

New Forest Freshwater and Wetland Restoration Plan: Section 1 - Guidance

Freshwaters and wetland restoration in the New Forest

- 1.1 The New Forest wetlands and watercourses are of exceptional importance for biodiversity. The streams that drain the New Forest arise within the Forest boundary and flow to either the sea or the chalk rivers on the boundaries; they flow almost entirely through semi-natural habitat and are buffered against adverse ecological change, for example from pollutants or extraction. The New Forest is the most important area in the UK for lowland valley mires, networks of small, acidic streams and temporary ponds. Together with rivers and permanent ponds, wet grassland, heathland and woodland, these are, variously, designated features within the [New Forest Site of Special Scientific Interest¹\(SSSI\)](#), [New Forest Ramsar site²](#) and [New Forest Special Area of Conservation³ \(SAC\)](#).
- 1.2 However, from the 1840s onwards, New Forest watercourses have been deliberately channelized (Langford, 1996), confining them and separating them from their floodplains, and in the 1960s there was a more strategic effort to increase drainage across the New Forest (e.g. see Tuckfield, 1976). This disconnected watercourses from their natural floodplains, essentially fracturing the wetland ecosystem and changing the character of its habitats. In addition, ditches and drains have been dug through and across the mires (commonly called “bogs” in the New Forest) and floodplain grasslands, further drying them out. While the watercourses have thankfully remained of high quality due to the semi-natural status of the catchment, they are, like almost all of the UK’s rivers and streams, lacking the natural habitat diversity, dynamism and connectivity with riparian⁴ and floodplain wetlands that more natural systems support. Through allowing the restoration of the diversity of conditions typical of naturally-functioning watercourses, including shallow open margins, meanders, pools, riffles, deadwood snags and seasonal floodplain inundation, the ecology of the watercourses and floodplains, including bogs, can be improved. As a result, their capacity for carbon storage and downstream flood mitigation and the natural irrigation and

¹ <https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1003036.pdf>

² <https://jncc.gov.uk/jncc-assets/RIS/UK11047.pdf>

³ <https://sac.jncc.gov.uk/site/UK0012557>

⁴ The transitional semi-aquatic areas immediately adjacent to a water body that are regularly influenced by fresh water

fertilization of the floodplain lawns, an important component of the unique New Forest commoning system, will also be improved.

- 1.3 A number of different restoration projects have been carried out in the New Forest since 1997. This includes a high-profile mire and stream restoration scheme undertaken since 2010 as part of the Verderers of the New Forest Higher Level Stewardship (HLS) agreement, which has been awarded the UK [River Prize 2019](#)⁵. Prior to this, a Life 2 project *Securing Natura 2000 Objectives in the New Forest* (1997-2001) identified a series of generic prescriptions and management policies for wetland habitats, and management prescriptions for wetlands identified as being in unfavourable condition were progressed under the Life 3 project *Sustainable Wetland Restoration in the New Forest* (2002-2006). A 10-year [Wetland Management Plan](#) was also produced (Smith, 2006). Following the expiry of this plan in 2016, the [New Forest Freshwater and Wetland Habitats Restoration Strategy 2019](#) (Hill 2019) was developed in consultation with a wide range of stakeholders. The Strategy emphasises the need to work in closer partnership with stakeholders, develop a shared understanding of the needs and benefit and, as far as possible, to achieve the outcomes through the adoption of natural processes and assisted natural recovery. A partnership forum (the Freshwater and Wetland Restoration Forum) was established to help shape the next steps, along with two short-term sub-groups tasked with developing an evidence and monitoring plan and a communications plan. Both of these documents are now included within this Restoration Plan.

Unique character of New Forest rivers and wetlands

- 1.4 As seen in its multiple designations, the New Forest wetlands and watercourses are of international importance. The combination of streams, mires and pools within an extensive semi-natural setting is unique in lowland Britain and the New Forest supports around 30% of England's threatened freshwater species.
- 1.5 The New Forest is the key area for lowland valley mires in the UK and has about 90 different mires in 20 valley systems, forming the largest valley mire complex in the UK, which is of European importance. The New Forest mires are groundwater-fed systems but are mostly acidic, so exhibit vegetation associated with both bogs and fens, and are structurally very varied. A complex mosaic of valley bogs, poor fens, marl flushes, seepage mires, soakways and bog pools, they support Red Listed species such as Lesser Bladderwort *Utricularia minor*, Great Sundew *Drosera anglica* and Slender

⁵ <https://www.therrc.co.uk/2019-uk-river-prize>

Cottongrass *Eriophorum gracile* and breeding populations of wading birds. An important microhabitat is the heathy margins of mires, which support nationally scarce plants such as Pillwort *Pilularia globulifera*, Marsh Clubmoss *Lycopodiella inundata* and Brown Beak-sedge *Rhynchospora fusca*. Overall, the New Forest wetlands support over two thirds of the UK's wetland plants (c300 spp.).

- 1.6 The network of water courses is, as described above, of unusual quality. The generally acid nature of the water means that the streams do not support the diversity of macro-invertebrates or microfauna and flora seen in more calcareous systems such as chalk streams; nonetheless the New Forest supports over one third of the UK's freshwater invertebrates (c400 spp.) including many specialists of acidic conditions. Again, intact transitions with terrestrial habitats are important for species such as Pillwort. In places, outcrops of more neutral, enriched soils influence the water chemistry of streams; such watercourses provide the UK stronghold for the rare Southern Damselfly *Coenagrion mercuriale*. Collectively, the New Forest wetlands are considered to form the most important locus for dragonflies in Britain. Twenty species of fish have been recorded, including Eel, Brown Trout, Bullhead and Brook Lamprey.
- 1.7 Other important features of the New Forest wetlands include the large temporary ponds, shallow ephemeral pools and poached damp hollows, which support rarities such as Tadpole Shrimp *Triops cancriformis*, Fairy Shrimp *Chirocephalus diaphanus* and Medicinal Leech *Hirudo medicinalis* and nationally scarce plants such as Coral-necklace *Illecebrum verticillatum*, Yellow Centaury *Cicendia filiformis* and Pennyroyal *Mentha pulegium*. These waterbodies are hard to ascribe to defined types and are sometimes referred to as being "of a similar type to Mediterranean temporary water bodies". Rather similar pools on the Lizard, Cornwall are ascribed to the Annex I type 3170 [Mediterranean temporary pools](https://sac.jncc.gov.uk/habitat/H3170/)⁶ but the New Forest temporary pools are not considered to be fully characteristic of this Annex 1 type and are classified as Annex I 3130 [Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*](https://sac.jncc.gov.uk/habitat/H3130/).⁷
- 1.8 The New Forest Purple Moor-grass lawns are characteristic of the stream floodplains and form an intrinsic part of the New Forest wetlands. They are unusual in the UK in being particularly species-rich, with abundant small sedges and species such as Petty Whin *Genista anglica*.

⁶ <https://sac.jncc.gov.uk/habitat/H3170/>

⁷ <https://sac.jncc.gov.uk/habitat/H3130/>

Potential impacts of restoration

- 1.9 The effects of wetland and stream restoration vary between different groups of species (e.g. Smith, 2020). Stream restoration is particularly beneficial for species dependent on the associated riparian zones and floodplains and is likely to result in more lost species returning to floodplain and margins than to the channel. However, an improvement and increase in the in-channel habitat mosaics should result in an overall increase in abundance in species, particularly those whose niches were reduced through channel modification. This is particularly the case for measures such as reinstating meanders and raising the bed level of watercourses. In addition, restoration has a greater effect on the number of individuals than on the number of taxa (e.g. it is easier to increase the number of individuals than reintroduce taxa). This is important to take into account when planning targets to measure success against and suggests that, for the New Forest wetland restorations, the overall species diversity within the landscape (“gamma diversity”) should be considered rather than changes to species diversity within the channel (e.g. fish or macroinvertebrates). Once the target environmental conditions are restored, they can be exploited by target species assemblages over time; early monitoring should focus on the environmental conditions.

The scope and contents of the Restoration Plan

- 1.10 This Restoration Plan provides a framework for the delivery of restoration projects within the New Forest. It covers the area of the New Forest SSSI, but it is hoped that it will also be used for wetland restorations that fall outside of the boundary but are functionally linked to the New Forest (for example tributaries within the River Avon System SSSI). Landowners and conservation organisations will be able to consider the different elements and choose those that suit their level of resources and the scale of work undertaken.
- 1.11 Figure 1 summarises the work flow required when identifying, planning, carrying out and evaluating restoration work. This restoration plan comprises a series of documents and information sheets that guide the use through the step by step process.

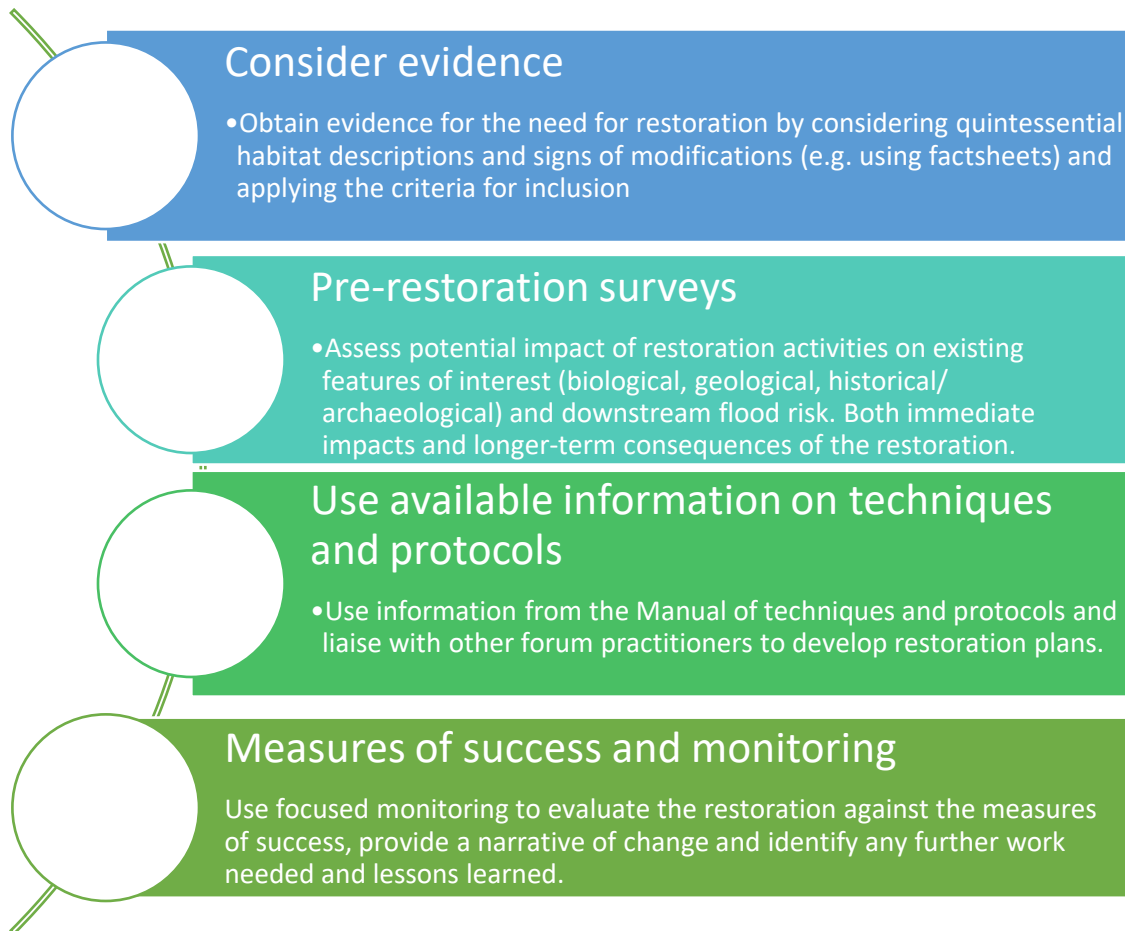


Figure 1: New Forest wetland restoration evidence: key elements.

1.12 The plan takes the form of a series of documents and information sheets as follows:

1. Guidance
2. Vision and desired outcomes
3. New Forest freshwater and wetland habitat descriptions
4. Information Sheets: high quality habitats and modified features
5. Criteria for Restoration
6. Pre-restoration surveys
7. Manual of techniques and protocols
8. Measures of success
9. Monitoring
10. Catchment-based approach
11. Summary flow chart

1.13 The plan sets out the vision and desired outcomes (see Section 2). Restoration will be based on evidence and informed by monitoring (see Figure 1). Evidence needs to recognise the existing high quality and unique nature of New Forest streams and wetlands while considering how these can

be improved with reference to the very best examples of naturalistic streams with associated abundant mire habitat and increased transitional and marginal habitats. Evidence should be used to inform where and whether restoration is needed, how it should be carried out, and what success will look like. The next sections (see Section 3: Habitat Descriptions and Section 4: Information Sheets) provide the information about high quality New Forest habitats and modified features needed to inform the selection of sites. Section 5: Criteria for Restoration sets out the criteria that should be used to select restoration sites, based around the evidence provided in the preceding sections. Section 6: Pre-restoration surveys outlines the information that should be gathered during the restoration planning process to inform the creation of site-specific restoration plans following site selection. The techniques used also need to be based on evidence to ensure that best practice is followed and experience gained is made available to all practitioners. Section 7: Manual of techniques and protocols provides the most up-to-date information available and is based on two decades of restoration work in the New Forest. This section (together with the rest of the plan) will be available via the Restoration Hub and should be updated regularly with experience gained from new restorations and follow-up interventions at existing restorations.

- 1.14 Monitoring is key to understanding how successful restorations are, when and where further intervention are needed, and will allow further development of best practice. Monitoring should relate to the measures of success identified for each restoration and should provide a clear narrative of change. Section 8: What does success look like? outlines the recommended approach for evaluating restorations based on existing high quality sites and features and relates to the vision, objectives and desired outcomes. Overall principles for monitoring are presented in Section 9: Monitoring, together with protocols for key monitoring methods.
- 1.15 Watercourses and associated wetlands are inextricably linked and the natural processes that shape them, including erosion and deposition, operate at a catchment level. Restoration work should be planned within the context of the catchment to ensure that compromised functionality up or downstream does not impinge on the restoration project. In reality, this can prove difficult, for example due to landownership boundaries or immovable constraints. Nonetheless, taking a catchment approach should allow for targeted restorations that will contribute to the restoration of the entire catchment and prove more resilient themselves. To facilitate this, a catchment map of the New Forest is provided in Section 10.

- 1.16 Finally, the overall process of planning, executing and monitoring New Forest freshwater and wetland restorations is summarised in Section 11.
- 1.17 Figure 2 shows how the vision, objective and desired outcomes will shape evidence-based restorations.

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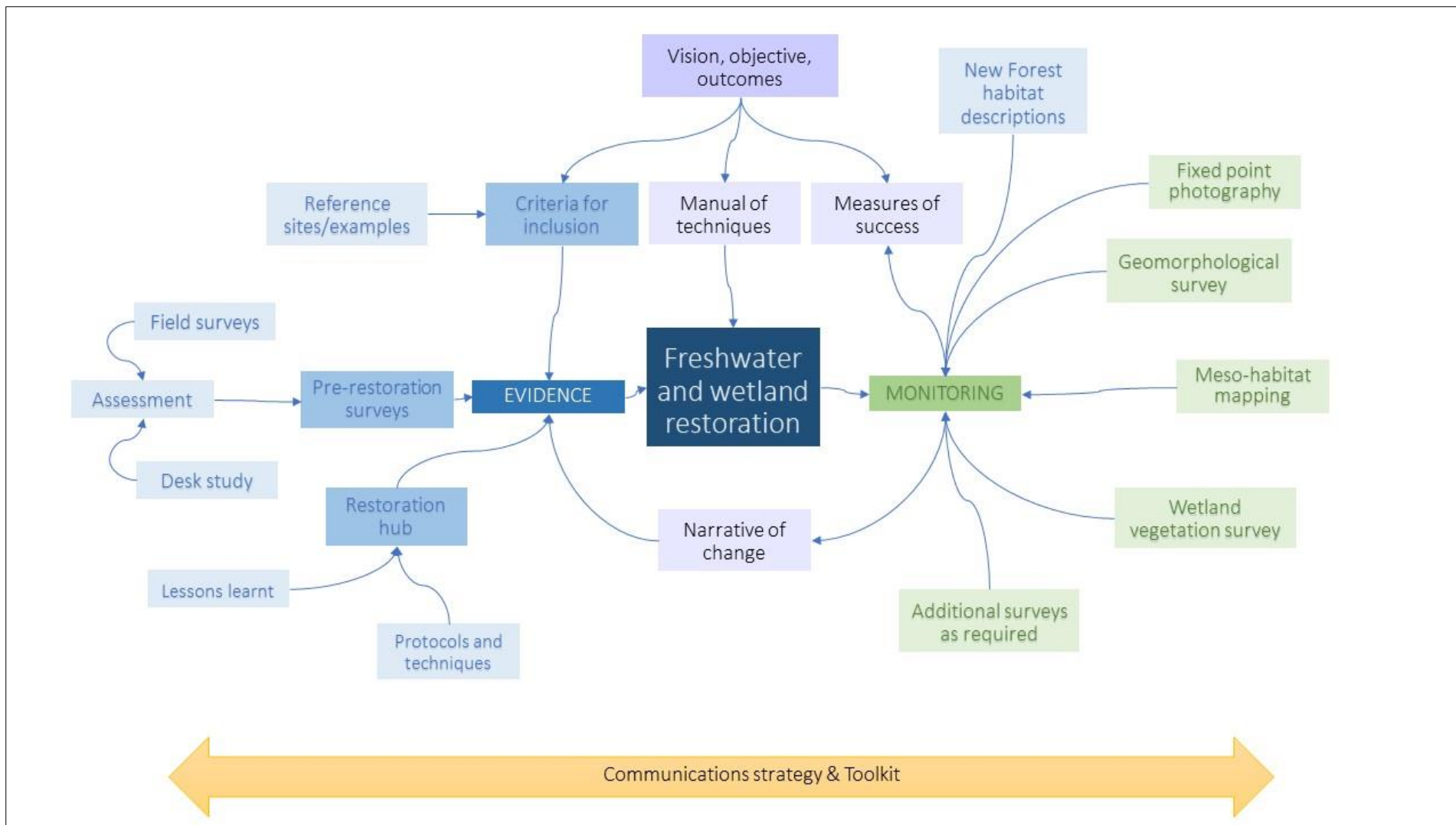


Figure 2: Schematic diagram showing the relationship between evidence gathering and monitoring and the vision, objects, outcomes and measures of success of New Forest Freshwater and Wetland restorations.