and 2 to absorb increasing visitor numbers in these areas, providing a good visitor experience whilst also maintaining core areas of non-disturbance.

A dog-ban is enforced on the main Shapwick Heath site, with dog's allowed under effective control on the public right of way through Canada Farm.

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#### **ML++/1 AVALON MARSHES PARTNERSHIP**

The Avalon Marshes Landscape Partnership was formed to deliver an award-winning Heritage National Lottery -funded scheme to deliver a range of heritage and conservation projects across the Avalon Marshes landscape. Key partners in this were Natural England (NE), Somerset Wildlife Trust (SWT), the RSPB, South West Heritage Trust (SWHT) and the Hawk & Owl Trust

(H&OT).

This partnership of organisations continues to have a commitment to the legacy of this project and continues to seek to work closely together across the landscape. To steer this vision and make decisions on behalf of all the organisations involved is the Avalon Marshes Steering Committee and to inform this committee, concerning co-ordination on the ground, are the Avalon Marshes Management Group and the Avalon Marshes Visitor Forum. Natural England are deeply committed to working closely with their partners and continuing to positively develop the Avalon Marshes landscape.

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**ML++/2      AVALON MARSHES VISITOR MANAGEMENT STRATEGY**

Within this management plan many aspects of Shapwick Heath's visitor engagement and management is captured within different projects. It is now becoming essential that the visitor management of Shapwick Heath is seen and planned for in the context of the wider Avalon Marshes landscape, and the suite of reserves in the area.

The NNR team are working closely with others in the Avalon Marshes Partnership: the RSPB, Somerset Wildlife Trust, Hawk & Owl Trust and the South West Heritage Trust to achieve this. Discussion, decisions and actions are taken through the Avalon Marshes Steering Group and the Avalon Marshes Visitor Forum. Discussions are currently taking place to inform an Avalon Marshes Visitor Management Strategy with partner organisations bringing together their visitor engagement and experience plans, as a starting point to the writing of a comprehensive joint strategy.

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**ME/1      AVALON MARSHES CENTRE DEVELOPMENT**

The development of the Avalon Marshes Centre as a quality visitor information centre, an orientation point for visitors to the landscape, a provider of public facilities and an educational and economic hub, has long been an aim for Natural England (NE) in Somerset. The site has developed over a number of years.

During 2016-2018 a large Defra capital investment was made to renovate existing buildings on site (Somerset Crafts Gallery) and purpose-build a new office to serve NE employees and make available rental space for partner organisations the RSPB, Somerset Wildlife Trust (SWT) and the Hawk & Owl Trust. The old NE offices and RSPB and SWT porta-cabins, which were no longer fit for purpose have been removed. A new café lease have constructed their own temporary premises and a new temporary toilet facility has been installed to serve the public.

Phase 3 of the development work has seen a sewage connection to the mains installed to ensure necessary infrastructure is in place for growing visitor numbers.

Phase 4, will involve landscaping works to the site to improve it's functioning as a visitor centre. This will include improvements to the car-park, wildlife garden, reception areas and café area,

as well as installation of a permanent toilet block and a new education building. This will be Defra-funded with contributions in match-funding from other organisations. Within this, landscaped access to the South West Heritage Trust's historical reconstructions will be opened up and space for a reconstruction roundhouse enabled.

Phase 5 will see the re-development of the old Peat Moors Centre as a complimentary area for outdoor education.

Phase 6 would ideally see direct access to the NNR made possible, without the necessity for the members of the public to walk along the main road.

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**ME0/2      AVALON MARSHES CENTRE MANAGEMENT**

Current responsibility for the Avalon Marshes Centre day-to-day running and maintenance lies with Natural England Somerset NNR team, co-ordinated by the Senior Reserves Manager.

Grounds maintenance is carried out by reserve staff and contractors. Public facilities on site, including car park infrastructure and toilets, also falls under the reserve team's responsibility. Leases for on-site businesses are drawn-up and administered by the Natural England land agency team.

The area containing the historical reconstructions is leased to, and the responsibility of, the South West Heritage Trust.

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**AE00/1      AVALON MARSHES VISITOR MANAGEMENT POST**

With the continuing development of the visitor facilities at the Avalon Marshes Centre and its importance in providing visitor orientation and information for the whole landscape, having a staffed presence in the Visitor Information Point has become essential. This post should be a jointly-funded partnership post which benefits all the organisations and locations in the area and meshes visitor management together.

The post is currently funded by Natural England (NE) and Somerset Wildlife Trust (SWT) at three days per week, with the post-holder providing visitor information and assistance at the Avalon Marshes Centre visitor information point and at some times out on reserves. Volunteers are also recruited, trained and managed to staff the centre, with the aim to have a presence at the Visitor Information Point seven days per week.

The post-holder is formerly employed by Somerset Wildlife Trust for one year with a view to continuing and developing the post. Development of the post will be dependent on finding ways to raise income to assist with funding.

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**MI20/2      AVALON MARSHES 'SCHOOLS ON RESERVES' JOINING NE/ RSPB FIELD TEACHING SCHEME**

Natural England co-funds this field-teaching scheme overseen by the RSPB on Ham Wall and Shapwick Heath NNRs. A set of standard sessions, linked to specific areas of the curriculum, are on offer to schools who pay for the sessions to cover the cost of provision.

The income is divided between the two organisations for cost recovery. The lead teacher is a part-time 2-day-per-week post and works in conjunction with the 2-day-per-week engagement officer that also supports NNR family engagement events.

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**AN20/1      AVALON MARSHES NNR**

The National NNR Partnership Steering Group and the Avalon Marshes Steering Group are currently in discussion regarding re-designating the suite of nature reserves of the Avalon Marshes into one joint Avalon Marshes NNR.

The benefits of this would be improved public perception and understanding of the reserves of the area and what they offer, to further develop partnership working to enable all organisations to use resources most efficiently, and to provide a robust framework for continued landscape-scale conservation.

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**MI00/4      AVALON MARSHES STARLING HOTLINE**

The starling hotline is an essential tool to aid management of the large number of visitors that come to the area to see the starling murmurations between November – February each winter. The starlings can roost in any reedbed location across the landscape, so this management needs to be a co-ordinated endeavour between natural England (NE), the RSPB and Somerset Wildlife Trust (SWT) to help orientate visitors and assist them in accessing the most likely nights roosting spot whilst parking safely on their visit.

The line is currently operated by the RSPB and staffed by volunteers. It is NE's position that making this line chargeable, with income raised going into the Avalon Marshes Legacy Fund to support further visitor management across the Avalon Marshes, would be a positive move going forward. NE aim to work with partners to develop this.

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**MI60/1      NNR EVENTS**

An annual programme of NNR events is planned by reserve staff each year. The centre-piece of this is the Avalon Marshes Open Day held in June, in which all partner organisations participate, and is an opportunity to showcase all of our work across the landscape and engage with our local communities.

A programme of family-orientated engagement events are supported by a jointly-funded NE/RSPB engagement officer. These include between two and four larger free 'Wild Day Out' events, held at the Avalon Marshes Centre, which are the first point of contact for those new to the reserve and a chance for local communities to get involved. 'Forest School for All the Family' sessions run six to eight times per year, at weekends or school holidays, and a one-day per week activity for four weeks of the summer holidays is in place. Funding for this is linked to the joint 'Schools on Reserves' scheme run in conjunction with the RSPB.

Reserve staff also organise and lead a number of guided walks focussed on particular species and habitats to engage and inform the public. Payments for events are set at a rate agreed by the Avalon Marshes Steering Committee and are aimed to cover basic costs.

Walks and talks can be requested by local community groups on a particular subject of interest (e.g. natural history, heritage) and a donation is suggested for these.

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**MI60/3 AVALON MARSHES YOUNG WARDENS PROGRAMME**

The Avalon Marshes Young Wardens scheme is a programme of practical conservation activities for the 11-17 year-old age group. Natural England co-ordinates the programme and its provision, with each session run by one of the organisations of the Avalon Marshes Partnership. The sessions run approximately monthly, for eight months of the year.

Children are registered to be able to attend the scheme, and the hours volunteered can count towards the 'community volunteering' section of the Duke of Edinburgh Award. A stand-alone certificate of outlining the activities the child has taken part in can also be issued, or a reference given regarding the volunteering to include as part of a curriculum vitae or portfolio.

All activities provided are suitable to the age-group and are meaningful tasks, with which they can learn valuable practical skills and contribute to real conservation goals on the reserves they work on.

The scheme is promoted by poster, at NNR events, in publications and newsletters, websites and social media by all partner organisations. Bookings are taken via Natural England's Symphony online booking system, with a charge being made to cover basic costs of the provision.

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**ML50/1 HEALTH AND WELLBEING PROVISION**

With the increasing importance of the health and wellbeing agenda, Natural England seek to promote opportunities for people to enjoy the benefits of getting out on National Nature Reserves. The Somerset NNRs team will look to make links and build relationships with other organisations to increase the use of Shapwick Heath for 'health walks', as a 'green gym', and for mindfulness practices to aid mental, as well as physical wellbeing.

A link has been established with healthy walking provider 'Zing'. Further links with local GP surgeries, to increase knowledge of and access to the NNR for communities will be developed over the next 2-3 years.

External funding will be sought to support such a project.

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**MI50/1      NNR SIGNS**

It is a mandatory requirement to keep NNR signage up-to-date and in a good state of repair. Signage is audited every six months as part of infrastructure and tree safety surveys and action taken where necessary. Current signage at reserve entrances are due for an update following the installation of new reserve infrastructure. Rationalisation of signage is also currently under review.

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**MI50/2      NNR PUBLICATIONS**

The Shapwick Heath NNR leaflet was updated in 2017 and is available free of charge from leaflet dispensers on the reserve, the Avalon Marshes Visitor Information Point and a number of local Tourist Information Centres.

For more in-depth information the Shapwick Heath FSC Guide is retailed at £3.80 from Somerset Crafts and a number of local stockists in Glastonbury and Wells.

A number of Avalon Marshes partnership leaflets are available and the future of these will be developed as part of the joint visitor management strategy.

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**ML80/1      UNIVERSITY OF THE WEST OF ENGLAND (UWE) LINK DEVELOPMENT**

The Natural England Somerset NNR team and UWE Department of Conservation Biology is currently developing a link. The aim of this project is to improve practical skills learnt by degree students and improve the capability and 'job-readiness' of students coming into the sector. This is to benefit both students coming into the sector, by being better prepared for the jobs on offer, and to the entire sector by having new entrants to the industry entering with stronger skill-sets.

The first element of this partnership will be to pilot a week-long Field Skills unit module by UWE and NE staff on Shapwick Heath NNR. The aspiration is that further joint practical modules could then be developed.

The aim of the project is that this provision, of practical elements to enhance conservation degrees, will become an exemplar for the sector.

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**MI30/1      STUDY LIST**

There are many subjects, species and areas of interest related to the NNR that would benefit from in-depth study but are out of the remit of staff capacity or financial resource. There are however, students and volunteers on a range of courses, from foundation degrees, through honours, masters and up to PhD level, that may be looking for subjects of study that would have practical value to conservation and to a specific NNR.

Opportunities may also arise through externally funded projects to incorporate an area of research or reporting. For this reason a list of priority subjects is maintained, that we is available to those who enquire or interested parties are actively sought. The current list of subjects includes:

- Water vole population & distribution
- Distribution of Ramsar –listed invertebrates
- Starling roost movements
- Starling roost visitor impacts on Avalon Marshes reserves network.
- Economic benefits of Avalon Marshes reserve network
- Social benefits of NNRs
- Natural capital value of Somerset NNRs
- Sustainable transport possibilities for Avalon Marshes reserve network

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**AT50/1      MANAGE VOLUNTEERS**

Volunteers comprise a vital part of the NNR workforce and are greatly valued by Natural England. Volunteers are actively recruited for three main task areas: practical conservation tasks on reserves, survey and monitoring tasks and public engagement.

For any volunteer role a new recruit will be offered a trial day before formally signing-up as a volunteer. This is so that the volunteer can find out if they are happy with and suited to the tasks and staff can ascertain the same, and be sure that any additional needs or support can be provided for. If both parties are happy with the placement, and that the tasks are suitable, the volunteer will be formally registered by completing the volunteer application form, which is processed by Natural England Volunteer Services. Part of this process involves both parties signing the 'Volunteer Promise' which clearly outlines the roles and expectations of both parties.

On their first working day new volunteers will be given an induction, including an essential

health and safety briefing, and an introduction to their role. Practical volunteers will be given specific work-days, and tasks will be overseen by a member of staff. Those involved with survey and monitoring tasks may work without a member of staff, but will adhere to a lone working 'buddy' procedure, so a member of staff knows where they are and what they are doing. Public engagement staff may work alone if posted giving visitor information but those working actively with children will always be working with a member of staff.

Regular events are held to thank volunteers for their work and ensure that they feel valued. They will also receive the Shapwick Heath NNR quarterly newsletter, get advance information about booking events and receive a free volunteer car-parking pass for any chargeable Natural England car-parks.

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**AE00/2 APPRENTICESHIPS**

Apprenticeships are offered on a formal basis through schemes run centrally by the Natural England apprenticeship team. Opportunities will be made available on NNR's as and when there is funding available.

Suitable tasks will be provided, line management and support from the NNR team will be in place and an apprenticeship provider engaged for coaching and assessment.

One apprentice is currently in place until September 2019.

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**ML80/2 WORK PLACEMENTS**

A range of work placements are made available with the Natural England NNR team for those from GCSE age upwards. Placements can range from one day, a week intensive, or to a number of days a week over a period of time.

Placements are provided on an ad-hoc basis according to who enquires, the level of support they require, staff availability and suitability of tasks. On enquiry a meeting will be convened to discuss the student's needs and whether appropriate tasks and sufficient staffing is available. For longer term placements a trial day will be organised for both the student and members of staff to ascertain if the placement will be suitable. NNR staff will always endeavour to accept student places where possible, but workload, staffing, level of support needed, suitability of tasks and dates will be important to the decision.

Once accepted on a work placement the student is registered as a volunteer and will adhere to the same 'Volunteer Promise' agreement as regular volunteers. School or College registration forms may also be required.

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**MI00/3 PUBLIC COMMUNICATION**

The main forms of NNR public communication are posters and leaflets at the Avalon Marshes Centre (AMC) and on site, event listings on the Avalon Marshes website, weekly posts and notices on 'Friends of Shapwick Heath' facebook page and a quarterly newsletter available at the AMC and via e-mail to the 'Friends of Shapwick Heath' distribution list (GDPR compliant). These communications are all undertaken by NNR staff.

NNR staff also contribute to the NE South-West twitter account, occasional articles for the NE intranet or other external publications and produce press releases when necessary.

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**MI40/1 THE BITTERN TRAIL**

A sign-posted cycle route from Glastonbury Town Centre, along the footpath of the South Drain, through Ham Wall and Shapwick Heath NNR's, ending at the Avalon Marshes Centre.

This project is being developed with Glastonbury Town Council to encourage sustainable transport to the nature reserves of the Avalon Marshes. A cycle hire initiative is being trialled at the starting point in the town centre.

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**ML++/3 CAR-PARKING AND SUSTAINABLE TRANSPORT**

Current car-parking capacity for Shapwick Heath NNR is limited and opportunities are sought to improve current facilities and increase car-parking space. Landscaping work at the Avalon Marshes Centre in 2018/19 should increase spaces by a small amount. Opportunities to purchase land near to the reserve for car-parking are desirable.

Public transport links to the reserve are currently poor but work is underway with the Promoting Glastonbury Committee to explore options such as the development of the cycle route along the footpath of the South Drain that runs from Glastonbury through Ham Wall NNR and on into Shapwick Heath.

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**MB01/1 INCOME GENERATION: SHAPWICK FIREWOOD PROJECT**

Scrub clearance work on the NNR every winter produces a volume of waste wood that needs to be removed from site. This by-product of our conservation work has for some time been a problematic waste product needing storage and disposal. The Shapwick Firewood Project initiated in 2015 changed this waste into a resource, by processing and packaging this product and creating a market for it.

Stacks of felled firewood is removed from site by staff and volunteers during the late summer months when fields are dry. It is stored in the bio-barn at the wintering yard and processed with a small mobile wood processing machine and then stacked to dry. Once at 15% moisture it can

be bagged and sold, or sold in loose loads.

Packaging is in hessian sacks which are re-usable and bio-degradable. Messages on the packaging and associated promotional material showcase the NNRs and their ability to produce a sustainable product. Firewood is sold within a 10 mile radius to keep carbon footprint to a minimum and to connect buyers of the product to the place their firewood has come from.

Trees and scrub are only felled and removed from the reserve on ecological grounds and to achieve conservation aims, with wood being sold only a by-product of this. Scrub is never removed solely for the purpose of generating income. Firewood sold is at a commercial rate with the aim to generate income to support continuing conservation work on the NNR.

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#### **ME02/1 INCOME GENERATION: SOLAR PANELS**

The Avalon Marshes Centre facilities are currently powered by a large installation of solar panels. The aspiration of the Somerset NNR team is to increase the solar generation opportunities of the site by installing further panels at the Avalon Marshes Centre and to service farm and NNR operations at Canada Farm and the Wintering Yard.

The installation of solar panels across the site will provide long-term opportunities to contribute to national programmes of renewable energy generation, reduce electrical running costs for the Avalon Marshes Centre and allow for the development of off grid operational bases on the NNR.

#### **ME8+/1 INCOME GENERATION: ELECTRICAL HOOK-UPS AND CAMPER VAN BAYS**

As part of the upgrading of the Avalon Marshes Centre two fast charge electrical car charging points will be installed alongside two electrical camper van hook-ups in the spring of 2019.

##### Electrical charge points

These are designed to provide a known charging point for electrical vehicle drivers within the South West. This will encourage users of electrical vehicles to visit the Avalon Marshes and contribute to the national drive to move away from petrol and diesel vehicles. Visitors will be charged for using this facility which will provide an income stream for Centre management and running costs.

##### Camper Van hook-ups

There is a known and increasing demand for overnight hook-up sites for camper van users. Through a booking system Natural England plan to hire-out these spaces during evenings throughout the year, in order to contribute towards visitor needs and to provide an additional income towards centre management and running costs.

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**MI01/1 INCOME GENERATION: WILDLIFE TOURS**

With the rising public profile of the Avalon Marshes there is increased interest in guided walks and tours, not just of Shapwick Heath NNR, but of the suite of reserves across the area. This has the potential to be a source of income to all the partners managing the reserves and support conservation effort across the landscape.

Currently there are a number of private tour operators utilising the reserves across the area. It is Natural England's view that the organisations of the Avalon Marshes Partnership should take a joint approach to these companies, creating a mechanism for them to make a contribution to the resourcing of nature reserve management as part of their business costs. This may take the form of a voluntary agreement, an accreditation process or a permissive licence to run a business utilising the reserves. Natural England envisage the funds from this going into a joint fund to support visitor management. This project is also for development and discussion by the Avalon Marshes Steering Committee.

Further to this there is also the potential to have an in-house or contracted-in provision of commercially chargeable bespoke guided walks and tours that would generate income more directly for the partnership. Again, this project is for development and discussion by the Avalon Marshes Steering Committee.

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**ML80/3 INCOME GENERATION: LOXTONS PLOT EXCLUSIVE WILDLIFE EXPERIENCE**

Loxton's plot (Unit 70) being non-SSSI, having a separate entrance from the main public areas of the NNR and with an area of hard-standing lends itself to the potential of hosting a private area for pay-per-view bird-hides and up-market camping accommodation.

A project such as this would be aiming to charge commercial prices to a small number of visitors for an exclusive experience, to generate income that would support conservation work and general visitor infrastructure on the main area of the reserve.

A scoping exercise and habitat regulations assessment would need to be carried out before any external funds were sought to fund works.

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**MI60/4 INCOME GENERATION: FOREST SCHOOL HOLIDAY CLUB**

With the upcoming completion of landscaping works and a new classroom building at the Avalon Marshes Centre, there is an opportunity to raise funds from renting the building and gardens, and associated access to the reserve, to more commercial providers of a number of services, one of which could be a Forest School Holiday Club. Community-orientated Forest School provision is already in place, aimed at cost recovery only, to support a community

engagement aim. The 'holiday club' scheme would be run on a commercial basis, contracted-out to an external provider, who would charge commercial rates and pay rental fees for use of Natural England facilities. Although a commercial operation the scheme would stay within the spirit of the NNRs, helping to promote positive messages about the reserve and environment

This scheme would need to be assembled in detail with any potential provider.

A development of a wider sustainable transport scheme would need to involve all Avalon Marshes partnership organisations, along with local and county councils and planning authorities.

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**MI30/2 INCOME GENERATION: NATURAL CAPITAL ASSESSMENTS**

Natural Capital is defined as the world's stocks of natural assets, these include geology, soil, air, water and living biodiversity. This natural capital provides humans with 'ecosystem services' such as crops, water, materials for fuel, building medicines and so on. It also provides for less visible things such as climate regulation, natural flood defences, carbon storage, pollination by insects and even the inspiration humans draw from wildlife and nature.

Natural Capital Assessments are a tool to estimate the value of services provided by the environment of any particular area. These assessments are being developed as a way to value the 'priceless', to build its costs into economic valuations, to access funding to maintain our natural environments. The Avalon Marshes landscape provides many of these ecosystem services from its natural capital - such as carbon storage, water storage and flood mitigation, pollination; alongside wider health and wellbeing benefits for visitors.

Natural England's Innovation, Commercial Planning and Income Teams will be working with local partners to develop long-term Natural Capital Assessments for Shapwick Heath NNR and the wider Avalon Marshes, as a way to unlock future funding streams to ensure financial sustainability for the nature reserves of the area.

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**ML80/4 INCOME GENERATION: NET GAIN**

The principle of biodiversity 'net gain' has been developed to guide planning authorities and the building industry to be able to create an increase (a 'net gain') in biodiversity as a result of their commercial activity. This can mean creating high-quality natural habitats within building developments and/or providing funding for creating habitats elsewhere.

Natural England's Commercial and Planning Team seek to work with local partners and planning authorities to identify opportunities within the Avalon Marshes area where 'net gain' funding could provide enhancements for habitat works and species recovery programmes. In

the long-term this could become an important source of funding for conservation and the management of the nature reserves of the area.

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**ML00/1      WESSEX WATER LINK**

Wessex Water are the owners of a significant area of Shapwick Heath NNR, with Natural England taking on responsibility for management of this portion of the reserve through a 25-year lease.

Natural England are currently developing a strong partnership with Wessex Water to enable joint working on the enhancement of the natural capital, habitats, species and important archaeological features within the Wessex Water landholding. The current discussions aim to confirm potential joint projects to run during the 2020-2025 year period.

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**ME0/3      ON-SITE BUILT INFRASTRUCTURE MAINTENANCE**

All built infrastructure in safety Zones 1 & 2 (See Appendix 11: Map 9) are inspected 6-monthly, with repairs and replacements made where necessary.

All Zone 3 infrastructure such as gates, fences and water-control features are inspected and maintained as and when necessary.

There are ongoing material and maintenance costs associated with this.

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**MM10/1      WORKSHOP MANAGEMENT & MACHINERY MAINTENANCE**

Workshop buildings comprise one large unit subdivided into three workshops. One services Natural England staff whilst the others are leased to and managed by Somerset Wildlife Trust and the RSPB respectively. The Natural England land agency team draw-up and administer these agreements.

It is the Natural England Somerset NNR team's responsibility to maintain the workshop building and machinery and comply with all relevant health and safety legislation. There are yearly costs associated with machinery maintenance and repairs as well as Personal Protection Equipment (PPE), associated survey and monitoring equipment and educational resources.

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**AI30/1 SAFETY AUDITS AND INSPECTIONS**

The Natural England Somerset NNR Team undertake safety inspections and update all health and safety documents as legally required, including:

- Regular servicing and maintenance of all fire safety systems, fixed and portable electrical appliance checking and COSHH
- All safety and service inspections of machinery including vehicles, tractors, trailers, all-terrain vehicles and small equipment such as brushcutters and chainsaws.
- Carry out weekly site inspections of public access routes and public areas of NNR and Avalon Marshes Centre.
- Undertake 6-monthly auditable inspections of site infrastructure and tree safety survey of all Zone 1 and 2 areas of the NNR (See Map 9).
- Complete an annual safety audit led by members of the Natural England Health & Safety Team.

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**AI30/2 HEALTH AND SAFETY DOCUMENTATION**

The Natural England Somerset NNR Team prepare and revise all health and safety documentation - including safety statements, guidance for visitors and permit holders and risk assessments - in accordance with regional and organisational timetables.

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**MM00/1 NNR VEHICLES**

NNR vehicles include:

Landrover Defender EUO9 AOD  
Toyota Hilux (2-seater) DG10 UOR  
Toyota Hilux (5-seater) LS62 NFE  
Vauxhall Astra (car-derive van) WV12 VHZ  
Ford transit (minibus) OV53 UDY  
John Deere GatorWA03 NPU  
Polaris WK15 CZ0  
Log-Logic Soft-trak WA62 EJJ  
Ford New Holland tractor M380 VYD  
Kubota tractor T723 PYD

Associated trailers & attachments: Flatbed trailer, people trailer, small trailer, 2 tipper-trailer, soft-trak trailer, chipper, topper, hakke-pilka wood-processor, front loader.

Maintenance records, insurance details and all associated paperwork is stored in the Natural England office at the Avalon Marshes Centre. Red diesel is brought in and stored on-site for the agriculturally registered vehicles. Diesel & petrol are bought at pumping stations as and when required for the road vehicles.

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**ME7+/1 OFFICE MANAGEMENT**

The Natural England-owned and managed office at the Avalon Marshes Centre provides facilities not only for Natural England staff, but also rented space for other partner organisations within the Avalon Marshes. These partners currently include Somerset Wildlife Trusts, the RSPB and the Hawk & Owl Trust. Leases and rental agreements for these are drawn-up and administered by the Natural England land agency team.

General day to day running and management of the office is currently administered by the Somerset NNRs Senior Reserves Manager (SRM). The well-used and enhanced facilities at the Avalon Marshes Centre mean that this is a large and growing responsibility for the SRM and NNR team. A national NNR process is currently underway to provide additional support for this type of operational provision and the Avalon Marshes Centre office is likely to be a trial for this new type of contract.

Contracts for cleaning and maintenance services of the building are out-sourced, with IT services being maintained by IBM and Defra IT services. Stationary and such provisions fall within the general NNR budget.

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**MI00/2 UPDATE WEBSITE INFORMATION**

The NNR web page on the .gov.uk website must be updated annually in accordance with the organisational programme.

More detailed information about Shapwick Heath and its place within the Avalon Marshes is kept updated on the [www.avalonmarshes.org](http://www.avalonmarshes.org) website, along with current information about events and volunteer groups.

A National NNR website is currently under development by Natural England and reserve staff contribute to this development wherever possible.

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**RH34/1 VISITOR NUMBERS**

The logging of visitor numbers is a mandatory requirement on NE NNRs and to this end people counters are installed at the two main entrances to the reserve on Shapwick Road and Ashcott Road.

Counters are manufactured, maintained and software run by Traffic Technology. Numbers are accessed online.

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**AP20/1      MANAGEMENT PLAN STATUS**

Record status of management plan in Project Outcome statement as follows:

Current - if plan is live

Under review - if plan is live but subject to 5 year review

Out of date - if plan has not been reviewed for more than 5 years