

Restoration of Biodiversity

David Hill FCIEEM

Supplementary Material

Table 1. A brief summary of some of the documented losses to biodiversity.

Habitat/species	Loss	Period	Geographic relevance/scale
Lowland meadows	97%	1930s - 1984	UK
Lowland heathland	80%	Since 1800	UK
Coppice woodland	90%	1900 - 1970	UK
Vascular plant species	60%	1970 - 2013	UK
Butterfly species	62%	1970 - 2013	UK
Bird species	49%	1970 - 2013	UK
Farmland birds	56%	1970 - 2016	UK
Woodland birds	23%	1970 - 2016	UK
6168 Red List species	12% at risk of extinction		Britain
67 of 244 bird species ¹	27% Red Listed		UK
213 Priority species across all taxa (see UK Priority Species Indicator entry below)	39% decline in those species considered priority for action		UK
UK Priority Species Indicator ²	67% decline in abundance, 35% decline in occupancy	Since 1970	UK
Marine vertebrates	34% decline	Since 1970	UK
Marine invertebrates	75% decline	Since 1970	UK

Note: For country-specific details and for other taxa, see the State of Nature Reports (2016a,b,c,d)

Notes

1. The UK has 244 regularly occurring breeding and non-breeding birds of which 67 are now (at 2015) considered to be Red List species as defined in Hayhow, D.B., Bond, A.L., Douse, A., Eaton, M.A., Frost, T., Grice, P.V., Hall, C., Harris, S.J., Havery, S., Hearn, R.D., Noble, D.G., Oppel, S., Williams, J., Win, I. and Wotton, S. (2017). *The state of the UK's birds 2016*. The RSPB, BTO, WWT, DAERA, JNCC, NE, NRW and SNK. Sandy, Bedfordshire.
2. Definition of Priority Species in the UK based on JNCC (2014). *Status of priority species*. Available at jncc.defra.gov.uk/page-4238. Accessed 23 April 2018.

References

- Hayhow, D.B., Burns, F., Eaton, M.A., Bacon, L., Al-Fulajji, N., Brereton, T., Brookman, E., Burke, O., Butler, J., Davis, J., De Massimi, S., Gambling, P., Lewis, S., Macadam, C.R., Matthews, F., Meredith, C., Newson, S.E., Noble, D.G., O'Hara, D., Pearson, J., Stevenson, K., Tansley, D., Winder, F., Wynde, R.M. and Gregory, R.D. (2016a). State of Nature 2016: England. The State of Nature partnership. Available at rspb.org.uk/stateofnature. Accessed 17 April 2018.
- Hayhow, D.B., Burns, F., Eaton, M.A., Bacon, L., Al-Fulajji, N., Bladwell, S., Brookman, E., Byrne, J., Cheesman, C., Davies, D., De Massimi, S., Elding, C., Hobson, R., Jones, J., Lucas, S.R., Lynch, S., Morgan, L., Rowe, A., Sharp, R., Smith, R.G., Stevenson, K., Stretton, T.A., Taylor, R. and Gregory, R.D. (2016b). State of Nature 2016: Wales. The State of Nature partnership. Available at rspb.org.uk/stateofnature. Accessed 17 April 2018.
- Hayhow, D.B., Burns, F., Eaton, M.A., Bacon, L., Bingham, C., Brookman, E., Burgess, S., Daniels, M., Darvill, B., De Massimi, S., Densham, J., Douglas, D.J.T., Duncan, C., Elliott, S., Ewing, S.R., Keegan, M., Kirkland, P., Long, D., Luxmore, R.A., Macadam, C.R., Malone, K., Minting, P., Stevenson, K., Prescott, T., Varnham, K.J., Youngman, A. and Gregory, R.D. (2016c). State of Nature 2016: Scotland. The State of Nature partnership. Available at rspb.org.uk/stateofnature. Accessed 17 April 2018.
- Hayhow, D.B., Burns, F., Eaton, M.A., Bacon, L., Bain, R., Barnett, C., Bertrand, C., Bodles, K.J., Brookman, E., Campbell, P., Carson, P., Cush, P.F., De Massimi, S., Hamill, T., Healy, K., Horton, M.P., Long, M.P., Malley, M., Mantell, A., Mckinney, C., Pickett, S.R.A., Roche, N., Shortall, D., Stevenson, K. and Gregory, R.D. (2016d). State of Nature 2016: Northern Ireland. The State of Nature partnership. Available at rspb.org.uk/stateofnature. Accessed 17 April 2018.

Restoration of Biodiversity

David Hill FCIEEM

Supplementary Material

Table 2. A review of the three key sectors where changes are required to deliver effective restoration of biodiversity, noting what needs to happen in policy terms, possible solutions that could be put in place and the potential scale of the market.

Sector	The problem	What needs to happen	Solutions	Potential scale of market
Farming	Unsustainable for wildlife due to direct habitat removal, habitat loss and degradation, intensification, use of broad-based pesticides that destroy arable plants and invertebrate fauna, nitrification, crop density, management practices (e.g. silage making, lack of winter stubbles), nutrient run-off, pollution of watercourses, emissions.	Substantial improvement to environmental performance. Account needs to be taken of all externalities, which should be factored into pricing of food and other agricultural products. Externalities include the full cost of flood risk, soil and peatland erosion and mismanagement, pesticide use (e.g. chemical concoctions create impacts through obesity and neurological illness with major costs to the health service), damage to watercourses, impacts on roads, pollution (e.g. plastic litter). Greater emphasis on technological development could release land for biodiversity conservation and ecosystem services.	Convert CAP Pillar 1 into commercial environmental land management contracts using market-based mechanisms. Prioritise environmental delivery of permanent features such as woodland, dense scrub, ponds, reedbeds, wide streams and other habitats, permanent grasslands. Conservation covenants to secure and protect the long-term value of the public investments made through agricultural support (currently not the case with short-term Countryside Stewardship agreements). Highest payments to High Nature Value farming methods; extensification areas, i.e. managed rewilding in appropriate locations; areas with high landscape and environmental diversity; provision of clean water and slowing the flow; diverse cropping regimes that build habitats for birds; broadleaved woodlands at scale; seasonally inundated floodplain grasslands; coastal and floodplain grazing marsh; wet woodland; fen, lowland raised bog, reedbed and blanket bog.	£600m p.a. needed to deliver on existing BAP objectives, minimum of £1.2bn (Lawton <i>et al.</i> 2010) to deliver moderate biodiversity improvements. Therefore £3.2bn (from conversion of CAP Pillar 1 money) to restore biodiversity via environmental contracts would keep the funds within the farming sector and produce a transformational change in how the countryside looks and the biodiversity it contains.
Development	No long-term history of effective compensation for impacts on biodiversity. Badly enforced where subject to S106 agreement. Lack of continuity at development sites, i.e. change in operator, developer moves on/liquidated, lack of interest, will not provide long-term assurance (abrogate their liabilities).	Deliver net gain as default position. Planning authorities to properly deliver their legal duties for biodiversity.	Make net gain mandatory through planning system. Require all planning authorities to deliver their legal duties under the National Planning Policy Framework via local plans and supplementary planning documents - development quantitatively assessed using the biodiversity impact accounting metric, residual impacts (plus gain) compensated by purchase of conservation credits from offsets. Removes long-term liabilities from developer. Puts maximum investment into creating habitat in natural environment (either bespoke sites or habitat banks). Those who know how should be the ones to create and manage the habitats – remove this liability from developers.	£500m - £1.2bn p.a. as evidenced by the Ecosystem Markets Taskforce and supporting research (EMTF 2012, 2013).

Restoration of Biodiversity

David Hill FCIEEM

Supplementary Material

Table 2. *Continued*

Sector	The problem	What needs to happen	Solutions	Potential scale of market
Corporates	Unknown impacts on natural capital through their supply chains. Business risks, potential impacts on investment value.	Account for impacts on natural capital through supply chains. Provide evidence in annual reports. Build customer and investor confidence to attract higher investment returns.	Natural capital accounting undertaken by corporates. Relies on development and roll-out of national metrics – Office for National Statistics and National Audit Office are currently developing measurement metrics for corporates to undertake assessments of their businesses. Residual impacts on biodiversity to be compensated for through purchase of environmental credits from environmental schemes. Funds placed into the environmental land management sector for restoration of natural capital assets such as biodiversity and ecosystem services.	Not assessed but potentially >£3bn p.a. Credits could also be tradable if supported by a standard.

References

Ecosystem Markets Taskforce (2012). *EMTF Second Phase Research: Opportunities for UK Business that Value and/or Protect Nature. Consultation paper. Opportunity 1 : Biodiversity Offsetting*. Available at <http://webarchive.nationalarchives.gov.uk/20140304164435/http://www.defra.gov.uk/ecosystem-markets/>. Accessed 16 May 2018.

Ecosystem Markets Taskforce (2013). *Realising nature's value: The Final Report of the Ecosystem Markets Task Force*. Report to Defra. Available at <https://www.gov.uk/government/publications/realising-natures-value-final-report-of-the-ecosystem-markets-task-force>. Accessed 23 April 2018.

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.J., 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.

Restoration of Biodiversity

David Hill FCIEEM

Supplementary Material

Table 3. Examples of opportunities and risks for the ecological profession from the commitments made in the 25-Year Environment Plan (Defra 2018).

Theme	Policy area	Opportunity/skill set	Risks / Risk Mitigation
Using and managing land sustainably	Embed 'environmental net gain' principle for development including housing and infrastructure via a formal requirement for planning authorities to ensure environmental net gains. Mainstream use of existing biodiversity net gain approaches (i.e. biodiversity impact accounting metric).	<ul style="list-style-type: none"> • Vegetation and habitat surveys • Metric calculations • Negotiation with LPAs and developer's planning consultancy • GIS • Scenario modelling • Management planning • Habitat creation and long-term management contracts • Species and habitat monitoring and reporting • Providing standardised quantification of impacts rather than qualitative approaches. • Scale-up in net gain and hence offsetting. Ecologists to drive through the need for development to deliver net gain. Survey data used to apply biodiversity impact accounting metric, calculations of impact (biodiversity loss units), set up offset sites such as habitat banks. 	Slow engagement from consultants will lead to net gain not being realised. Mitigate risk by series of training events to bring consultants up to speed on delivery. Link to brokers to find offset sites.
	Expand net gain approaches used for biodiversity to include wider natural capital benefits – flood protection, recreation, improved water and air quality. (Could include nutrient and pesticide offset credits.)	<ul style="list-style-type: none"> • Survey and assessment of range of natural capital assets • Development of novel metric approaches for different asset classes • Water and air quality assessments • Visitor survey data design, collection, analysis • Development and application of standards to drive credit markets in asset classes • Impact investing skills 	Too much time spent developing metrics without impacting habitat on the ground. Mitigate risk by ensuring that perfection is not the enemy of the good.
	Improve the way we manage and incentivise land management. Precision farming, resource efficiency, better livestock and crop management, new environmental land management system based on public money for public goods. Limit nutrient and pesticide inputs.	<ul style="list-style-type: none"> • Farming and wildlife advice • Integrated pest and integrated crop management • Design of new farming methods based on wildlife value • Writing of tenders for farmers/landowners to secure environmental land management contract funding 	Limited funding to design proper schemes and ensure optimum delivery by working with farmers. Farmers not used to having to bid for these types of environmental land management contracts. Issues to do with historical culture – have always received subsidy – how do they modernise?

Restoration of Biodiversity

David Hill FCIEEM

Supplementary Material

Table 3. *Continued*

Theme	Policy area	Opportunity/skill set	Risks / Risk Mitigation
Using and managing land sustainably (Continued)	Improve soil health and restore and protect peatlands.	<ul style="list-style-type: none"> • Soil ecology • Peatland restoration methods • Vegetation and habitat survey • Contract writing and management 	Do not overcomplicate the restoration. Keep it as simple as possible.
	Expand woodland cover; better management for existing woodlands; maximise benefits provided by woodlands. Reporting framework for carbon to drive demand for Domestic Offsets (credits); carbon guarantee scheme and forestry investment zones.	<ul style="list-style-type: none"> • Woodland ecology – ecological functioning • Management and restoration skills • Impact investing re. carbon markets • Spatial modelling to determine location of woodland planting schemes to maximise join-up and natural capital benefits • Measure recreational benefits for people 	Carbon market has suffered from a bad press. Mitigate the risk by transparency around the metric; application to specific sites; traceability of the credits purchased; ensure maximum amount of the funding goes into habitat creation and not administration of scheme.
	Reduce risk of harm from flooding and coastal erosion; greater use of natural flood management solutions.	<ul style="list-style-type: none"> • Coastal ecology • Habitats Regulations Assessments in relation to flood mitigation and coastal erosion schemes • Habitat survey • GIS • Habitat creation and design – wetlands • Management planning 	Not getting involved very early on. Complicated stakeholder landscape.
	Potential for District Protected Species Licencing to be expanded to include more species.	<ul style="list-style-type: none"> • Species-specific metric development • Marketing of policy and solution to planning consultants and developers • Habitat creation and management at new sites outwith development site 	Site based survey work and translocation schemes no longer necessary. Mitigate risk by bringing forward developments to have their impacts tested through the District Licensing process. Construct habitats. Show the value added by the approach to other wildlife groups.
Theme	Policy area	Opportunity/skill set	Risks / Risk Mitigation

Restoration of Biodiversity

David Hill FCIEEM

Supplementary Material

Table 3. *Continued*

Recovering nature and enhancing the beauty of landscapes	Strategy to tackle biodiversity loss.	<ul style="list-style-type: none"> • Policy development • Monitoring and evaluation • Consultation responses 	
	Develop a Nature Recovery Network – complement and connect to existing protected sites; provide opportunities for species conservation and reintroductions of native species. Create 500,000 ha of priority habitat linked to existing sites, e.g. over 25 catchment or landscape-scale recovery areas.	<ul style="list-style-type: none"> • Species reintroductions • Survey and monitoring • Habitat creation and management design • Management planning – catchment and landscape-scale • Site sourcing with farmers/landowners • Collaborations with NGO conservation sector • Development of landscape-scale funding bids 	Slow take up. Mitigate risk by lobbying hard for the Nature Recovery Network and demonstrate natural capital values to society.
	Conservation covenants to secure long-term maintenance of existing or newly created wildlife assets.	<ul style="list-style-type: none"> • Land agency • Land management • Legal aspects of land ownership • Management planning • Biodiversity offsetting • Creation of habitat banks 	Voluntary nature conservation means many sites will not become protected by conservation covenants. Mitigate risk by case studies of landowners where covenants are demonstrating a stable environment on which to build future business resilience.
	Health and wellbeing.	<ul style="list-style-type: none"> • Visitor assessment • Linking health and environment • Local initiatives based on encouraging people to use the outdoors • Visitor management strategies, sign-posting • Environmental education 	Many players in the space. Difficult to quantitatively demonstrate impact on people. Mitigate risk by consortium of operators working together to lobby and demonstrate its results and value.

References

Defra (2018). *A Green Future: Our 25 Year Plan to Improve the Environment*. HMSO. Available at <https://www.gov.uk/government/publications/25-year-environment-plan>. Accessed 23 April 2018.