

Exmoor National Park
Wildlife Report Series No 1

EXMOOR WILDLIFE RESEARCH AND MONITORING FRAMEWORK 2014-2020



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Wildlife Report Series

This report series includes interim reports, policy documents and other information relating to the wildlife of Exmoor National Park.

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Kingfisher (John Bridges, rspb-images.com)

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EXECUTIVE SUMMARY

Information on the status of Exmoor's wildlife is vital to inform our State of the Park reviews and represents a health check of the general condition of the National Park. Research and monitoring is not an end in itself but is paramount to inform management decisions on nationally and internationally important sites, and important biodiversity habitats and sites. Organisations and individuals involved in managing these areas need good quality data that requires existing datasets to be compiled, analysed and available. Relevant research, including data collection and sharing, needs to be co-ordinated and focussed on agreed priorities especially where there are current gaps in knowledge. Monitoring and evaluation of management activities will record whether or not desired outcomes are achieved or outstanding issues remain or are exacerbated.

Developed by a sub-group of the Exmoor Nature Conservation Advisory Group, the Exmoor Wildlife Research and Monitoring Framework contains an audit of current survey, monitoring and research being undertaken on Exmoor. In collaboration with local wildlife specialists it has developed lists of Exmoor Priority Species and Habitats, the aim of which is to identify those species and habitats on Exmoor of national or international biodiversity importance, populations that have reduced to levels of serious concern, and/or which would achieve most for biodiversity conservation if targeted for local action.

The Framework sets out priorities for future action on survey, research and monitoring and is organised according to key habitats with additional sections on invasive species and data management and dissemination. The progress of these actions will be reviewed annually by the Exmoor Nature Conservation Advisory Group.

This Framework is aimed at anyone interested in helping to record information about Exmoor's wildlife including natural history recording groups, conservation bodies, universities and other academic institutions, landowners and interested members of the public. It is hoped that the development and promotion of the Framework will help further develop a robust science base to underpin the management of Exmoor's wildlife.

FOREWORD

Exmoor's wildlife and landscapes stimulate and delight us. Its open spaces include vibrant coastal heaths, plunging down steep cliffs to the sea, giving way uphill to purple heather- dominated moorland and exposed, wet peatlands. Steep combes of western oakwoods, cloaked in mosses and lichens, are equally special as are the transitions between them. We must pass on these riches in a good or better state to future generations.

To do this, we need to stop the seemingly inexorable decline in many species, and the continuing loss of valuable wildlife habitats. In my 25 years working on Exmoor, I have witnessed the loss of the red grouse, the decline of the curlew and the shrinking in range of rare fritillary butterflies. Yet we have had some successes. The restoration of our peatlands by blocking ditches is one I am particularly proud of, with recent monitoring showing signs that, for example, snipe have responded to the increased wetness.

I can do no better than to quote the summary of the 2010 Lawton report¹ which is crystal clear:

'...what is needed is a step-change in nature conservation. We need to embrace a new, restorative approach which rebuilds nature and creates a more resilient natural environment for the benefit of wildlife and ourselves. This will require strong leadership from government, but is not a job for government alone. It will require effective and positive engagement with the landowners and land managers. And it will need improved collaboration between local authorities, local communities, statutory agencies, the voluntary and private sectors, farmers, other land-managers and individual citizens.'

The collection of information about Exmoor's natural riches is crucial to achieving this approach. Less exciting, but equally worthy, is the maintenance of the data collected. Sharing this information widely, so that good decisions can be taken, is also vital. For instance, perhaps our most fragile habitat is tiny flower-rich meadows, away from the moorland, in narrow Exmoor combes. Without good surveys of their locations, communicated effectively to owners or graziers, they can be quickly lost to scrubbing up, fertilisers or pesticides, horsiculture or development.

Unless we have detailed information provided by skilled recorders, we may miss species altogether. Otherwise we may not have appreciated that we have 98% of the world population of the recently named No Parking whitebeam (*Sorbus admonitor*)! More generally, the clues provided by declining numbers of specialist species - while less choosy, generalist species do better - tell us about the quality of our wider environment outside designated sites.

¹ Lawton, J.H., Brotherton, P.N.M., Brown, V.K., Elphick, C., Fitter, A.H., Forshaw, J., Haddow, R.W., Hilborne, S., Leafe, R.N., Mace, G.M., Southgate, M.P., Sutherland, W.A., Tew, T.E., Varley, J., & Wynne, G.R. (2010) Making Space for Nature: a review of England's wildlife sites and ecological network. Report to Defra.

Detailed research is also needed so that we can take appropriate action if it is necessary. We are more careful in our woodland management now we know the rare barbastelle bat roosts in small splits in trees, as low as 1-2m above the ground. Evidence shows young greater horseshoe bats need pastures rich in cow pats, the food source and habitat for the dung beetles caught in their first feeding flights in August. Our management advice therefore now promotes cattle grazing close to their roosts.

Effective survey, monitoring and research require enthusiasm, commitment and co-ordination. I invite you to help achieve the vision set out below by supporting the National Park and its partners in carrying out the key actions from this Framework.

Dr Flemming Ulf-Hansen, Natural England

VISION

- An effective and targeted research and monitoring programme covering Priority Species and Habitats which seeks to conserve the essential elements of Exmoor's wildlife.
- The results underpinning sustainable management of the natural environment, helping to guide management decisions and reverse decline of key species.
- Research and monitoring carried out by a broad spectrum of individuals, groups, societies and organisations involving the local community and providing a range of learning opportunities for all.
- The results of research pooled and disseminated widely, in a timely fashion and in an appropriate format.
- A continuing, rigorous reappraisal of our knowledge.
- A Natural Environment Record for Exmoor National Park up-to-date and accessible to all.

WHY AN EXMOOR WILDLIFE RESEARCH AND MONITORING FRAMEWORK?

Exmoor National Park is a landscape of international importance, supporting 18 Sites of Special Scientific Interest (SSSIs), 2 Special Areas of Conservation and 3 National Nature Reserves which in turn are home to a large number of species of key conservation concern.

Since the Exmoor Biodiversity Action Plan² was published 12 years ago in 2001, there have been some important changes to populations of key species on Exmoor. Some species are now known to be extinct in the Park. These include iconic upland birds such as lapwing and ring ouzel, butterflies such as the pearl-bordered fritillary and mammals such as the water vole, whilst other species including curlew, merlin and marsh fritillary are now at very low numbers. The composition of Exmoor's wildlife is changing as a result of land management and possible climatic effects. In the case of moorland birds for example, there has been a recent increase in passerines which favour areas of scrub or longer vegetation. These include grasshopper warbler, stonechat, reed bunting, lesser redpoll and linnet.

Information on the status of Exmoor's wildlife is vital to inform our State of the Park reviews and represents a health check of the general condition of the National Park. Research and monitoring is not an end in itself but is paramount to inform management decisions on nationally and internationally important

² Exmoor Biodiversity Action Plan (ENPA, 2001)

sites, and important biodiversity habitats. Organisations and individuals involved in managing these areas need good quality data. This requires existing datasets to be compiled, analysed and available. Relevant research, including data collection and sharing, should be co-ordinated and focussed on agreed priorities especially where there are current gaps in knowledge. Monitoring and evaluation of management activities will record whether or not desired outcomes are achieved, or outstanding issues remain or are exacerbated.

Collaborative research offers potential partners the opportunity to contribute directly towards improving the state of the Park, thereby demonstrating the impact of research activities to the public. Research partners can further assist by sharing existing research findings and by developing collaborative research programmes. There are also greater efficiencies and economies to be gained through shared research. This Framework is aimed at anyone interested in helping to record information about Exmoor's wildlife including natural history recording groups, conservation bodies, universities and other academic institutions, landowners and interested members of the public. It is hoped that the development and promotion of the Framework will help develop a robust science base to underpin the management of Exmoor's wildlife.



WHAT WILL THE EXMOOR WILDLIFE RESEARCH AND MONITORING FRAMEWORK DO?

The Framework identifies current research and monitoring being undertaken on Exmoor before addressing future needs, structured according to key habitats. Monitoring and research are taken to mean:

- survey is the collecting of quantitative information about items in a population;
- monitoring is defined as an activity (such as species counts or habitat assessments) undertaken in a structured and repeatable way at regular intervals. The objective of monitoring is to detect changes sometimes still of an unknown nature;
- research is the gathering and analysis of data, information or facts to diagnose a problem or test a hypothesis.

The purpose of survey, monitoring and research into Exmoor's natural environment is:

- (i) to provide baseline information about features of significance within Exmoor's key habitats and species;
- (ii) to monitor the effects of natural processes and the effects of climate change on the condition of these habitats and species;
- (iii) to monitor the success of carrying out management aimed at enhancing or restoring these habitats;
- (iv) to disseminate the results of these three activities in an accessible form to other bodies, landowners and the general public in order to promote better management of key priority habitats and species.

THE IMPORTANCE OF EXMOOR'S WILDLIFE

Exmoor supports an exceptionally rich and diverse flora and fauna, which reflects the area's varied geology and its geographical location on the Atlantic seaboard of the British Isles. This leads to generally cool summers, relatively mild winters and relatively high rainfall - over 2000 mm in places - through the year. Some species with a southern distribution reach their northern limit here; similarly some species with a northern distribution are at their southern extent. As a result, and with the influence of its history of land use, Exmoor is home to

important rare species and unusual habitats. The edges of habitats often support particularly rich wildlife communities and the relative abundance of semi-natural habitats in close proximity to each other, contributes to Exmoor's outstanding biodiversity.

Exmoor holds a range of habitats such as heath, blanket bog and western oak woods, which are internationally rare, with approximately 19,300 ha (or 28%) of the National Park specially designated by UK and European law to protect its distinctive wildlife. About 12,600 ha of that area has been selected by Government under the European Habitats Directive as a Special Area of Conservation. There are 3 National Nature Reserves within the National Park and 18 SSSIs. There are also just over 500 County Wildlife Sites across the National Park which complement the network of nationally and internationally designated sites. These include important species-rich grassland, ancient woodland, heath and freshwater habitats of high quality or recognised because they support species of conservation importance.



Lichen survey training day in Horner Wood

Notable species found on Exmoor include 16 of the 17 breeding British bats including the barbastelle and bechstein's bats that live in woodlands and the surrounding habitat. Exmoor supports some of the UK's rarest butterflies including the heath and high brown fritillary. Merlin can sometimes be seen over parts of Exmoor's moorland whilst birds such as the Dartford warbler, stonechat and grasshopper warbler are typical moorland species.

Along the coastal woodlands, unparalleled in England, rare endemic whitebeams are found. The nationally important networks of ancient sessile oak woodlands, internationally rare lichens indicative of continuity of tree cover and one of the densest collections of veteran trees in Europe, illustrate the long history of woodland management on Exmoor.

THE NATIONAL PARK PARTNERSHIP PLAN AND ITS NATIONAL CONTEXT

The Exmoor National Park Partnership Plan³ sets out what is special about Exmoor and the long term vision, objectives and priorities to be achieved on Exmoor during the period 2012 to 2017. One of the special qualities identified in the Plan is ‘..a mosaic of habitats supporting a great diversity of wildlife including herds of wild red deer, rich lichen communities, rare fritillary butterflies, bats, and other species uncommon in Southern Britain’. The vision for the Plan is ‘working together for Exmoor’ so that by 2030 there is an increased extent of wildlife habitats and linkages between them, more habitats are in good condition, and populations of valued native plants and animals are thriving.

The main priority for wildlife conservation during the previous National Park Management Plan⁴ was to ensure that land designated as Sites of Special Scientific Interest (SSSI) was in ‘target condition’ (‘favourable’ or ‘unfavourable recovering’ condition). This provided a strong focus for action and has led the targeting of agri-environment funding through the new Environmental Stewardship regimes. Monitoring by Natural England indicated that 97% of SSSIs in the National Park had reached ‘target condition’ by the end of 2010. A key focus for the period of the Partnership Plan and to achieve Biodiversity 2020 targets will be to ensure that significant progress has been made towards at least 50% of SSSIs on Exmoor moving from ‘unfavourable recovering’ to ‘favourable’ condition.

As well as improvements in the condition of priority habitats in the National Park over the past five years, significant progress has been made on Exmoor in improving the prospects of important species such as fritillary butterflies, lowland birds, dormice, otters, migratory fish and bats.

However, much remains to be achieved particularly in light of the government policy set out in the Natural Environment White Paper⁵ which places a high priority on conservation of biodiversity and the services provided to people by the natural environment. An independent review (Making Space for Nature, 2010⁶) concluded that England’s collection of wildlife areas is fragmented and does not represent a coherent and resilient ecological network capable of responding to the challenges of climate change and other pressures. The review called for: ‘a step-change in nature conservation [...] a new, restorative approach which rebuilds nature and creates a more resilient natural environment for the benefit of wildlife and ourselves’.

The review summarised what needed to be done in just four words: more, bigger, better, and joined. This was taken forward through the England

3 Exmoor National Park Partnership Plan 2012 - 2017 (ENPA, 2012)

4 Exmoor National Park Management Plan 2007 - 2012 (ENPA, 2007)

5 *The Natural Choice: securing the value of nature*, Natural Environment White Paper (Defra, June 2011)

6 Lawton, J.H., Brotherton, P.N.M., Brown, V.K., Elphick, C., Fitter, A.H., Forshaw, J., Haddow, R.W., Hilborne, S., Leafe, R.N., Mace, G.M., Southgate, M.P., Sutherland, W.A., Tew, T.E., Varley, J., & Wynne, G.R. (2010) *Making Space for Nature: a review of England’s wildlife sites and ecological network*. Report to Defra.

Biodiversity Strategy 2020⁷ which set out the Government's ambition to halt overall loss of England's biodiversity by 2020, support healthy well functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people. The 'hot spots' for biodiversity, like Exmoor National Park, have a vital role as the focal point for programmes to help create the more resilient natural environment being sought by government.

Other issues highlighted in the Partnership Plan include the importance of continuing to manage invasive species, such as knotweed and Rhododendron, through co-ordinated programmes of spraying and clearance. A severe outbreak of the *Phytophthora* blight on Japanese Larch during 2010 has led to significant impacts on landscape. This disease and others affecting important tree and plant species such as ash dieback *Chalara* are likely to be an increasing concern and will need close monitoring in future.

Maintaining in good condition, extending and connecting Exmoor's important wildlife habitats, and the species they support, is a priority for the Partnership Plan. This can only be achieved if it is underpinned by sound research and monitoring which will enable us to apply appropriate management prescriptions and to assess whether our goals are being reached.



Heather moorland on Dunkery

⁷ Biodiversity 2020: a strategy for England's wildlife and ecosystem services (Defra, August 2011)

THE NATIONAL BIODIVERSITY FRAMEWORK

The Exmoor Biodiversity Action Plan 2001-2010 was developed in response to the UK Biodiversity Action Plans which were written between 1995 and 1998 identifying the most threatened habitats and species. A new UK List of Priority Species and Habitats was published in 2007, following a 2-year review of the BAP process and priorities, representing the most comprehensive analysis of such information ever undertaken in the UK. The list now contained 1150 species and 65 habitats that were listed as priorities for conservation action under the UK BAP.

On Exmoor, 91 of these species and 29 of the habitats are known to occur on Exmoor and are included in the Section 41 list of species and habitats which are of principal importance for the conservation of biodiversity in England (under the Natural Environment and Rural Communities (NERC) Act 2006). The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under Section 41 of the NERC Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions.



As a result of new drivers and requirements, the *UK Post-2010 Biodiversity Framework*⁸, published in July 2012, has now succeeded the UK BAP. In particular, due to devolution and the creation of country-level biodiversity strategies, much of the work previously carried out under the UK BAP is now focussed at a country level. Additionally, international priorities have changed: the framework particularly sets out the priorities for UK-level work to support the Convention on Biological Diversity's (CBD's) *Strategic Plan for Biodiversity 2011-2020*⁹ and its five strategic goals and 20 'Aichi Targets', agreed at the CBD meeting in Nagoya, Japan, in October 2010; and the new EU Biodiversity Strategy¹⁰ (EUBS) in May 2011.

The UK BAP lists of priority species and habitats remain, however, important and valuable reference sources. Notably, they have been used to help draw up statutory lists of priorities in England, Scotland, Wales and Northern Ireland and to develop local lists of priority species.

⁸ *UK Post-2010 Biodiversity Framework* (JNCC and Defra on behalf of the Four Countries' Biodiversity Group, July 2012.)

⁹ *Strategic Plan for Biodiversity 2011 – 2020 and the Aichi targets* (Secretariat of the Convention on Biological Diversity, Oct 2010)

¹⁰ *Our life insurance, our natural capital : an EU biodiversity strategy to 2020* (European Commission, May 2011)

THE EXMOOR PRIORITY SPECIES AND HABITATS LISTS

The Exmoor Priority Species and Habitats lists have been produced as part of the development of the Framework and have been derived from the Exmoor Biodiversity Action Plan. Their purpose is to identify those species and habitats on Exmoor which are nationally or internationally important in biodiversity terms, populations that have reduced to levels of serious concern, and/or which would achieve most for biodiversity conservation if targeted for local action. The new Exmoor Priority Species list can be found in Appendix 1 and Priority Habitat list in Appendix 2.



The Priority Species list will be used as a tool to guide conservation action in the future, one of the aims of the list being to prevent accidental loss, through the development/spatial planning process, of species that are not legally protected, but are of biodiversity importance on Exmoor. Its publication should promote greater awareness and understanding of local biodiversity amongst the public, and encourage greater levels of recording activity.

The 198 species that appear on this list are a small fraction of those that occur naturally on Exmoor, but are considered to be the ones that are under the greatest degree of threat if current trends continue, or for which Exmoor is particularly important. The species have been selected, with input from local specialists, because they meet one or more of the selection criteria agreed by the Panel developing the Framework and which are shown in Appendix 2. The list is not intended to be an exhaustive checklist of species which occur on Exmoor. This can be found on the Exmoor Natural History Society website at www.enhs.org.uk/checklists.htm. It is also important to note that this is not a list of legally protected species which can be found on the JNCC website at www.jncc.gov.uk, or all Section 41 species of principal importance.

The Exmoor Priority Species List reflects the knowledge and data held at the time and will require review at regular intervals to keep it up to date, particularly when a large number of new species records are acquired or the UK Priority Species list is reviewed again. The Priority Species List will be reviewed periodically and updated as required in line with changes to the national checklists, as published on the NBN gateway: data.nbn.org.uk.

The Priority Habitats list (Appendix 2) is based on the list of Habitat of Principal Importance in England (drawn up under the NERC Act 2006) which was derived from the UK Biodiversity Action Plan and included habitats which continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework. The Exmoor Priority Habitats list includes terrestrial habitats such as blanket bog, upland oak woodland and hedgerows, and freshwater and marine habitats such as rivers and streams, coastal saltmarsh and Sabellaria (tube worm) reefs.

WILDLIFE RESEARCH PRIORITIES FOR EXMOOR

Current activity relating to survey, monitoring and research on Exmoor's wildlife is summarised in Appendix 3. This list is not meant to be exhaustive but is a summary of what is happening currently and a source of contacts to find out further information. For habitats such as moorland there has been an impressive amount of monitoring and research generated, particularly through the Exmoor Mires Project which is nationally recognised for the research associated with its programme of mire restoration. In addition, moorland has received good attention in relation to its importance for breeding birds - there is an excellent dataset going back to the 1970s.

Woodland has received a good level of attention with some comprehensive surveys being carried out of mosses, lichens and rare whitebeams. Meanwhile, other important areas such as the marine environment have received little attention partially due to the largely inaccessible coastline and our knowledge of the importance of marine habitats is therefore limited.

In drawing up new actions for this Research and Monitoring Framework, all research actions in the Exmoor Biodiversity Action Plan and the Moorland¹¹ and Woodland¹² Research Strategies have been reviewed. To gather input from specialist recording groups, a workshop event was held in September 2013 to seek views on priorities for future wildlife research and monitoring. The actions proposed in the following section are ordered according to habitat but with species sections contained within them.

¹¹ *Exmoor National Park Authority Moorland Research Strategy 1997 - 2002* (ENPA, 1997)

¹² *Exmoor National Park Authority Woodland Research Strategy 1997 - 2002* (ENPA, 1997)

1. Woodland

Exmoor has a higher proportion of woodland cover than many other parts of England with about 9,375ha of woodland, representing 13.5% of the area of the National Park. Of this about 66% (just over 6,000ha) is managed and includes 3350ha of ancient woodland sites, of which about 2,000ha is classified as ancient semi-natural woodland - usually the most important for wildlife. Exmoor has a significant proportion of the UK and world total of the remaining western oakwoods. Exmoor has a higher than average percentage of ancient semi-natural woodland and the blocks of woodland tend to be large compared to the rest of the country. The coastal woodlands, which extend from the high cliffs down to the shoreline in places, are unique in England.

Significant areas of woodland have been designated as SSSIs of which some are also designated as the Exmoor and Quantock Oakwoods Special Area of Conservation. The National Trust-owned Horner Woods and National Park Authority woodlands at Tarr Steps and Hawkcombe are also National Nature Reserves.

Veteran trees, orchards, parklands such as Dunster and Nettlecombe, copses and individual trees are often distinctive features of the Exmoor landscape and are often important habitats in their own right - more than 1,600 ancient trees have been recorded on Exmoor.



Research and monitoring actions for woodland

(i) Habitat actions

1. Continue monitoring vegetation change in ENPA-owned woodlands using permanent monitoring plots as outlined in management plans.
2. Refresh the Veteran Tree Inventory for Exmoor, identifying gaps. Develop methodology and carry out a survey and monitoring of veteran trees on Exmoor including an assessment of threats.
3. Re-assess and update the Ancient Woodland Inventory for Exmoor, particularly addressing the issue of small woodlands (<2ha).
4. Seek to designate the coastal woods as an SSSI.

(ii) Species actions

5. Collate existing records for all bat species in the National Park, identify gaps in knowledge and develop and implement a general survey strategy for bats, including surveys of potential hibernaculum and monitoring of roosts of selected species particularly as part of national recording programmes (National Bat Monitoring Programme).
6. Carry out further research into greater horseshoe bat foraging behaviour and barbastelle ecology in areas within the National Park and use results to influence planning and agri-environment schemes.
7. Assess the known distribution of dormice on Exmoor, identify other potential suitable sites and carry out systematic surveys in these key areas. Ensure all data collected from national nestbox recording schemes is disseminated at a local level.
8. Investigate the potential for the re-introduction of relevant Priority Species into sites where suitable conditions exist, for example, heath fritillary and pine marten.
9. Carry out survey and monitoring of lungwort lichens in all important populations which fall outside of SSSIs.
10. Undertake further research into the recolonisation of trees by lungwort lichens.
11. Carry out research on effects of management practices and natural processes on rare Sorbus (whitebeam) trees.
12. Develop criteria to guide site selection for re-introducing rare Sorbus (whitebeam) trees.

(iii) Environmental impact actions

13. Monitor beech regeneration in native woodlands to support any necessary management in the light of climate change and potential spread, for example, on flood plains or around important lichen trees.
14. Support research on effects of red deer in woodlands on Exmoor, particularly looking at vegetation patterns within deer exclosures.
15. Carry out a literature review on the effects of pheasants on the ecology of woodlands to improve the existing Exmoor Code of Good Shooting Practice for wildlife.
16. Investigate climate change adaption particularly in relation to woodland expansion.
17. Continue the Exmoor Phenology Survey to gather information on changes possibly related to climate change.
18. Initiate a study of the genetics of Exmoor's broadleaved trees, particularly in response to climate change, seeking to identify positive adaption characteristics from the native tree population.
19. Investigate the importance on Exmoor's woods in relation to flood control in valley systems.
20. Monitor lichen communities on ancient trees in relation to the effects of nitrogen loading and the potential age gap in trees.
21. Assess the age and suitability of bark conditions for species migration or transplanting of lichens.
22. Carry out research into the changes in the distribution of lichen species due to climate change.



2. Moorland

Exmoor's c. 19,000 ha of moor and heath, represents 23 out of the 82 nationally recognised moor and heath vegetation types. It includes some 7000 ha of upland heath; 4600 ha of upland grass moor; 3900 ha of bracken; 1500 ha of lowland heath (including coastal heath) and 3000 ha of blanket bog. Exmoor is at least regionally important for the extent of its upland and coastal heaths, upland grass moor and blanket bog with the second largest area of moorland in southern Britain. It is nationally important within England and Wales for the presence of a wide combination of upland heath types, including two rare types of heathland - bristle bent (*Agrostis curtisii*) / western gorse (*Ulex gallii*) heath and ling (*Calluna vulgaris*) / western gorse heath - which are of international importance. Exmoor's moors and heaths support nationally important populations of whinchat, stonechat, Dartford warbler and heath fritillary butterfly. About 88% of Exmoor's moor and heath is legally protected through SSSI status and a large area of this is included within the Exmoor Heaths Special Area of Conservation.



Research and monitoring actions for moorland

(i) Habitat actions

1. Continue research into diversifying *Molinia* (purple moor-grass) dominated swards.
2. Continue research on effectiveness and ecological impact of burning techniques including size of burns based on trials on Mill Hill and Porlock Common.
3. Continue to monitor vascular plant transects at restored mire sites (beyond that already scheduled for 2014).
4. Carry out research into techniques to encourage regeneration of *Sphagnum* and other mire plants on mire sites.
5. Continue to monitor birds and instigate invertebrate, soil and vegetation monitoring of selected 'Natural Links' reversion sites.

(ii) Species actions

6. Implement any necessary monitoring or research programmes for selected declining moorland species including curlew, merlin, ring ouzel, whinchat and the threatened fritillary butterflies.
7. Continue the 6-yearly programme of Moorland Breeding Bird Surveys across Section 3 Moorland on Exmoor.
8. Continue to carry out research into Priority Species associated with mires such as the adder and specialist peatland invertebrates.
9. Carry out a survey of peatland lichens.
10. Carry out research into why Exmoor's moorlands are poor in lichens addressing the possible causes of nitrogen or lack of boulders or micro-sites.
11. Carry out feasibility study into marsh fritillary re-introduction in suitable areas supporting devil's bit scabious.

(iii) Environmental impact actions

12. Continue research on heather recovery following heather beetle attacks based on trials on Withypool Common and East Anstey.
13. Identify means of controlling tick-borne diseases that are not solely reliant upon the control or eradication of bracken stands and carry out research into the effects on tick populations of peatland restoration.
14. Continue mires monitoring at Spooners and Aclands up to 2020 including maintenance of stations and support for research outcomes, including recording of greenhouse gas fluxes, water quality, water storage, biodiversity changes, agricultural impacts and pests.



Marsh fritillary ID training



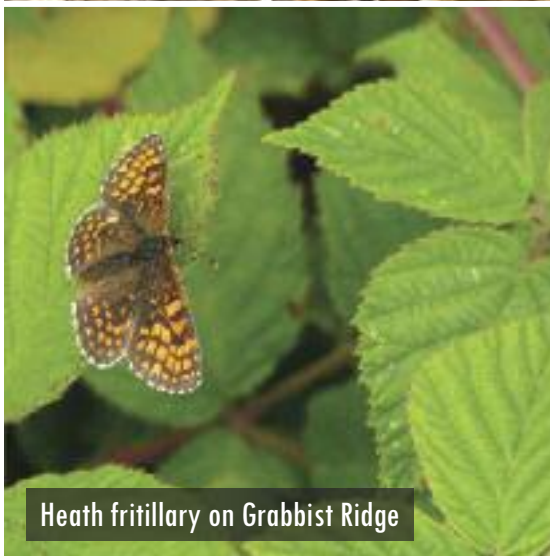
Blanket bog at Aclands



High brown fritillary caterpillar



Surveying for moorland birds



Heath fritillary on Grabbist Ridge



Snipe Andy Hay (rspb-images.com)

3. Farmland

Farmland provides a series of important habitats in the National Park. Less intensively used farmland is always more valuable for wildlife. For example, the remaining small areas of unimproved meadows and pastures support a great variety of wild plants including the scarce mountain pansy and adder's tongue and moonwort ferns. Unploughed grassland supports ant hills of the yellow meadow ant, butterflies, the scarce hornet robber fly and rare waxcap fungi, plus bats, which feed on the insects. An important habitat in farmland is provided by boundary features such field margins, hedgerows, hedgebanks and verges, providing refuges for wild plants and shelter and nest sites for birds, mammals and invertebrates.

Exmoor supports an extensive area of improved grassland some of which would have previously been moorland or unimproved grassland. Some attempts have been made to 're-wild' such areas by allowing to revert back to more tussocky species-rich grassland particularly where these areas buffer existing high quality habitat and there needs to be more research into better ways of achieving this.



View of farmland across to Dunkery



Research and monitoring actions for farmland

(i) Habitat actions

1. Repeat Parish hedgerow surveys carried out in Exford and Parracombe to assess the change in condition of hedgerows in these parishes every 15 years.
2. Collate existing grassland site data including from Farm Environment Plans (FEPs) and BAP inventories, identify gaps in knowledge and make available for decision making.
3. Collate existing information on important road verges from Devon County Council and Somerset County Council and establish the need for further surveys.
4. Carry out surveys which help to establish the wildlife importance of traditional orchards on Exmoor and develop a methodology for monitoring orchards on Exmoor.

(ii) Species actions

5. Continue to monitor farmland bird species every 6 years in the selected 3 sample areas and encourage collation of records and wider recording of farmland birds in other areas of the National Park.
6. Carry out an audit of key non-avian farmland species such as brown hare and voles and identify future monitoring needs.
7. Survey the invertebrate fauna of neutral and acid grassland and identify important sites.
8. Complete a grassland fungi survey of Exmoor by adding to the existing survey work in Somerset and by undertaking a similar survey of Devon grasslands.
9. Survey important arable weed sites.
10. Carry out a survey of lichens in orchards, on isolated apple trees and wayside/farm trees.
11. Ensure that all grassland sites supporting important wildlife including waxcap assemblages are designated as County Wildlife Sites (CWS) where they meet the selection criteria.

**(iii) Environmental impact actions**

12. Monitor the impacts of intensive farming practice on adjacent wetlands and watercourses.
13. Seek to understand and respond to threats to grassland habitat by carrying out regular surveys of CWS.
14. Establish if eutrophication is a threat to Exmoor's rich verges as appears elsewhere, by repeating existing surveys or establishing a new baseline.

4. Rivers and Streams

Most of Exmoor's rivers and streams have their source on the high moors and either head north, plunging only a few miles to the Bristol Channel or combine to form the River Exe that flows southwards for more than 80 kilometres to the English Channel. The clean, fast flowing waters of Exmoor support a rich and varied community of wild plants and animals including luxuriant growth of algae, aquatic mosses and lichens, such as the rare river jelly lichen. There are also several internationally rare mosses and liverworts. The moss-covered stones also provide a habitat for a wide variety of insects including rare beetle species.

The rivers support healthy populations of brown trout, bullhead and grayling and the more unusual stone loach and brook lamprey. Exmoor streams are particularly important for the spawning of salmon and sea trout and the East Lyn, Exe and Barle are particularly important for these migratory species, the Barle having the highest densities of young fish of any river in the SW. Many of Exmoor's bird species are found along river valleys, as well as the characteristic species of fast flowing rivers such as the dipper, grey wagtail and kingfisher. Otters are present on watercourses throughout the National Park. The River Barle has been notified as being a SSSI from its source virtually to its confluence with the Exe because it is considered the best example in Britain of an acidic upland stream grading into a richer river on sandstone.



East Lyn near Watersmeet



River corridors are often the only semi-natural habitat in areas of intensive agriculture and are often important as linear woodland or tall vegetation providing foraging areas for bats and shelter and food for other species.

Research and monitoring actions for rivers and streams

(i) Habitat actions

1. Review the importance of the River Lyn complex for wildlife to support possible SSSI notification.
2. Monitor condition of the River Barle SSSI and management practices affecting it.

(ii) Species actions

3. Continue otter surveys on Exmoor including the annual 2 day survey which covers all catchments and provides an estimate of the otter population on Exmoor.
4. Carry out surveys of lesser known groups including river flies.
5. Carry out a feasibility study of water vole re-introduction on Exmoor including a survey of historical and potential water vole sites, both on lowland and upland riparian habitats.
6. Continue survey and monitoring of river jelly lichen.

(iii) Environmental impact actions

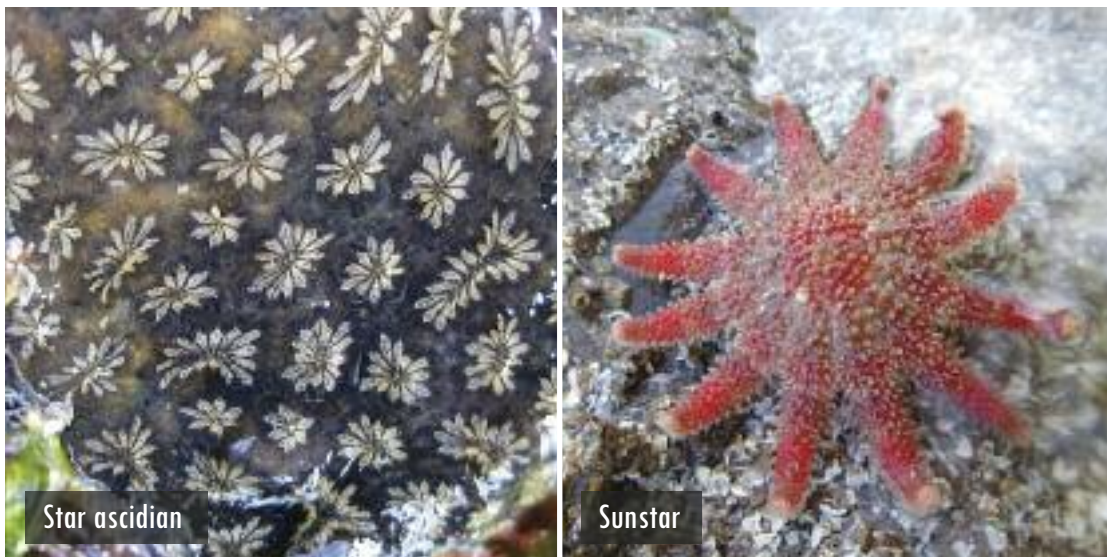
7. Continue to monitor the effects of mire restoration on water quality and quantity.



5. Coast and Marine

Exmoor has some of the most unspoilt stretches of coast in England. The Exmoor cliffs are the highest in England and are high, sheltered and are well vegetated compared with most Atlantic sea cliffs being covered with bracken, scrub, grassland, western heath and long stretches of undisturbed woodland. Many parts are not managed in any way and are, therefore, as close to a natural condition as is possible in Britain and are of national importance for wildlife.

Due to the relatively slow rates of erosion, slow growing lichen and bryophyte communities are able to establish themselves on bare rock and these communities are of international importance. They are particularly well developed at the Valley of Rocks, which is an important stronghold for nationally rare species. The rocky cliffs between Lynmouth and Heddon's Mouth have breeding fulmar, guillemots, razorbills and kittiwakes, of regional importance and the cliffs below Glenthorne also support significant seabird colonies.



Exmoor's intertidal habitats consist largely of boulders with associated under-boulder communities. These, together with occasional rocky reefs and stretches of sand, are backed by steep, and often high, cliffs, making access to beaches impossible in all but a few places. Where sites have been surveyed, such as Wild Pear Beach in the far west of the national park, they have been assessed as being of considerable biological importance.

Exmoor also marks a transition between different marine wildlife communities, with groups of plants and animals typical of the open coast and sea giving way



Honeycomb reef worm



Harbour porpoise

to those more suited to an estuarine existence from west to east. Foreland Point marks the western-most point of the transition zone, with a strong boundary between community types in Porlock Bay. The seas off the Exmoor coast are home to a number of cetacean species, with harbour porpoise being especially common and easily seen from coastal headlands.

The importance of Exmoor’s intertidal and marine habitats has been recognised by local stakeholders, with the area included in the Bideford to Foreland Point recommended Marine Conservation Zone (rMCZ). Further survey by Natural England as part of the MCZ process, and by Shoresearch Exmoor will only serve to uncover more of Exmoor’s fascinating marine wildlife.

Research and monitoring actions for the coast

(i) Habitat actions

1. Implement any research recommendations from the Porlock Bay Working Group.
2. Design a monitoring methodology, including indicators of possible climate change, and carry out a survey of all accessible intertidal areas along the Exmoor coast.



Surveyor looking for Dartford warblers

(ii) Species actions

3. Encourage recording of cetaceans from the Exmoor coast.
4. Carry out monitoring of all breeding seabirds every 15 years as part of the national survey and at least once in between.
5. Carry out survey of lichens in maritime grasslands and other coastal sites including Porlock shingle ridge.

(iii) Environmental impact actions

6. Support the protection of key coastal and marine species and habitats through the designation of Bideford to Foreland Point MCZ.

6. Invasive Species

Some non-native introduced species have contributed to the decline of native species in the National Park and where these are particularly invasive they threaten important habitats. Of greatest concern is the increase in certain introduced plants that support little native wildlife, such as rhododendron (*Rhododendron ponticum*) and knotweeds, particularly Japanese and Himalayan, and replace or destroy existing high value habitats. In woodland habitats alone, previously 450ha of Rhododendron was affecting a large proportion of SSSI woodlands. To date, 350ha have been cleared, largely since 2005. Knotweed occurs particularly on river systems such as the Lyn, Heddon and Barle and also on farmland, hedgerows, verges and gardens and over 1000 sites have recorded, many of which are being treated through the Exmoor Knotweed Control Project.

In addition to the invasive knotweed species, there are a number of other non-native plants which are also becoming problematic on Exmoor. These include Montbretia (*Crococsmia*) which is rapidly expanding along the river Barle and has been recorded up to 10 metres away from the river in mire habitats. Montbretia is known to be attractive to grazing cattle and it is thought it is being spread on the feet of cattle to higher ground in addition to along the river by flooding. Himalayan balsam (*Impatiens glandulifera*) occurs on many river systems



Japanese knotweed near Porlock

including the River Barle and some experimental pulling was successfully carried in 2013. Another garden escape, fringe cups (*Tellima grandiflora*) is threatening the native woodland flora including some rare species in the Lyn Valley below Watersmeet and some experimental control is being carried out by the National Trust. Other known non-native invasive species recorded on Exmoor include Himalayan honeysuckle and winter heliotrope (*Petasites fragrans*).

American signal crayfish (*Pacifastacus leniusculus*) are also thought to be having a fundamental effect on river ecosystems on Exmoor, as they eat invertebrates, snails, small fish and fish eggs and in addition their extensive burrows can cause river banks to collapse. The status of the white-clawed crayfish on Exmoor is still not fully known with a recent survey in the east of the National Park not confirming their presence. Incidental but regular records of signal crayfish have been received from the rivers Exe and Barle but the full extent of its distribution on Exmoor is not known.

Research and monitoring actions for invasive species

1. Assess the effectiveness of the existing Rhododendron control programme in restoring native flora and fauna.
2. Investigate the need and cost of eradicating rhododendron from cliff slopes as a necessary step to avoiding reinfestation of less steep areas already cleared.
3. Continue to survey and collate information on knotweed species on Exmoor.
4. Collate information on other invasive species such as Montbretia, Himalayan balsam, Himalayan honeysuckle and fringe cups.
5. Research organic methods of control of knotweed and Montbretia.
6. Research effective methods of control for Himalayan balsam and fringe cups.
7. Carry out a survey and consider implications of signal crayfish on Exmoor's rivers and streams concentrating initially on the River Barle SSSI.



7. Data management and dissemination

Ensuring that data collected on the wildlife of Exmoor is properly stored and made available, as far as possible, is fundamental to this Wildlife Research and Monitoring Framework. The National Park Authority currently has Service Level Agreements with the Devon Biodiversity Records Centre (DBRC) and the Somerset Environmental Records Centre (SERC) and this ensures regular updates are received. However, historical data exists which have not been input into the Local Records Centre; an audit is needed to ensure all ecological data goes through the respective LRC and is fed back to the National Park Authority as well as shared with other key partners such as Natural England. This may include national datasets which include data for Exmoor and which could help give great insight into the local picture.

The National Park Authority needs to continue to develop its good relationships with the LRCs and to encourage all recording of the natural environment to be managed through them. The National Park Authority needs to hold all relevant wildlife data in an integrated system covering both the Devon and Somerset sides of the National Park and this needs to be made available where appropriate through an Exmoor Natural Environment Record.

Exmoor National Park Authority, DBRC & SERC recognise that certain species (and a small number of other biodiversity features) are particularly vulnerable to collecting, damage, disturbance or commercial exploitation if certain information about them is released to the general public. Whilst we will endeavour to provide access to biodiversity information on the National Park through appropriate channels, there may be some circumstances where access will be restricted where disclosure would adversely affect the protection of the environment to which the information relates.

Due to Exmoor's relative inaccessibility and its small population, there is not as much wildlife recording and monitoring happening through local wildlife recording groups as may be envisaged within a National Park. There needs to be more encouragement for established wildlife recording groups to become more active on Exmoor and they should be given support wherever possible to achieve some of the actions in this Framework.

Through the promotion of this Framework closer links need to be made with local academic institutions including the universities in Plymouth, Exeter and Bristol and colleges such as Cannington, Duchy and Petroc. To bring about a wider understanding of the natural environment on Exmoor, there should be more opportunities for the general public to become involved in wildlife

recording. This could be through opportunities provided through the National Park Authority's 'Get Involved' programme or through initiatives such as the Exmoor Moorland Landscape Partnership. Landowners are also a partner to get more closely involved in wildlife recording as local knowledge is an extremely valuable asset and landowners may have excellent historical information on changes in Exmoor's wildlife.

Key actions for data management and dissemination

1. Carry out an audit of all existing wildlife information on Exmoor including that held by national organisations and ensure that it is held by the relevant Local Records Centre as well as centrally by the National Park Authority working towards developing a Natural Environment Record for Exmoor.
2. Carry out improvements to data storage of wildlife information for Exmoor making it more publicly available where appropriate.
3. Encourage more wildlife recording on Exmoor both through specialist wildlife groups and public participation surveys including the use of online and mobile recording such as phone apps.
4. Encourage new audiences to become involved in helping to record wildlife on Exmoor for example by working through the National Park Authority's 'Get Involved' programme and with local landowners.
5. Support events and initiatives that increase local people's contact with, and understanding of, coastal and marine wildlife.
6. Continue to support the development of the Local Record Centres covering Exmoor by agreeing new Service Level Agreements.
7. Encourage wider data sharing with other organisations such as universities and colleges where appropriate.
8. Provide input into nationally recording schemes such as Biodiversity Action Reporting System (BARS).
9. Improve the provision of information on Exmoor's wildlife on the National Park Authority's website.



Public participation at Bogtastic event

IMPLEMENTING THE FRAMEWORK - NEXT STEPS

It is hoped that this Framework will encourage greater wildlife recording on Exmoor and that more people will be encouraged to become involved in some of the actions within it. The actions contained in this plan are aimed at a wide audience - conservation organisations, wildlife recording groups, volunteers, landowners, academic institutions and the general public. It is a summary of opportunities for future survey, research and monitoring and the National Park Authority would like to work closely with anyone who is keen to help take forward actions in this plan. Progress towards the targets will be monitored on an annual basis by the Exmoor Nature Conservation Advisory Group with a full review being undertaken in 2020. Funding of such an ambitious programme will need to rely on a diverse range of sources ranging from the National Park Authority's Partnership Fund, Heritage Lottery Fund programmes, national conservation bodies, academic funding and voluntary organisations. Through commitment, enthusiasm and co-ordination it is hoped that the Framework will deliver its vision of 'an effective and targeted research and monitoring programme covering Priority Species and Habitats which seeks to conserve the essential elements of Exmoor's wildlife'.



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APPENDIX 1: EXMOOR PRIORITY SPECIES

1. TERRESTRIAL SPECIES				
Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
FUNGI				
Ascomycetes				
<i>Geoglossum atropurpurea</i>		1. UK Priority Species	Acid grassland.	Nettlecombe.
<i>Poronia punctata</i>	Nail fungus	1. UK Priority Species; 3. Red Data Book; 4. IUCN Threatened or Near Threatened	Areas supporting grazing by horses as found on horse dung	Limited
Basidiomycetes				
<i>Battarraea phalloides</i>	Sandy stilt puffball	1. UK Priority Species; 3. Red Data Book; 4. IUCN Threatened or Near Threatened	Sandy soil in hedgebanks.	Nettlecombe.
<i>Cantharellus ferruginascens</i>		3. Red Data Book Species; 4. IUCN Threatened or Near Threatened	Mixed woodland.	Allerford Wood & Porlock Toll Road.
<i>Creolophus cirrhatus</i>		4. IUCN Threatened or near Threatened	Dead trunks and limbs of deciduous trees, usually on beech.	Nettlecombe & the Barle Valley.
<i>Geastrum quadrifidum</i>	Earth star	3. Red Data Book Species; 4. IUCN Threatened or Near Threatened	Woodland.	Nettlecombe.
<i>Hydnellum concrescens</i>		1. UK Priority Species	Woodland	
<i>Hydnellum scobiculatum</i>		1. UK Priority Species	Beech leaf litter	Nutcombe Bottom, Webbers Post
<i>Hydnellum spongiosipes</i>	Velvet tooth	1. UK Priority Species	Exposed bare soil	Porlock Toll road.

Species		Common Name	Status	Habitat	Distribution on Exmoor
Latin Name					
<i>Hygrocybe calyptraeformis</i>	Ballerina waxcap	2. Exmoor Species Action Plan	Unimproved grassland.	A number of sites on Exmoor including Weather Station Field at Nettlecombe, Dunster Deer Park, Northcombe, Pinkery, Withypool, Wimbleball and South Hill.	
<i>Hygrocybe spadicea</i>	Date waxcap	1. UK Priority Species; 3. Red Data Book; 4. IUCN Threatened or Near Threatened	Unimproved grassland.		
<i>Sarcodon scabrosus</i>	Bitter tooth	1. UK Priority Species; 3. Red Data Book; 4. IUCN Threatened or Near Threatened	Associated with oak and beech.	Porlock Toll road.	
LICHENS					
<i>Biatoreidium delitescens</i>		3. Nationally rare; 4. IUCN Threatened or Near Threatened	Sheltered situations in old woodlands on hazel.	Barle valley. New to England.	
<i>Collema dichotomum</i>	River jelly lichen	1. UK Priority Species; 3. Nationally scarce; 4. IUCN Threatened or Near Threatened; 8. Schedule 8 of W&CA Act 1981	Submerged rocks in fast flowing streams.	River Barle.	
<i>Lecanographa amyloacea</i>		1. UK Priority Species; 3. Nationally scarce; 4. IUCN Threatened or near Threatened	Low down on dry bark of old oak trees in parkland.	Rare	

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Lecania chlorotiza</i>		1. UK Priority Species; 3. Nationally scarce; 4. IUCN Threatened or near Threatened	On elm and willow plus very old Oak.	Barle valley. Could be more widespread
<i>Lobaria amplissima</i>	Lungwort lichen	2. Exmoor Species Action Plan; 6(iv) and 6(v) Local specialist recommendation	On bark of old trees in upland oak woodland, parkland & wood pasture.	Horner/Hawkcombe, Barle valley, Bray valley, Haddeo
<i>Lobaria laetevirens</i>	Lungwort lichen	2. Exmoor Species Action Plan; 6(iv) and 6(v) Local specialist recommendation	On bark of old trees in upland oak woodland, parkland & wood pasture.	Horner/Hawkcombe, Barle valley, Bray valley, Haddeo
<i>Lobaria pulmonaria</i>	Lungwort lichen	2. Exmoor Species Action Plan; 6(iv) and 6(v) Local specialist recommendation	On bark of old trees in upland oak woodland, parkland & wood pasture.	Horner/Hawkcombe, Barle valley, Bray valley, Haddeo
<i>Lobaria scrobiculata</i>	Lungwort lichen	2. Exmoor Species Action Plan; 6(iv) and 6(v) Local specialist recommendation	On bark of old trees in upland oak woodland, parkland & wood pasture.	Horner/Hawkcombe, Barle valley, Bray valley, Haddeo
<i>Parmelia carporrhizans</i>		3. Nationally scarce; 4. IUCN Threatened or near Threatened	Well-lit branches on deciduous trees.	Nettlecombe. New Devon site in 2012. Difficult to find.
<i>Rhizocarpon simillimum</i>		3. Nationally rare; 4. IUCN Threatened or near Threatened	Exposed, gently sloping rock faces on sea cliffs.	East of High Veer Point.
<i>Rinodina aspersa</i>		3. Nationally rare; 4. IUCN Threatened or near Threatened	On stones on shingle beach.	Porlock Shingle Ridge (not found in 2013 during BLS survey).

Species		Common Name	Status	Habitat	Distribution on Exmoor
Latin Name					
<i>Schizatomma graphidioides</i>			1. UK Priority Species; 3. Nationally scarce; 4. IUCN Threatened or near Threatened; 6(ii) & 6(iv) Local specialist recommendation	On ash bark in upland oak woodland.	Horner Wood and Dunster
<i>Sticta canariensis</i>			1. UK Priority Species; 3. Nationally rare; 4. IUCN Threatened or near Threatened	On tree bark and rocks in upland oak woodland.	Watersmeet.
<i>Synoesia myrticola</i>			3. Nationally scarce; 4. IUCN Threatened or near Threatened	Dry oak bark & under-hangs on rocks. Coastal dry heaths especially in <i>Armeria</i> tufts	Hangman & Valley of the Rocks.
<i>Teloschistes flavicans</i>	Golden-hair lichen		1. UK Priority Species; 3. Nationally scarce; 4. IUCN Threatened or Near Threatened; 6(i) Local specialist recommendation; 8. Schedule 8 of W&CAct1981	Sea cliffs, on rocks & dead woody heather stems.	Possibly extinct on Exmoor. Last seen mid-1980's at Hurlstone Point. Extensive searches have not re-found this species.
MOSSES & LIVERWORTS					
<i>Bryum gemmiparum</i>	Welsh thread-moss		3. Red Data Book Species	Rock crevices in fast-flowing rivers.	River Lyn.
<i>Dumortiera hirsuta</i>	Dumortier's liverwort		3. Red Data Book Species	Upland oak woodland.	Watersmeet.
<i>Habrodon perpusillus</i>	Lesser squirrel-tailed moss		3. Red Data Book Species	Tree trunks.	Holnicote Estate.
<i>Hamatocaulis vernicosus</i>	Slender green feather moss		3. Nationally scarce; 5. EU Habitats Directive; 8. Schedule 8 of W&CAct1981	Base-rich flushes and springs in upland areas	
<i>Leptodontium gemmascens</i>	Thatch moss		1. UK Priority Species; 3. Red Data Book Species;	On old thatched roofs.	Holnicote Estate.

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Tortula cuneifolia</i>	Wedge-leaved screw-moss	1. UK Priority Species; 3. Red Data Book Species	Bare soil, rock crevices, and coastal cliffs.	Upper Hoar oak
FERNS and other bryophytes				
<i>Asplenium obovatum</i>	Lanceolate spleenwort	3. Nationally scarce; 4. IUCN Threatened or Near Threatened	Shaded rocks, roadsides and old stone walls, usually near the coast.	
<i>Gymnocarpium dryopteris</i>	Oak fern	6(iii) & (v) Local specialist recommendation	Rocky deciduous woodland and ravines, along stream banks, and on cliff ledges and stable block screes	Known from 5 or 6 sites
<i>Huperzia selago</i>	Fir clubmoss	6(i) & (iii) Local specialist recommendation	Acidic, nutrient-poor, sandy or peaty soils in grassland, heathland and blanket bog	
<i>Hymenophyllum tunbrigense</i>	Tunbridge filmy fern	6(iv) & (v) Local specialist recommendation	Very sheltered, often deeply shaded, humid habitats; these include acidic rock faces, humic banks and tree trunks, particularly in deep stream valleys, and crevices on upland boulder scree	
<i>Ophioglossum azoricum</i>	Small adder's tongue	3. Nationally scarce; 6(i) Local specialist recommendation	Grassland, cliff-tops and maritime heaths.	
<i>Ophioglossum vulgatum</i>	Adder's tongue	6(v) Local specialist recommendation	Mildly acidic to base-rich soils in open woodland, meadows and damp pastures	

Species		Common Name	Status	Habitat	Distribution on Exmoor
Latin Name					
VASCULAR PLANTS					
<i>Allium ampeloprasum</i> var. <i>Babingtonii</i>	Babington's leek	6 (iii) & (iv) Local specialist recommendation	Sandy and rocky places near the sea, especially in old fields and hedge banks, and in drainage ditches and other disturbed places	Porlock Marsh	
<i>Chamaemelum nobile</i>	Chamomile	1. UK Priority Species	Grazed grasslands with short sward often coastal	Currently known to occur at two Exmoor sites	
<i>Euphorbia hyberna</i>	Irish spurge	4. IUCN Threatened or near Threatened	Upland oak woodland.	Watersmeet.	
<i>Euphrasia anglica</i>	Glandular eyebright	1. UK Priority Species	Old pastures, heaths, moorlands	Not recorded since 1989 but this is probably due to difficulties in identification rather than a lack of the plant	
<i>Listera cordata</i>	Lesser twayblade	6 (iii) & (v) Local specialist recommendation	Moorland and on peat bogs		
<i>Melittis melissophyllum</i>	Bastard balm	1. UK Priority Species	Woodland, wood-borders, hedge banks and scrub on base-rich soils	Hawkcombe, Watersmeet and on road verge at Sully Corner	
<i>Orobancha rapum-genistae</i>	Greater broomrape	6 (v) Local specialist recommendation	Gorse & broom.	Recorded at Luckwell Bridge & Wheddon Cross but no recent records.	
<i>Pinguicula grandiflora</i>	Large-flowered butterwort	6 (iv) Local specialist recommendation	Wet rocks, flushed moorland and acidic bogs		
<i>Sanguisorba officinalis</i>	Greater burnet	6 (v) Local specialist recommendation	Unimproved floodplain grassland.	Barle and Exe valleys.	

Species		Common Name	Status	Habitat	Distribution on Exmoor
Latin Name					
<i>Sorbus admonitor</i>	a Whitebeam (No Parking Tree)	2. Exmoor Species Action Plan; 6(ii) and 6(v) Local specialist recommendation	Upland oak woodland	Watersmeet	
<i>Sorbus anglica</i>	a Whitebeam	2. Exmoor Species Action Plan; 4. IUCN Threatened or Near Threatened	Rock outcrops.	Hollow Brook, West Exmoor.	
<i>Sorbus devoniensis</i>	a Whitebeam	2. Exmoor Species Action Plan; 4. IUCN Threatened or Near Threatened; 6(iv) local specialist recommendation	Upland oak woodlands & hedges on well drained soils.	Watersmeet, Sillery Sands, Neck Wood, West Woodybay Wood, Hollow Brook, Timberscombe Wood & Bury.	
<i>Sorbus margaretae</i>	a Whitebeam (Taxon D)	2. Exmoor Species Action Plan; 6(ii) local specialist recommendation	Rock outcrops in upland oak woodland on the coast.	Glenthorne Woods & Neck Wood.	
<i>Sorbus porrigentiformis</i>	a Whitebeam	2. Exmoor Species Action Plan	Rock outcrops in upland oak woodland.	Woody Bay & Wester Wood.	
<i>Sorbus rupicola</i>	Rock whitebeam	2. Exmoor Species Action Plan	Rock outcrops in upland oak woodland, & sea cliffs.	Neck Wood.	
<i>Sorbus subcuneata</i>	Somerset whitebeam	1. UK Priority Species; 2. Exmoor Species Action Plan; 4. IUCN Threatened or Near Threatened; 6(ii) local specialist recommendation	Rock outcrops in upland oak woodlands.	Culbone, Watersmeet, Neck Wood & West Woodybay Wood.	
<i>Sorbus vexans</i>	Bloody whitebeam	1. UK Priority Species; 2. Exmoor Species Action Plan; 4. IUCN Threatened or Near Threatened; 6(ii) local specialist recommendation	Rock outcrops in upland oak woodland & sea cliffs.	Culbone, Watersmeet, Neck Wood.	

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Vaccinium uliginosum</i>	Bog bilberry	6(v) local specialist recommendation	Peaty acidic soils in upland dwarf-shrub heaths and blanket bog	Haddon Hill
<i>Verbascum lynchitis</i> (yellow-flowered variety)	White mullein	3. Nationally scarce; 6(i) & (ii) Local specialist recommendation	Rough pastures, recently cleared woodland, tracksides and road verges	Endemic on Holnicote Estate
CRUSTACEANS				
<i>Austropotamobius pallipes</i>	White-clawed crayfish	1. UK Priority Species; 5. EU Habitats/Birds Directive; 6(i) local specialist recommendations; 8. Schedule 5 of W&CACT 1981	Lowland rivers & water bodies.	Nettlecombe.
INSECTS				
Ants				
<i>Formica rufa</i>	Red wood ant	6(iv) & (v). Local specialist recommendation	Upland oak woodland and coniferous woodland. Keystone species; exclusive host of a large number of other important invertebrates including two Exmoor Priority Species including <i>Monotoma angusticollis</i> and <i>Mastigusa macrophthalma</i> .	Horner Wood, Grabbist, Croydon Hill, Hawkcombe and Culbone.

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Tapinoma erraticum</i>	Erratic ant	1. UK Priority Species; 6(i) & (v) local specialist recommendation	Lowland heath	Highly threatened on Exmoor with just two very small colonies, North Hill and Grabbist, in areas where there are stands of pioneer lowland heath.
Bees				
<i>Andrena rosae</i>	A mining bee	3. Red Data Book Species; 6(iv) local specialist recommendation	Range of open habitats	Single moorland edge site near Challacombe
<i>Andrena stragulata</i>	A mining bee	3. Red Data Book Species; 6(iv) local specialist recommendation	Range of open habitats	Single moorland edge site near Challacombe
<i>Bombus monticola</i>	Mountain bumble bee	6(iv) & (v) local specialist recommendation	Upland heather moorland. Upland 'flagship' species indicative of suitable habitat for many other upland invertebrates.	Sites include Molland Common, Dunkery, Exmoor Forest, Brendon Common, Mill Hill.
<i>Nomada argentata</i>	A nomad bee	3. Red Data Book Species; 6(v) local specialist recommendation	Marshy grassland with much devil's-bit scabious, cleptoparasite of <i>Andrena marginata</i> (Na).	Only one known Exmoor site for both this and its nationally scarce host near Challacombe; habitat greatly declined on Exmoor.
Flies				
<i>Asilus crabroniformis</i>	Hornet robber-fly	1. UK Priority Species; 6(iv) & 6(v) local specialist recommendation	Unimproved grassland, associated with cattle dung.	Northcombe, Dunster Deer Park, Winsford & Lyncombe.
<i>Chrysopilus erythrophthalmus</i>	a snipe fly	3. Red Data Book Species; 6(ii) & 6(v) local specialist recommendation	Larva aquatic in woodland streams in upland oak woodland.	Very rare, third British specimen from Horner Wood; also recorded in Heddon Valley in 1990s.

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Lipsothrix nervosa</i>	Southern yellow sprinter	1. UK Priority Species; 6(v). Local specialist recommendation	Deadwood in wet seepages in upland oak woodland.	Eastwater & Aller valleys & Horner Wood.
<i>Molophilus czizeki</i>	A crane fly	3. Red Data Book Species; 6(iv) & 6(v) local specialist recommendation	Upland oak woodland	Horner Wood & Watersmeet
Mayflies				
<i>Nigrobaetis niger</i>	Iron blue mayfly	1. UK Priority Species; 6(v) local specialist recommendation	Rivers	SS72, 73, 74, 83, 92 & 93.
Beetles				
<i>Actocharis readingii</i>	a rove beetle	3. Red Data Book Species	Under stones, seashore, intertidal zone.	Woody Bay.
<i>Atheta autumnalis</i>	a rove beetle	3. Red Data Book Species	Periodically inundated dead wood on wooded riverbanks.	
<i>Hydraena flavipes</i>	a water beetle	4. IUCN Threatened or Near Threatened	In gravel of fast flowing streams.	SS75, SS92 & ST03; also Roadwater and Horner Water.
<i>Hydraena pygmaea</i>	a water beetle	3. Red Data Book Species	In gravel of fast flowing streams.	SS75, 84 and 92; also Porlock area.
<i>Hydrocyphon deflexicollis</i>	a scirtid beetle	4. IUCN Threatened or Near Threatened	Shingle and gravel by upland streams.	Bossington, Weir Water.
<i>Hydroporus longicornis</i>	a diving beetle	4. IUCN Threatened or Near Threatened	Seepages on acidic mires	SS74 & 83; also Withypool Common and Spooners.
<i>Hypopycna rufula</i>	a rove beetle	3. Red Data Book Species	Fungi in woodlands	Dulverton Woods
<i>Lathrobium pallidum</i>	a rove beetle	3. Red Data Book Species	Shingle by stream	Bossington.
<i>Leptura sexguttata</i>	a longhorn beetle	3. Red Data Book Species	Larva in dead wood in upland oak woodland.	Watersmeet.
<i>Lucanus cervus</i>	Stag beetle	1. UK Priority Species; 5. EU Habitats/Birds Directive	Larva in dead wood in upland oak woodland & parkland.	Recent records from two sites, at Horner Wood & Wootton Courtenay.

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Meloe proscarabaeus</i>	Black oil-beetle	1. UK Priority Species	Open habitats with mining bee colonies	Cloutsham, Dulverton Woods, Timberscombe.
<i>Meloe violaceus</i>	Violet oil-beetle	1. UK Priority Species	Upland fringe habitats with mining bee colonies.	Brendon Common, Dunkery, Exford, Heddon Valley, Horner Woods, Knaplock Bank, Parsonage Cleeve, Pickedstones Brake, Hurscombe.
<i>Montoma angusticollis</i>	a Monotomid beetle	3. Red Data Book Species	In red wood ant nests.	Culbone Woods.
<i>Philorhizus vectensis</i>	a ground beetle	1. UK Priority Species; 3. Red Data Book Species; 6(v) local specialist recommendation	Coastal lowland heath.	Bossington Hill.
<i>Quedius riparius</i>	a rove Beetle	3. Red Data Book Species	In moss on banks of upland streams.	Bossington, Horner Woods, Hawkcombe and Watersmeet.
<i>Rugilus geniculatus</i>	A rove Beetle	3. Red Data Book Species	Dry unimproved grassland.	Northcombe Farm.
<i>Stictonectes lepidus</i>	a diving beetle	4. IUCN Threatened or Near Threatened	Upland pools	Pinkery Pond
Butterflies & Moths				
<i>Aphelia unitana</i>	a tortrix moth	3. Nationally scarce	On bramble, hogweed, etc.	Luckbarrow, Heddon's Mouth.
<i>Argynnis adippe</i>	High brown fritillary	1. UK Priority Species; 2. Exmoor Species Action Plan; 3. Red Data Book Species; 6(iii), (iv) & (v) local specialist recommendation; 8. Schedule 5 of W&CAct1981	Warm bracken slopes with abundant violets.	Heddon valley, Watersmeet, Bossington, Mansley Combe, Ashton Cleeve, Lyncombe, Barle valley.
<i>Biselachista trapeziella</i>	a micro moth	3. Nationally scarce	Larva on wood-rush in upland oak woodland.	40+ records to 2012 including Woody Bay.

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Boloria euphrosyne</i>	Pearl-bordered fritillary	1. UK Priority Species; 6(i) local specialist recommendation; 8. Schedule 5 of W&CAct1981	Bracken slopes with abundant violets.	Heddon valley & Barle valley.
<i>Boloria selene</i>	Small pearl-bordered fritillary	1. UK Priority Species; 6(v) local specialist recommendation	Warm bracken covered slopes where common dog-violet, the larval food plant, is abundant; also found in damp grassland areas, where it feeds on marsh violet.	
<i>Cepphis advenaria</i>	Little thorn	6. Local specialist recommendation	Sunny open woodland, sometimes in long-established scrub. Primarily feeds on bilberry	2 Exmoor records May 2011 - Periton Combe & Webber's Post
<i>Cerastis leucographa</i>	White-marked	6. Local specialist recommendation	Open broad-leaved woodland, old hedgerows, and scrub	5 Exmoor records, 2 on Devon side and 3 on Somerset side (1961 - 1964)
<i>Coenonympha pamphilus</i>	Small heath	1. UK Priority Species	On areas of high moorland	Still widely distributed on Somerset side of Exmoor
<i>Cosmia affinis</i>	Lesser-spotted Pinion	6. Local specialist recommendation	Woodlands, hedgerows etc. with elm, the larval foodplant	24 records 1973 - 2009
<i>Cosmia diffinis</i>	White-spotted Pinion	1. UK Priority Species	Woodlands, hedgerows, riversides, commons, etc. Larva on elm.	5 old records including one from Minehead area.
<i>Cyclophora porata</i>	False mocha	1. UK Priority Species	Likely to be associated with areas of scrubby oak	8 old records from 1940- 1973

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Eurodryas aurinia</i>	Marsh Fritillary	1. UK Priority Species; 5. EU Habitats/Birds Directive; 6(v) local specialist recommendation; 7. SSSI notified feature; 8. Schedule 5 of W&CAct1981	Larva on devil's-bit scabious in marshy grassland.	Still an extant but small population at Codsend Moor
<i>Hemaris tityus</i>	Narrow-bordered bee-hawkmoth	1. UK Priority Species	Damper parts of moorland, damp grassland, possibly open woodland. Larva on devil's-bit scabious.	No recent records but old record from Porlock area.
<i>Hipparchia semele</i>	Grayling	1. UK Priority Species	Coast and heathland areas	Good colonies at North Hill Minehead, Bossington and Mill Hill. Occasion sightings from elsewhere.
<i>Hydrelia sylvata</i>	Waved carpet	3. Nationally scarce	Larva on a variety of deciduous trees and shrubs, upland oak woodland.	Parracombe, Treborough Wood, Mounsey Reserve, Horner Wood, Withycombe Scruffets & Watersmeet.
<i>Hypena rostralis</i>	Buttoned snout	3. Nationally scarce	Hedgerows & scrub. Larva on hops.	Porlock Weir, Halse Combe, Nettlecombe, Porlock area & Bossington.
<i>Jodia croceago</i>	Orange upperwing	1. UK Priority Species; 3. Red Data Book Species	Larva on recently coppiced oak in upland oak woodland.	Old record from Heddon valley.
<i>Lasioommata megera</i>	Wall	1. UK Priority Species	Coastal areas, especially unimproved grassland, cliff edges and hedgerows	Seen good recovery in 2013. Often recorded along the coast with occasional sightings inland.

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Lygephila craccae</i>	Scarce blackneck	3. Red Data Book Species; 6(iv) & 6(v) local specialist recommendation	Coastal upland oak woodland and sea cliffs. Larva on wood vetch.	Culbone Woods, Woody Bay, Porlock Weir & Heddon valley. Most recent record 2003.
<i>Mellicta athalia</i>	Heath fritillary	1. UK Priority Species; 2. Exmoor Species Action Plan; 3. Red Data Book Species; 6(ii) & (v) local specialist recommendation; 7. SSSI notified feature; 8. Schedule 5 of W&CAct1981	Lowland heathland / woodland edge.	Dunkery, Dunster heaths, Grabbist Hill, Alcombe Common, Haddon Hill, Hawkcombe, Metcombe, Badgworthy Water.
<i>Mythimna turca</i>	Double line	3. Nationally scarce	Larva on various grasses in upland oak woodland.	Heddon valley, Porlock Weir, Chibbet Ford, Porlock area, Barle valley, Halse Combe, Horner Wood, Ashcombe & Watersmeet. 100+ records to 2012; seems to be increasing & spreading eastwards
<i>Rheumaptera hastata</i>	Argent & sable	1. UK Priority Species	Scrub and woodland edge, larva on birch.	Barle valley.
<i>Satyrium w-album</i>	White letter hairstreak	1. UK Priority Species	Favourite sites are elms on the edge of deciduous woodland, but also found in more open habitat such as roadside verges if suitable elms are present	A few recent records from Porlock/ Minehead area.
<i>Schiffermuellerina grandis</i>	a micro moth	3. Red Data Book Species	Larva in dead wood.	Abundant near Porlock, most recent record 1989.

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Schrankia taenialis</i>	White-line snout	3. Nationally scarce	Damp woodland, open heathland & shady hedgebanks.	10 records, most recent from 2009 from Hurlstone Point. Also records from Selworthy.
<i>Thecla betulae</i>	Brown hairstreak	1. UK Priority Species	Habitats where blackthorn, the primary larval foodplant, is abundant, such as hedgerows and woodland.	
<i>Xestia rhomboidea</i>	Square-spotted clay	3. Nationally scarce	Deciduous woodlands, larva on birch bramble.	Selworthy & East Water Valley. 13 records most recent 2006.
SPIDERS				
<i>Aulonia albimana</i>	a wolf spider	3. Red Data Book Species	Disused heathy quarries	1970s records from quarries near Dunster
<i>Diplocephalus protuberans</i>		3. Nationally scarce	Wet places, among moss, grass or rushes, often near streams or on moorland	Very rare in southern England; 3 records, one from Exmoor
<i>Drepanotylus uncutus</i>		6(v) local specialist recommendation	Marshes and bogs	Unusual in southern UK; 4 South England records including Exmoor
<i>Hilaira excisa</i>		6(v) local specialist recommendation	A bog species	A spider of the wetter parts of NW Britain, unusual in the south but found on Exmoor
<i>Hybocoptus decollates</i>		3. Nationally scarce	Occurs on yew and gorse near the coast	Exmoor record from gorse; only 6 post 1980 records for S England
<i>Leptothrix hardyi</i>		6(v) local specialist recommendation	Moorland and heathland	No post 1980 records for S England

Species		Common Name	Status	Habitat	Distribution on Exmoor
Latin Name					
<i>Liocranum rupicola</i>			3. Nationally scarce	Dry places, especially old quarries, in cracks in cliffs, shingle	Porlock Shingle Ridge
<i>Tapinocyba pallens</i>			6(v) local specialist recommendation	Sphagnum bogs	Unusual in south; four Exmoor records
<i>Tuberta macrophthalma</i>	a spider		3. Red Data Book Species	Associated with ants around old trees & dead wood.	Old records from Porlock area.
FISH					
<i>Anguilla anguilla</i>	European eel		1. UK Priority Species; 4. IUCN Threatened (CR)	Rivers and streams. Ponds and lakes.	Widespread records from North to South Exmoor and Porlock/Minehead Marsh areas. Eiders seen in streams
<i>Cottus gobio</i>	Bullhead		5. EU Habitats/Birds Directive	Rivers & streams.	Common.
<i>Lampetra planeri</i>	Brook lamprey		5. EU Habitats/Birds Directive; 6(v) local specialist recommendation	Rivers and streams.	Upper Exe/Barle catchments. Washford, Pill, Aller, Horner and Kilve
<i>Salmo salar</i>	Atlantic salmon		1. UK Priority Species; 5. EU Habitats/Birds Directive; 6(v) local specialist recommendation; 7. SSSI notified feature	Fast flowing rivers and streams.	Significant runs on the Exe/Barle and East Lyn, small run on the lower reaches of the River Washford

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Salmo trutta</i>	Brown/sea trout	1. UK Priority Species	Rivers and streams, some ponds and lakes fed by rivers	Populations of resident brown trout in most Exmoor rivers. East Lyn has a notable run of sea trout. Limited numbers of sea trout run the Exe and the Avill.
REPTILES AND AMPHIBIANS				
<i>Anguis fragilis</i>	Slow-worm	1. UK Priority Species; 8. Schedule 5 of W&CACT 1981	Heathland, tussocky grassland, woodland edges and rides, gardens and orchards	Common on heaths, in hedgebanks, allotments and gardens.
<i>Bufo bufo</i>	Common toad	1. UK Priority Species; 8. Schedule 5 of W&CACT 1981	Favours woodlands and damp areas with plenty of cover.	Widespread and common in various fairly dry places except in breeding season when it seeks ponds and pools on moorland and gardens.
<i>Natrix natrix</i>	Grass snake	1. UKBAP Priority Species (2007); 8. Schedule 5 of W&CACT 1981	Damp grassland, gardens and near ponds	Often near water; thought to have decreased in numbers
<i>Triturus helveticus</i>	Palmate newt	8. Schedule 5 of W&CACT 1981	Found in shallow still water typically on heathland and moorland	Breeds in shallow water, puddles, ponds and garden pools, also in brackish water. Occurs on the moor and on coastal marsh. Adults found in various habitats near breeding sites.

Species		Common Name	Status	Habitat	Distribution on Exmoor
Latin Name					
<i>Vipera berus</i>	Adder	1. UKBAP Priority Species (2007); 6(v) local specialist recommendation; 8. Schedule 5 of W&CACT 1981	Heathland & rough grassland.	On damp or dry moorland, also hedgerows and walls. Grey, brown, greenish, cinnamon and black coloration forms have all been recorded on Exmoor.	
<i>Zootoca vivipara</i>	Common lizard	1. UK Priority Species; 8. Schedule 5 of W&CACT 1981	Open habitats.	Widely distributed on heaths and moors.	
BIRDS					
<i>Accipiter gentilis</i>	Goshawk	8. Schedule 1 of W&CACT 1981	Woodland	Rare resident. A few breeding season records since 1990.	
<i>Alauda arvensis</i>	Skylark	1. UK Priority Species; 3. BoCC	Moorland & farmland.	Very common on grass moorland; >2,470 pairs recorded in Exmoor Moorland Breeding Bird Survey (EMBBS)2008	
<i>Alca torda</i>	Razorbill	6(v) local specialist recommendation	Sea cliffs.	About 745 birds recorded in 2008, most between Heddon's Mouth and Woody Bay.	
<i>Alcedo atthis</i>	Kingfisher	5. EU Habitats/Birds Directive; 8. Schedule 1 of W&CACT 1981	Rivers.	Scarce breeder, particularly on the Barle.	
<i>Anthus trivialis</i>	Tree pipit	1. UK Priority Species; 3. BoCC; 6(v) local specialist recommendation	Scrub associated with moorland and woodland, tall old beech hedges adjacent to grass moorland	180 pairs recorded in EMBBS 2008	

Species		Common Name	Status	Habitat	Distribution on Exmoor
Latin Name					
<i>Caprimulgus europaeus</i>	Nightjar	1. UK Priority Species; 2. Exmoor Species Action Plan; 3. BoCC; 5. EU Habitats/Birds Directives; 6(ii) local specialist recommendation	Lowland heathland / woodland edge & recent clear-fells in coniferous woodland.	About 50 pairs - Dunster and Minehead area, Robin How, Webber's Post, Ley Hill, Haddon Hill.	
<i>Carduelis cabaret</i>	Lesser redpoll	1. UK Priority Species; 3. BoCC	Gorse and birch	Most regular on Winsford Hill, Road Common and Room Hill. Also recorded in Badgworthy headwaters and Shallowford area. Largely summer visitor.	
<i>Carduelis cannabina</i>	Linnet	1. UK Priority Species; 3. BoCC	Lowland heathland, scrub & hedges.	Almost universal where there are large patches of common gorse, but scarce on higher ground in winter	
<i>Cuculus canorus</i>	Cuckoo	1. UK Priority Species; 3. BoCC; 6(iv) local specialist recommendation	Moorland	64 calling males recorded in EMBBS 2008	
<i>Dendrocops minor</i>	Lesser spotted woodpecker	1. UK Priority Species; 3. BoCC; 6(v) local specialist recommendation	Woodland	Almost all records come from Horner; no Devon records	
<i>Emberiza citrinella</i>	Yellowhammer	1. UK Priority Species; 3. BoCC	Moorland and farmland	78 pairs recorded on moorland in EMBBS 2008; also arable areas such as Withycombe	
<i>Emberiza schoeniclus</i>	Reed bunting	1. UK Priority Species; 6(iv) & (v) local specialist recommendation	Wet grass moorland in summer; bracken and gorse used in winter	Widespread on moorland and in marshy grasslands; 208 pairs recorded in EMBBS 2008.	

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Falco columbarius</i>	Merlin	5. EU Habitats/Birds Directive; 6(i) local specialist recommendation; 8. Schedule 8 of W&CACT 1981	Upland heathland.	Despite a few summer records, not known to have bred since 2010.
<i>Falco peregrinus</i>	Peregrine	5. EU Habitats/Birds Directive; 6(iv) local specialist recommendation; 8. Schedule 1 of W&CACT 1981	Sea cliffs	Perhaps up to 8 coastal and 2 inland pairs
<i>Ficedula hypoleuca</i>	Pied flycatcher	6(v) local specialist recommendation	Upland oak woodland	Sites include Hawkcombe, Barle Valley woodlands, Barlynch Woods, Withycombe Scruffets, Treborough Wood, Woodcock Gardens, Farley Wood, East Lyn Valley, woods from Culbone to Glenthorne and from Lee Bay to Hunter's Inn.
<i>Fulmarus glacialis</i>	Fulmar	6(v) local specialist recommendation	Sea cliffs	126 pairs recorded in 2008
<i>Gallinago gallinago</i>	Snipe	6(v) local specialist recommendation	Heather and grass moorland with patches of bog	Perhaps 15 pairs

Species		Common Name	Status	Habitat	Distribution on Exmoor
Latin Name					
<i>Larus argentatus</i>	Herring gull	1. UK Priority Species; 3. BoCC	Sea cliffs	Main Somerset colony just outside the National Park. Breeds regularly at Glenthorne and west from the Foreland to Combe Martin; sometimes on Yellow Stone (Culbone) and at Hurlstone. In 2008, 360 pairs west of Lynmouth	
<i>Locustella naevia</i>	Grasshopper warbler	1. UK Priority Species; 3. BoCC; 6(iv) & (v) local specialist recommendation	Heather and grass moorland with long sward	300 pairs recorded in EMBBS 2008	
<i>Milvus milvus</i>	Red kite	8. Schedule 8 of W&CACT 1981	Open moorland, farmland, woodland	Increasingly common spring/early summer wanderer (from Midlands or continent). One unsuccessful breeding attempt near Dulverton in 2004.	
<i>Muscicapa striata</i>	Spotted flycatcher	1. UK Priority Species; 3. BoCC	Wooded areas and gardens.	No longer widespread; only recorded in 60 ENPA tetrads	
<i>Numenius arquata</i>	Curlew	1. UK Priority Species; 4. IUCN Threatened or Near Threatened; 6(i) & (iii) local specialist recommendation	Blanket bog, upland heathland & marshy grassland.	Previously known from Dunkery & Codsend Moor, but now almost vanished from Exmoor. In last 3 years, no breeding even suspected except perhaps on North Molton Common and Molland Moor.	
<i>Parus montanus</i>	Willow tit	1. UK Priority Species; 3. BoCC	Wet woodland	No recent records	

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Parus palustris</i>	Marsh tit	1. UK Priority Species; 3. BoCC	Mature deciduous woodland, usually oak and larger gardens	Has declined.
<i>Passer domesticus</i>	House sparrow	1. UK Priority Species; 3. BoCC	Farmland and villages	Numbers contracted; still universal in areas with large farms, but numerous only in arable areas (e.g Rodhuish) or where horses are kept
<i>Phoenicurus phoenicurus</i>	Redstart	6(v) local specialist recommendation	Upland oak woodland, beech woodland, moorland edge with scrub	86 pairs recorded in EMBBS 2008. Also likes edges of conifer plantations such as Croydon Hill and Stent Hill.
<i>Phylloscopus sibilatrix</i>	Wood warbler	1. UK Priority Species; 3. BoCC; 6(v) local specialist recommendation	Confined mainly to oak/ash woodland with closed canopy and sparse scrub layer.	Population at low level, but present in Horner area, Exe valley, coastal woodlands, Badgworthy.
<i>Phylloscopus trochilus</i>	Willow warbler	6(iii) local specialist recommendation	Scrub on moorland areas and woodland	958 singing males recorded in EMBBS 2008 but thought to be decreasing in woodlands
<i>Prunella modularis</i>	Duncock	1. UK Priority Species	Farmland and hedges	Almost universal but thinly distributed on higher ground. Not threatened on Exmoor
<i>Pyrrhula pyrrhula</i>	Bullfinch	1. UK Priority Species	Farmland and hedges	Widespread and not threatened on Exmoor
<i>Riparia riparia</i>	Sand martin	6(v) local specialist recommendation	Rivers and streams.	4 breeding sites with a total of up to 20 pairs from just above Sherdon Hutch down to Landacre Bridge. Also small and eratic colonies around Exe/Barle confluence

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Rissa tridactyla</i>	Kittiwake	6(iii) & (v) local specialist recommendation	Sea cliffs	184 Apparently Occupied Nests (AON) in 2008
<i>Saxicola rubetra</i>	Whinchat	6(ii) & (v) local specialist recommendation	Moorland with areas of bracken	411 pairs recorded in EMBBS 2008
<i>Saxicola torquata</i>	Stonechat	6(ii) & (v) local specialist recommendation	Moorland with areas of scrub	442 pairs recorded in EMBBS 2008
<i>Streptopelia turtur</i>	Turtle dove	1. UK Priority Species; 3. BoCC; 6(i) local specialist recommendation	Scrub & woodland.	Almost certainly extinct as a breeder. From 2008 - 12, only 4 records of which only one, at Kennisham Hill, could have been a breeder
<i>Sturnus vulgaris</i>	Common starling	1. UK Priority Species; 3. BoCC	Arable, woodland	In decline, except perhaps on coastal belt outside NP, from Minehead to Watchet. From 2008 - 2012, only recorded in 30 tetrads on Exmoor and few had breeding confirmed. Has apparently abandoned woodland nesting, eg. Horner, but abundant on grassland in winter with roosts at Liton and Allcombe Water.
<i>Sylvia undata</i>	Dartford warbler	4. IUCN Threatened or Near Threatened; 6(ii) & (v) local specialist recommendation; 8. Schedule 1 of W&CACT 1981	Dense gorse on lowland heathland.	Snow has reduced 150 pairs of 2009 to probably fewer than 10; still surviving on North Hill, Dunkery and Selworthy Beacon and perhaps on Crawler Hill

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Turdus philomelos</i>	Song thrush	1. UK Priority Species; 3. BoCC	Gardens, farmland, woodland, gorse	No longer widespread in gardens and farmland but still very common in woodland and in patches of common gorse
<i>Turdus torquatus</i>	Ring ouzel	1. UK Priority Species 3. BoCC; 6(i) local specialist recommendation	Moorland	Last bred probably in 2002. Still on both passages but has tended to be commoner in autumn often in former breeding grounds such as Chetsford Water and Goosemoor Common
<i>Tyto alba</i>	Barn owl	6(iii) local specialist recommendation; 8. Schedule 8 of W&CACT 1981	Farmland with rough grassland.	Recorded mostly on high grasslands, including Simonsbath, Dunster & Trentishoe but little breeding proved
<i>Uria aalge</i>	Guillemot	6(v) local specialist recommendation	Sea cliffs.	About 1314 birds recorded in 2008, most between Heddon's Mouth and Woody Bay.
MAMMALS				
<i>Arvicola terrestris</i>	Water vole	1. UK Priority Species; 6(i) local specialist recommendation	Dense vegetation, slower flowing rivers & streams.	Status on Exmoor unknown but possibly now extinct on Exmoor; old records from River Avill and River Barle

Species		Common Name	Status	Habitat	Distribution on Exmoor
Latin Name					
<i>Barbastella barbastellus</i>	Barbastelle bat	1. UK Priority Species; 2. Exmoor Species Action Plan; 4. IUCN Threatened or Near Threatened; 5. EU Habitats/Birds Directive; 6(v) local specialist recommendation; 8. Schedule 5 of W&CAct1981	Wooded river valleys.	Horner Wood, Barle Valley.	
<i>Cervus elaphus</i>	Red deer	6(iv) & (v) local specialist recommendation	Woodland, farmland and moorland.	Widespread.	
<i>Eptesicus serotinus</i>	Serotine bat	2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CAct1981	Woodland edge, tall hedgerows, parkland and pasture; roosts in buildings in mixed farming landscapes	Scarce. Recorded in Heddon Valley, Challacombe, Wootton Courtenay.	
<i>Erinaceus europaeus</i>	Hedgehog	1. UK Priority Species	Woodland edges, hedgerows and suburban habitats such as parks and gardens.	Distribution unknown	
<i>Lepus europaeus</i>	Brown hare	1. UK Priority Species	Open habitats.	Widespread but not common, found particularly on North Hill, Croydon Hill, Molland Common, Barle Valley and Withypool Common.	
<i>Lutra lutra</i>	Otter	1. UK Priority Species; 4. IUCN Threatened or Near Threatened; 5. EU Habitats/Birds Directive; 6(v) local specialist recommendation; 8. Schedule 5 of W&CAct1981	Undisturbed rivers and streams.	Widespread and increasing.	

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Micromys minutus</i>	Harvest Mouse	1. UK Priority Species	Areas of tall grass such as cereals, roadside verges, hedgerows and salt marshes where nests can be built.	Unknown
<i>Muscardinus avellanarius</i>	Dormouse	1. UK Priority Species; 2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 6(v) local specialist recommendation; 8. Schedule 5 of W&CAct1981	Ash-hazel woodland and species-rich hedges.	Widespread but not common, for example in Barle Valley, Luxborough, Mansley Combe and Woodcock Gardens.
<i>Myotis brandtii</i>	Brandt's bat	2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CAct1981	Woodland and near water	Barle Valley
<i>Myotis bechsteini</i>	Bechsteins bat	1. UK Priority Species; 2. Exmoor Species Action Plan; 4. IUCN Threatened or Near Threatened; 5. EU Habitats/Birds Directive; 6(i) local specialist recommendation; 8. Schedule 5 of W&CAct1981	Upland oak woodland.	Horner Wood.
<i>Myotis daubentoni</i>	Daubentons bat	2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CAct1981	By rivers and streams in well wooded areas.	All main river valleys.
<i>Myotis mystacinus</i>	Whiskered bat	2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CAct1981	Woodland, often near water; roosts in trees or buildings	Recorded in areas such as the Barle Valley.

Species		Common Name	Status	Habitat	Distribution on Exmoor
Latin Name					
<i>Myotis nattereri</i>	Natterer's bat	2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CACT1981	Open woodland or parkland; roosts in trees or buildings.	Recorded in areas such as the Barle Valley.	
<i>Myctalus leisleri</i>	Leisler's bat	2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CACT1981	Woodland; roost in tree holes and buildings	One record from Horner Wood 1998	
<i>Myctalus noctula</i>	Noctule bat	1. UK Priority Species; 2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CACT1981	Mixed farmland, parkland and woodland; roosts in trees holes.	Widespread, known from Horner Woods, Croydon Hill, Withycombe and the Barle Valley.	
<i>Pipistrellus nathusii</i>	Nathusius' pipistrelle	2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CACT1981	Woodland rides and edges	Rare.	
<i>Pipistrellus pipistrellus</i>	Common pipistrelle bat	2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CACT1981	Wide range of habitats; roosts usually in buildings.	Common and widespread.	
<i>Pipistrellus pygmaeus</i>	Soprano pipistrelle bat	1. UK Priority Species; 2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CACT1981	Usually found near water and often roosts in crevices around the outside of houses and buildings.	Recorded in areas such as the Barle Valley.	
<i>Plecotus auritus</i>	Brown long-eared bat	1. UK Priority Species; 2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CACT1981	Woodland, parkland and gardens; roosts in buildings & trees in lightly wooded areas.	Widespread.	

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Plecotus austriacus</i>	Grey long-eared bat	2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CAct1981	Woodland edges, meadows, grasslands and gardens	Dunster
<i>Rhinolophus ferrumequinum</i>	Greater horseshoe bat	1. UK Priority Species; 2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CAct1981	Woodland, hedges and pasture; roosts in old buildings.	Scarce with one large breeding roost inside the National Park and at least one other smaller roost. Also recorded in the Barle Valley. Hibernating in tunnels and possibly sea caves
<i>Rhinolophus hipposideros</i>	Lesser horseshoe bat	1. UK Priority Species); 2. Exmoor Species Action Plan; 5. EU Habitats/Birds Directive; 8. Schedule 5 of W&CAct1981	Sheltered valleys with deciduous trees; roosts in large country houses and farm buildings.	Recorded in Barle and Heddon Valleys, Nettlecombe, Dunster, Wootton Courtenay.
2. MARINE SPECIES				
Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Botryllus schlosseri</i>	Star ascidian	6 (v). Local specialist recommendation	Grows on slow-moving, submerged objects, plants, and animals in nearshore saltwater environments	Occurs west of Ilfracombe but status on Exmoor's coast unknown
<i>Crossaster papposus</i>	Common sunstar	6 (v). Local specialist recommendation	Rocky bottoms coarse sand and gravel	Scarce in the south west except for Isles of Scilly and possibly the North Devon coast; Exmoor could be an important stronghold

Species		Status	Habitat	Distribution on Exmoor
Latin Name	Common Name			
<i>Halichoerus grypus</i>	Atlantic grey seal	5. EU Habitats/Birds Directive	Coastal waters and beaches	Very common on Exmoor coast, with certain beaches used for pupping
<i>Phocoena phocoena</i>	Harbour porpoise	1. UK Priority Species	Coastal waters	Regularly sighted off Hurlstone point
<i>Ostrea edulis</i>	Native oyster	1. UK Priority Species	Shallow, sublittoral habitat	Once common off Porlock Weir, current status unknown
<i>Padina pavonica</i>	Peacock's tail	1. UK Priority species	Found in rock pools and on stones on the mid to lower shore	Recorded at Minehead
<i>Palinurus elephas</i>	Spiny lobster	1. UK Priority Species	Near the coast and offshore to 70m deep, in seascapes of bedrock and boulders.	Common around Lundy and may well occur close to Lynmouth
<i>Sabellaria spinulosa</i>	Ross worm	6 (v). Local specialist recommendation; also listed as a UK Priority Habitat	Found on hard substrata on exposed, open coasts where sand is available for tube building. Mainly subtidal but may be found in the low intertidal.	May occur off the Exmoor coast
<i>Sabellaria alveolata</i>	Honeycomb worm	6 (v). Local specialist recommendation; also listed as a UK Priority Habitat	Found on hard substrata on exposed, open coasts with moderate to considerable water movement where sand is available for tube building	Very important throughout the Severn and Bristol Channel – occurs at Minehead and probably elsewhere, but NE mapping does not extend beyond the Severn SAC

Exmoor Priority Species list criteria	
Summary reason	Reasons for Priority Status
1 UK Priority Species	The species is on the 2007 UK BAP priority species list. All of these on Exmoor are species listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 as Species of Principal Importance in England.
2 Archived Action Plan Species	The species is the subject of a Species Action Plan (SAP) in the Exmoor Biodiversity Action Plan (2001 – 2011)
3 UK criteria: Red Data Book Species, Birds of Conservation Concern or nationally threatened species	The species is in most recent Red Data Book for its taxonomic group and is in one of the following categories: RDB1; RDB2 or RDB3; is on the Red List of Birds of Conservation Concern (BoCC) or is classified as nationally scarce.
4 IUCN Threatened or Near Threatened	There has been a recent review of the level of threat faced in the UK by the species and it has been assigned to one of the following IUCN (International Union for Conservation of Nature) threat categories: Threatened which includes CR (Critically Endangered); EN (Endangered); VU (Vulnerable) or Near Threatened (NT).
5 EU Habitats/Birds Directives	The species is listed in Annex II or IV of the European Union’s Habitats Directive and/or Annex I of the EU Birds Directive. (Birds listed in Annex 1 of the EU Birds Directive that are scarce or rare on Exmoor are excluded, unless they have or are likely to breed in the county.)
6 Local Specialist Recommendation.	The species is recommended for inclusion by an acknowledged specialist in the particular taxonomic group to which the species belongs because (i) it can be shown to be under a high degree of threat of becoming extinct on Exmoor within the next 25 years; (ii) data shows that it has nationally important numbers on Exmoor (1% or more); (iii) there is evidence of severe decline on Exmoor; (iv) Exmoor is important for this species in a regional or national context; (v) it is strongly associated with an Exmoor Priority Habitat.
7 SSSI notified feature	The species is a notified feature of a Site of Special Scientific Interest on Exmoor
8 Schedules 1, 5 and 8 of the Wildlife and Countryside Act	The species has legal status under Schedules 1 (birds), 5 (other animals) and 8 (plants) under the Wildlife and Countryside Act 1981.

APPENDIX 2: EXMOOR PRIORITY HABITATS

Broad habitat	Habitat name
Arable and horticulture	Arable field margins
Arable and horticulture	Traditional orchards
Boundary	Hedgerows
Coastal	Coastal saltmarsh
Coastal	Coastal vegetated shingle
Coastal	Intertidal mudflats
Coastal	Maritime cliff and slopes
Freshwater	Ponds
Freshwater	Rivers
Grassland	Lowland calcareous grassland
Grassland	Lowland dry acid grassland
Grassland	Lowland meadows
Grassland	Purple moor-grass and rush pastures
Heathland	Lowland heathland
Heathland	Upland heathland
Inland rock	Inland rock outcrop and scree habitats
Marine	Intertidal boulder communities
Marine	<i>Sabellaria alveolata</i> reefs
Marine	<i>Sabellaria spinulosa</i> reefs
Marine	Subtidal sands and gravels
Wetland	Blanket bog
Wetland	Coastal and floodplain grazing marsh
Wetland	Lowland fens
Wetland	Upland flushes, fens and swamps
Woodland	Lowland mixed deciduous woodland
Woodland	Upland mixed ashwoods
Woodland	Upland oakwood
Woodland	Wet woodland
Woodland	Wood-pasture and parkland

APPENDIX 3: CURRENT WILDLIFE SURVEY, RESEARCH AND MONITORING IN EXMOOR NATIONAL PARK

Habitat	Rationale	Regularity of survey	Methodology	Key contacts for survey/research	Funded delivery mechanism	Survey, research or monitoring
1. Woodland						
a. Habitats						
SSSI Condition Assessment monitoring	To carry out favourable condition assessment of priority habitats	Every 6 years	Favourable condition assessment methodology	Natural England	NE	Monitoring
Biodiversity Monitoring Framework for County Wildlife Sites	Priority habitats	Different sites surveyed each year.	BMF methodology	Devon Biodiversity Records Centre	DCC/DWT	Monitoring
Survey of unconfirmed County Wildlife Sites in Devon	Priority habitats	One off	County Wildlife Site survey methodology based on Phase 2 survey	DBRC	ENPA Partnership Fund	Survey
Hawkcombe monitoring project	Monitoring of NNR	Annually	Methodology based on recommendations in monitoring report	Monitoring carried out by ENHS with support from ENPA	volunteers	Monitoring
Woodland monitoring in ENPA woods	To monitor Priority species and habitats	5 yearly	Methodology based on recommendations in management plan	ENPA	ENPA, FC and NE	Monitoring
b. Species						
Woodland bird survey	Priority Species	Every 6 years	Randomly selected timed point counts	RSPB, ENPA	RSPB, ENPA, volunteers	Monitoring
Nestbox schemes in Hawkcombe and Burridge Woods	Priority Species	Annually	Record species using boxes following breeding season	ENHS, BTO	volunteers	Monitoring
Wood warbler monitoring in Horner	Priority Species	Annual	20+ year study both observation and ringing effort; capture and recapture	W. J. Webber	NT	Monitoring

Habitat	Rationale	Regularity of survey	Methodology	Key contacts for survey/research	Funded delivery mechanism	Survey, research or monitoring
Bat surveys of woodlands, eg. Bechsteins and barbastelle	Priority Species	Ad hoc	Visual search of trees, habitat transects, bat detector recordings, mist and harp traps	NT, ENPA	NT, ENPA	Monitoring
Dormouse surveys –	Priority Species	Annually	National Dormouse Monitoring methodology	Blackford Woods – NT; Woodcock Gardens – ENHS; Tarr Steps, Mansley Combe, Church Wood – ENPA	volunteers	Monitoring
Red deer	Species of local interest to Exmoor	Annually	Co-ordinated count of all known areas supporting deer populations	Red Deer Initiative	volunteers	Monitoring
Moth recording	Priority Species	Ad hoc	Moth trapping	Somerset Moth Group, Devon Moth Group	volunteers	Survey
Oil beetles	Priority Species	Ad hoc	Random search method	Buglife	volunteers	Survey
Making the Small Things Count	Priority Species	Two years	Various generally systematic surveys of specific locations.	Plantlife	Volunteers	Survey
Woodland lichen surveys	Priority Species	Ad hoc	Various generally systematic surveys of specific locations. NT: Only part of Horner wood surveyed in detail. Seeking funding to complete whole wood.	NT, ENPA	NT, ENPA	Monitoring
Ancient veteran trees, eg Horner	Priority habitat; condition assessment for SSSI	Ad hoc	Some systematic and ad hoc surveys. NT: Using Ancient & veteran trees survey methodology linked to Woodland Trust Ancient tree map. Various measurements made trees tagged and GPS logged. Ideally extend this survey to the field and hedgerow trees through Porlock Vale to catalogue fully the resource and to aid succession planning.	NT, ENPA	NT, ENPA, volunteers	Monitoring

Habitat	Rationale	Regularity of survey	Methodology	Key contacts for survey/research	Funded delivery mechanism	Survey, research or monitoring
c. Environmental impact						
Tree phenology survey	Effects of climate change	Annually	Methodology in Exmoor Tree Condition Survey report 2006/07	ENPA	ENPA, volunteers	Monitoring
Opal Tree Health Survey	Tree health	Ad hoc	OPAL methodology	Forest Research		Monitoring
2. Moorland						
a. Habitats						
SSSI Condition Assessment monitoring	To carry out favourable condition assessment of priority habitats	Every 6 years	Favourable condition assessment methodology	Natural England	NE	Monitoring
Biodiversity Monitoring Framework for County Wildlife Sites	Priority habitats	Different sites surveyed each year.	BMF methodology	Devon Biodiversity Records Centre	DCC/DWT	Monitoring
Dunkery Moorland Monitoring	Priority habitat	Annual	Quadrat/transect vegetation monitoring	NT	NT	
Mire Project – SERC contract on restored sites and baselines for moorland plants	To monitor Priority species and habitats	Yearly if possible	Based on SERC methods developed for the project in 1998	Exmoor Mires Project team	SWW	Monitoring and research
Factors effecting the colonisation of created bog pools	Habitat restoration of UK Priority habitat	One off	Research thesis, BSc (Honours) in Countryside Management of Royal Agricultural College, Cirencester. 9 sites with bog pools, 2 samples from the largest and smallest pools of each site. Feeding water source identified. Domin Scale used to record vegetation cover in %. pH and conductivity of water samples tested; ammonium and nitrates measured.	Author: Michelle Katherine Easton Exmoor Mires Project team	SWW	Research

Habitat	Rationale	Regularity of survey	Methodology	Key contacts for survey/research	Funded delivery mechanism	Survey, research or monitoring
The continued effect of damming moorland drainage channels on Exmoor Mire vegetation	Habitat restoration of UK Priority habitat	One off	Research thesis, FdSc Countryside Management, 2011 Looking at 'All Species' and 'Bryophytes' Use of NVC method to enable comparison of sites, presented as a function of its abundance.	Author: Andy Glendinning Exmoor Mires Project team	SWW	Research
Analysis of the effects of drainage ditch blocking on blanket bog vegetation patterns	Habitat restoration of UK Priority habitat	One off	Research thesis, University of Bristol Sites: Squallacombe, Blackpitts and Exe Head Line transects with quadrats placed along, use of frequency scores in recording vegetation. NVC. Use of Ellenberg indicator values for statistical analysis	Author: Tessa. C. Ruddy Exmoor Mires Project team	SWW	Research
Response of vegetation to raising the water table as part of the Exmoor Mire Restoration Project	Habitat restoration of UK Priority habitat	One off (Including previously collected data from August 2006 and August 2008 and repeating along same site)	Research thesis, University of Exeter Use of NVC, 1m ² quadrats along a 50m long transect, Dipwells; statistical analysis	Author: Sarah R. Langton Exmoor Mires Project team	SWW	Research
Research Skills Project on Blackpitts	UK Priority habitat	One off Uses baseline vegetation survey data collected in 1998 by SERC as well as re-surveyed data from 2006	Replicated the surveying technique on the Blackpitts site Uses 30m long transects with 30 quadrats taken Quadrats = 4 x 0.5m x 0.5m	Author: Cathryn Scott Exmoor Mires Project	Volunteer	Research

Habitat	Rationale	Regularity of survey	Methodology	Key contacts for survey/research	Funded delivery mechanism	Survey, research or monitoring
b. Species						
Upland Mire Restoration in Exmoor National Park: using bryophyte species as indicators of mire hydrology	UK Priority habitat Looking at bryophyte species both pre and post water-table restoration, looking especially at <i>Sphagnum</i> species	One off Use of vegetation survey data from pre-2008 records	Advance Diploma in Environmental Conservation Research Thesis, Oxford University 1m ² quadrats along line transects 20-40m long. Use of pre-2008 vegetation survey data, NVC branding, Ellenberg Indicator Species, statistical analysis	Author: Anne Hand, Exmoor Mires Project team	SWW	Research
Survey of waders and other birds on mires in Exmoor National Park	Main species looked at: Snipe <i>Gallinago gallinago</i> and curlew <i>Numenius arquatus</i>	One off 2011-2012	Sites visited at least weekly during main breeding period Use of some research from the 2008 survey recorded by the Exmoor Moorland Bird Survey (EMBS)	Author: David Boyce RSPB	SWW	Monitoring
Chironomid populations within the Exmoor Mires	UK Priority Habitat	One off	Temporal pools observed with rashes or raised tubes made by peat sediment which were identified as insect larval tubes	Author: Hazel Kendall West Country Rivers Trust	SWW	Research
How restoring mires on Exmoor can potentially improve the habitat for snipe	Habitat restoration of UK BAP habitat <i>Gallinago gallinago</i> (Snipe)	One off	Research thesis, University of Exeter. (All sites had up-to-date vegetation composition data) Quadrats taken ever 1m along 3 transects on 3 sites; sticky traps (invertebrates composition and abundance)	Author: Kathryn Hodge Exmoor Mires Project team SERC	SWW	Research
Habitat selection in the common lizard	Priority species and habitats Focusing on <i>Lacerta vivipara</i>	One off	Research thesis, University of Exeter. 15 site visits between August – October 2009. Created refuges for reptiles along a transect on each of the 6 sites, recording number of reptiles underneath each one on visits. Soil under refuges also tested, vegetation surveys carried out on the sites	Author: Daniel Richards Exmoor Mires Project team	SWW	Research

Habitat	Rationale	Regularity of survey	Methodology	Key contacts for survey/research	Funded delivery mechanism	Survey, research or monitoring
Breeding moorland bird survey (including habitat data)	Priority Species	Every 6 years	Brown and Shepherd (1993) method	RSPB, ENPA	RSPB, ENPA, NE, SWW,	Monitoring
Annual bird monitoring surveys	Priority Species	Annually	Random transects over key moorland areas	SOS	volunteers	Monitoring
Mire breeding bird survey	Priority Species	Every 6 years	Brown and Shepherd (1993) method	Exmoor Mires Project team	SWW	Monitoring
Exmoor Wild Watch Survey	Priority Species	2 years	Public participation survey aimed at encouraging recording of 10 Priority Species	Exmoor Moorland Landscape Partnership	Public	Survey
In-stream invertebrate monitoring on Mire restored sites and baselines	Priority Species	Pre-restoration base line and post restoration annually	Standard in-stream invert survey methods	Exmoor Mires Project team or D. Boyce.	SWW	Monitoring
Whinchat habitat survey	Priority Species	Ad hoc	Various habitat measurements	RSPB	RSPB	Research
Nightjar	Priority Species	Annually	Assessment of population on key Exmoor sites	SOS	volunteers	Monitoring
Red deer	Species of local interest to Exmoor	Annually	Co-ordinated count of all known areas supporting deer populations	RDI	volunteers	Monitoring
Fritillary recording for heath and high brown fritillary	Priority Species	Annual	Standard Timed Count methodology as rec'd by BC; survey of historically occupied sites to check for presence	Co-ordinated by BC with input from NT	Two Moors Threatened Butterfly Project, volunteers	Monitoring
Marsh Fritillary web counts at Codsend	Priority Species	Annual	Timed search for larval webs in Aug/Sept	BC	Two Moors Threatened Butterfly Project, volunteers	Monitoring
Transects (6-7) for all butterfly species	Priority Species	Annual	Standard Timed Count methodology as rec'd by BC	BC	volunteers	Monitoring

Habitat	Rationale	Regularity of survey	Methodology	Key contacts for survey/research	Funded delivery mechanism	Survey, research or monitoring
Moth recording	Priority Species	Ad hoc	Moth trapping	Somerset Moth Group, Devon Moth Group	volunteers	Survey
Oil beetles	Priority Species	Ad hoc	Random search method	Buglife	volunteers	Survey
Adder survey in Bin Combe and Hanny Combe	Priority Species	Annual	RAGS methodology; systematic check of specific locations (tin sheets)	NT	NT, volunteers	Survey
Waxcap fungi	Priority Species	Ad hoc	Random search method	ENPA	Volunteers	Survey
c. Environmental impacts						
Hoincote Flood Project	Hydrometric monitoring of the Horner & Aller catchments	6 years	Automated stage metering plus stage-discharge rating curve carried out every 15 minutes at gauging stations	National Trust/JBA/PAA	Defra	Monitoring
The effects of prescribed burning on infiltration rates on heather moorland: Hoincote Estate, Exmoor National Park	Moorland management	One off	Research thesis, University of Leeds Single ring infiltrometer placed into soil at each site along a transect. The infiltrometer was filled and a recording of its level taken every minute	Author: Imran Hawkins Exmoor Mires Project team	SWW	Research
Molland Moor Grazing Management Project	Priority habitat	One off	As determined in research brief	Molland Estate, ENPA, Heather Trust	Molland Estate	Research
Moorland Case Studies: burn sizes	Priority habitat	One off	As determined in research brief	ENPA,	ENPA	Research
Moorland Case Studies: Restoration of moorland following heather beetle attack	Priority habitat	One off	As determined in research brief	ENPA,	ENPA	Research
Tick Study	Effects on priority habitat	One off	As determined by research brief	Sarah Randolph, University of Oxford		Research

Habitat	Rationale	Regularity of survey	Methodology	Key contacts for survey/research	Funded delivery mechanism	Survey, research or monitoring
Investigation of the Impacts of large and small burns on heather moorland on Exmoor	Effects on priority habitat	One off	As determined by research brief	Tom Foreman, University of Manchester		Research
Effects of moisture and climate change on Sphagnum growth rates in Exmoor mires	Climate change	One off	Research thesis, University of Exeter, 2010. 12 samples (10cm x 10cm in diameter) of 4 different <i>Sphagnum</i> species collected and stored in an cooled incubator for 24 days to stimulate Exmoor summer climate. Tested in the lab over 10 days to test the weight, reflectance and REIP before doing statistical analysis	Author: Alex Peters Exmoor Mires Project team	SWW	Research
Remote sensing and carbon stores; a study from Exmoor, Somerset.	Assessment of carbon stores	One off	BSc Geography dissertation by University of Exeter 2013 Unmanned Aerial Vehicle (UAV); BAP Precision S-Series mobile mapper with ArcGIS (Peat depth); transect collecting method (peat core taking); 2D Correlation in MATLAB (standard deviation etc.); dry ashing' technique (core loss of ignition)	Author: Nathaniel Meech Exmoor Mires Project team	SWW	Research
Evaluating Ecosystem Goods and Services after Restoration of Marginal Upland Peatlands in South-West England	Ecosystem services	One off	Research thesis, University of Exeter	Exmoor Mires Project team	SWW	Research
Water quality and peatland restoration relationships	Water quality in UK priority habitat	One off (results also compared with results of sites previously tested in 2007)	Research thesis, University of Loughborough Water samples analysed for conductivity, pH, alkalinity, TOC, total nitrogen, ammonium, nitrite, chloride, phosphate and silicate. Water quality was compared from an area of untouched mire with those from areas affected from land management practices	Author: James Peters Exmoor Mires Project team	SWW	Research

Habitat	Rationale	Regularity of survey	Methodology	Key contacts for survey/research	Funded delivery mechanism	Survey, research or monitoring
Hydrochemistry of headwater streams and blanket mire discharge in Exmoor National Park	Water quality in UK priority habitat	One off	Research thesis, University of Bristol Field sampling of 31 individual sites, testing water samples for pH, conductivity, total alkalinity, cations, chloride, sulphate and DIC/DOC. Lab analysis including leaching equilibration experiments of peat samples.	Author: Michael Crocott Supervisors: Ed Hornibrook and David Smith Exmoor Mires Project team	SWW	Research
Moorland Indicators of Climate Change Initiative (MICCI)	Climate change	Ongoing	Experiments designed to answer the question 'are upland moorlands storing carbon (good for climate change) or releasing carbon (bad for climate change)?'	Moors for the Future Partnership, Exmoor Moorland Landscape Partnership	Research carried out by schools	Research
3. Farmland and villages						
a. Habitats						
Biodiversity Monitoring Framework for County Wildlife Sites	Priority habitats	Different sites surveyed each year.	BMF methodology	Devon Biodiversity Records Centre	DCC/DWT	Monitoring
Survey of unconfirmed County Wildlife Sites in Devon	Priority habitats	One off	County Wildlife Site survey methodology based on Phase 2 survey	DBRC	ENPA Partnership Fund	Survey
Orchard survey	Priority Habitat; inform Local Plan	One off	Aerial photograph interpretation and field survey	ENPA	ENPA	Monitoring
Wet meadow grassland	Holnicote Flood Project	Annually	Quadrat/transect surveys	NT/PAA	DEFRA	Monitoring

Habitat	Rationale	Regularity of survey	Methodology	Key contacts for survey/research	Funded delivery mechanism	Survey, research or monitoring
Mapleridge Grassland Restoration Monitoring (calcareous grassland)	Priority BAP	Annual	Quadrat/transsect vegetation monitoring	NT	NT	Monitoring
b. Species						
Winter thrushes	Assessment of population	One off	Recording of population estimate	ENHS	volunteers	Monitoring
Bat surveys related to planning applications	Priority Species	Ad hoc	Building surveys, emergence counts	ENPA	Ecological survey funded by applicant	Survey and monitoring
Bat surveys relating to building repairs/improvements on Holnicote Estate	Priority Species	Ad hoc (whenever necessary)	Site inspections & dawn/dusk surveys by licensed bat worker where appropriate	NT	NT	Survey and monitoring
Wider Countryside Butterfly Survey	Priority Species	Annually	WCBS methodology developed by BC. At least 4 squares covering Exmoor	BC	volunteers	Monitoring
Moth recording	Priority Species	Ad hoc	Moth trapping	Somerset Moth Group, Devon Moth Group	volunteers	Survey
Waxcap fungi	Priority Species	Ad hoc	Random searches	ENPA	Volunteers	Survey
Thatch moss	Priority Species	Periodically	Survey of thatch roofs known to support thatch moss	NT	NT	Monitoring
c. Environmental impacts						
Holnicote Flood Project	Hydrometric monitoring of the Horner & Aller catchments	6 years	Automated stage metering plus stage-discharge rating curve carried out every 15 minutes at gauging stations	National Trust/JBA Consulting/Penny Anderson Associates	Defra	Monitoring
Tree phenology survey	Effects of climate change	Annually	Methodology in Exmoor Tree Condition Survey report 2006/07	ENPA	ENPA, volunteers	Monitoring
Opal Tree Health Survey	Tree health	Ad hoc	OPAL methodology	Forest Research		Monitoring

Habitat	Rationale	Regularity of survey	Methodology	Key contacts for survey/research	Funded delivery mechanism	Survey, research or monitoring
4. Rivers and Streams						
<i>a. Habitats</i>						
SSSI Condition Assessment monitoring	To carry out favourable condition assessment of priority habitats	Every 6 years	Favourable condition assessment methodology	Natural England	NE	Monitoring
<i>b. Species</i>						
Exmoor Otter survey – Devon and Somerset	Priority Species	Annually	Co-ordinated search for spraints along all Exmoor watercourses	Somerset Otter Group, DBRC and EA	volunteers	Monitoring
Signal crayfish	Invasive non-native species	Ad hoc	Habitat searches, panpipe and baited traps	EA	EA, volunteers	Monitoring
White-clawed crayfish	Priority Species	Ad hoc	Habitat searches including at night, panpipe and baited traps	Buglife, EA	ENPA Partnership Fund	Monitoring
In-stream invertebrate monitoring on Mire restored sites and baselines	Priority Species	Pre-restoration base line and post restoration annually	Standard in-stream invert survey methods	Exmoor Mires Project team or D. Boyce.	SWW	Monitoring
Aquatic invertebrate monitoring in rivers of Exe catchment	Priority Species	3 times a year	Kick sampling (3 minute) using standard equipment and technique as specified by Riverfly Partnership	Riverfly Anglers' Monitoring Initiative	volunteers	Monitoring
Salmon counts	Priority Species	Annually	Rod and net returns, National Fisheries Monitoring Programme (Electrofishing), Additional Electrofishing Surveys (WRT/RETA)	EA, WRT, RETA	EA	Monitoring

Habitat	Rationale	Regularity of survey	Methodology	Key contacts for survey/research	Funded delivery mechanism	Survey, research or monitoring
WFD fisheries	Priority Species	Annually	Rod and net returns, Environmental Status Indicator Monitoring (Electrofishing)	EA	EA	Monitoring
Exmoor Wild Watch Survey	Priority Species	2 years	Public participation survey aimed at encouraging recording of 10 Priority Species	Exmoor Moorland Landscape Partnership	Public	Survey
River jelly lichen	Priority Species	Ad hoc	Searches in suitable habitat along river Exe and Barle. Monitoring of status of population at selected sites.	EA	EA, ENPA, NE	Survey Monitoring
Aquatic invertebrates		Annually	Standard WFD methodology at EA monitoring sites.	EA	EA	Monitoring
5. Coastal and marine						
b. Species						
Shore Search Exmoor	Priority species	2 years	Recording of key species	Devon Wildlife Trust	volunteers	Survey
Living Seas	Priority Species	Ad hoc	Recording of key species	Somerset Wildlife Trust	volunteers	Survey
c. Environmental impact						
Porlock Bay shingle ridge	Geomorphology monitoring	Annually & post-storm events	GPS-derived topographical survey and aerial photography	Plymouth Coastal Laboratory	SW Regional Coastal Monitoring Programme	Monitoring
6. Invasive Species						
c. Environmental impact						
10 year review of success of Rhododendron control	Invasive non-native species	One off	Using survey data and aerial photography	ENPA	ENPA	Monitoring
Knotweed surveys	Invasive non-native species	Annually	Systematic catchment-wide surveys, ad hoc survey and monitoring by contractor carrying out treatment	ENPA	Exmoor Knotweed Control Partnership	Survey and monitoring

Habitat	Rationale	Regularity of survey	Methodology	Key contacts for survey/research	Funded delivery mechanism	Survey, research or monitoring
Himalayan balsam and Montbretia survey on River Barle	Invasive non-native species	Part of SSSI monitoring	Recording of abundance	NE		Monitoring
Chalara and Phytophthora surveys	Tree health	Ad hoc	Aerial photography and ground truthing	ENPA	ENPA	Monitoring
Signal crayfish	Invasive non-native species	Ad hoc	Habitat searches, panpipe and baited traps	EA	EA	Monitoring

Key to organisations

- BC – Butterfly Conservation
- BTO – British Trust for Ornithology
- DCC – Devon County Council
- DBRC – Devon Biodiversity Records Centre
- DEFRA – Department for Environment, Food and Rural Affairs
- DWT – Devon Wildlife Trust
- ENHS – Exmoor Natural History Society
- ENPA – Exmoor National Park Authority
- FC – Forestry Commission
- NE – Natural England
- NT – National Trust
- RETA – River Exe and Tributaries Association
- RDI – Red Deer Initiative
- RSPB – Royal Society for the Protection of Birds
- SERC – Somerset Environmental Records Centre
- SOS – Somerset Ornithological Society
- SWW – South West Water
- WRT – Westcountry Rivers Trust