

**Environment and Rural Affairs Monitoring & Modelling Programme (ERAMMP): ERAMMP Report 32: National Forest in Wales - Evidence Review: Annex 7, Integrated Assessment.**

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Published: 28/08/2020

Publisher's PDF, also known as Version of record

[Cyswllt i'r cyhoeddiad / Link to publication](#)*Dyfyniad o'r fersiwn a gyhoeddwyd / Citation for published version (APA):*

Emmett, B. A., Healey, J., Warren-Thomas, E., & Wong, J. (2020). *Environment and Rural Affairs Monitoring & Modelling Programme (ERAMMP): ERAMMP Report 32: National Forest in Wales - Evidence Review: Annex 7, Integrated Assessment. Report to Welsh Government (Contract C210/2016/2017)*. Centre for Ecology & Hydrology .

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Environment and Rural Affairs Monitoring & Modelling Programme (ERAMMP)

National Forest in Wales Evidence Review Annex-7

ERAMMP Report-39 Annex-7: Integrated Assessment

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Client Ref: Welsh Government / Contract C210/2016/2017
Version 1.0
Date: 28/08/2020



Funded by:



Canolfan Ecoleg
a Hydroleg y DU
UK Centre for
Ecology & Hydrology

Version History

Version	Updated By	Date	Changes
1.0	Author Team	28/08/2020	Published

Mae'r adroddiad hwn ar gael yn electronig yma / This report is available electronically at: www.erammp.wales/39

Neu trwy sganio'r cod QR a ddangosir / Or by scanning the QR code shown.



Mae'r ddogfen yma hefyd ar gael yn Gymraeg / This document is also available in Welsh

Series	Environment and Rural Affairs Monitoring & Modelling Programme (ERAMMP) National Forest in Wales - Evidence Review
Title	ERAMMP Report-39 Annex-7: Integrated Assessment
Client	Welsh Government
Project reference	C210/2016/2017 UKCEH 06297
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How to cite (long)	Emmett, B.A., Beauchamp, K., Jenkins, T.A.R., Alison, J., Bathgate, S., Bell, C., Braban, C., Broome, A., Bursnell, M., Burton, V., Dickie, I., Doick, K.J., Evans, C.D., Fitch, A., Griffiths, R., Hall, C., Healey, J.R., Jones, L., Keith, A.M., Kerr, G., Kuyser, J., Maskell, L.C., Matthews, R.W., Morison, J., Nicoll, B., Nisbet, T.R., O'Brien, L., Old, G.H., Pagella, T., Perks, M.P., Robinson, D.A., Saraev, V., Smart, S.M., Smith, A.R., Siriwardena, G.M., Swetnam, R., Thomas, A.R.C., Tye, A., Valatin, G., Warrar Thomas, E.M. & Wong, J. (2020). <i>Environment and Rural Affairs Monitoring & Modelling Programme (ERAMMP)</i> . ERAMMP Report-39: National Forest in Wales - Evidence Review Annex-7: Integrated Assessment. Report to Welsh Government (Contract C210/2016/2017)(UK Centre for Ecology & Hydrology Project 06297)
How to cite (short)	Emmett, B.A. et al. (2020). ERAMMP Report-39: National Forest Evidence Annex-7: Integrated Assessment. Report to Welsh Government (Contract C210/2016/2017)(UKCEH 06297)
Approved by	Lloyd Harris James Skates

Abbreviations Used in this Annex

BGS	British Geological Survey
BTO	British Trust for Ornithology
eftec	Economics for the Environment Consultancy
ERAMMP	Environment and Rural Affairs Monitoring & Modelling Programme
LISS	Low Impact Silvicultural Systems
UKCEH	UK Centre for Ecology & Hydrology
VOC	Volatile Organic Compound

Abbreviations and some of the technical terms used in this report are expanded on in the programme glossaries:
<https://erammp.wales/en/glossary> (English) and <https://erammp.cymru/geirfa> (Welsh)

Contents

1 Integrated Assessment	2
1.1 Trade-offs	2
1.2 Timelags and a changing baseline	3
1.3 Spatial and other contextual issues.....	3
1.4 Skills, economic and social barriers to uptake.....	3
1.5 Resilience to climate change.....	4
2 Summary Table	5
2.1 Next steps	5

1 INTEGRATED ASSESSMENT

This Integrated Assessment is intended to highlight the importance of many cross-cutting themes which may impact on the delivery of benefits resulting from woodland creation and management. These themes were identified by the experts as they undertook their reviews. A summary table has been collated to express the issues in a visual format using the approach developed for the ERAMMP Evidence Pack for the Sustainable Farm Scheme (ERAMMP Report-10a: *Integrated Analysis*¹).

1.1 Trade-offs

- a) Creation of new woodland habitat will inevitably be at the loss of land available for agriculture, non-woodland biodiversity, infrastructure and building land. Even with agroforestry there is usually a reduction in land available for crops although this may be offset by other benefits.
- b) Biodiversity displaced due to woodland creation and expansion needs to be considered. How do we prioritise the relative value of different priority and common species going forward, particularly with ongoing climate change?
- c) There is often a desire to conserve iconic communities by attempting to strictly maintain their species assemblages into the future; but this needs to be carefully weighed up against the potential gains in biodiversity or resilience to current and future environmental problems from allowing diversification
- d) Increasing connectivity has value primarily for woodland edge-species but may have risks for increasing flows of pests and disease (see also spatial context).
- e) Woodland creation at a particular location can have impacts not only at that location, but also at a wider landscape scale. Effects may be positive or negative. The proximity of woodland to other habitats must therefore be considered. For example, bird species that require open habitat are susceptible to predation from species that use woodland as cover (see also spatial context).
- f) The production of particulates from major expansion in the use of wood fuel (and current dependence on imports although this can be addressed in time) suggests a trade-off between climate mitigation and pollution removal services. There is also a risk of diverting timber from timber markets.
- g) Species selection should be considered when using trees to improve pollutant removal, as there are reports of short-term variation in pollen concentration produced by some species being associated with allergy medication purchases, asthma symptoms, and asthma-related emergency department visits.
- h) Natural Capital Accounts provide an additional source of evidence to contribute to the decision-making process when these trade-offs are being considered but accounts are always partial and methods are continually being refined and are not yet suitable (some would argue if ever) for biodiversity.

¹ www.erammp.wales/en/r-sfs-evidence-pack

1.2 Timelags and a changing baseline

- a) What is the baseline or counterfactual for many statements made? Are benefits specific to native woodlands or also delivered by other habitat and land use types e.g. green space in general?
- b) Ongoing change is happening and thus the status quo is not realistic anyway and is perhaps not the most appropriate comparator.
- c) When will benefits be realised? There are timelags to many outcomes including ecological lag times for species to populate new habitat and slow tree growth rates delivering carbon sequestration. This needs to be taken into consideration to moderate expectations.

1.3 Spatial and other contextual issues

- a) The proximity of woodlands to people fundamentally limits or increases many of the benefits they can deliver, including the effectiveness of air pollutant removal and associated health benefits, removal of contaminants transferring to water courses as well as many cultural benefits, including recreation.
- b) Distance to wood-processing plants and other production sites can limit the economic, environmental and climate mitigation potential of some options. Harvesting operations and timber transport routes impact on local and en-route communities as well as tourism.
- c) Embedding more trees in the agricultural system using a systems approach and also within the urban setting provides both opportunities and some risks.
- d) Woodland size can have impacts on some ecosystem services, and in particular the economic case for new planting and future management.
- e) Woodland type and management approach have a major impact on landscape aesthetics, many cultural benefits, carbon sequestration rates, economics and resilience going forward. Management approaches should always be clearly aligned to specific objectives.
- f) Forests, trees and woodlands can sometimes pose a risk to other sectors and land users, which may increase under climate change; for example, wind-throw, wildfires and landslides could damage property, transport or infrastructure. These effects can and must be mitigated through the appropriate management of trees and woodland adjacent to roads, railways and buildings, and the appropriate location and management of new woodlands.
- g) The importance of site-specific assessments set with a landscape context was emphasised by many. One size does not fit all.

1.4 Skills, economic and social barriers to uptake

- a) Many reviews highlight the issue of the need for disruptive approaches if the step change needed to increase woodland creation and management is to be achieved.
- b) There is a need to manage expectations for the timescales and resources required to achieve woodland restoration and creation objectives.

- c) For some woodlands the cost of intervention is greater than potential revenue, leading to lack of management. Converting traditionally managed stands to more resilient closer-to-nature management also comes with higher costs, increased perception of risk, and requires a different skill set.
- d) The re-introduction of woodland into our naturally heavily wooded country is not perceived as 'natural' or desirable by some due to generations of pastoral use of our landscape particularly in the uplands, and the legacy effect of post-war mid-century conifer plantations.
- e) There are risks of creating unwelcome or under-valued new forests if communities local to the site are not involved in some way in the conceptualisation, design and planning discussion for the forest.

1.5 Resilience to climate change

- a) The beneficial ecosystem services provided by woodlands may be impacted by climate change. Some benefits will increase, such as urban and riparian cooling, although the possibility of increased pollen production and Volatile Organic Compounds (VOCs) can aggravate certain medical conditions and should be considered
- b) A range of options to select species suitable for future climates and management options to improve condition, area and connectivity should also be considered although connectivity may also increase flows of pests and disease.

2 SUMMARY TABLE

A summary table has been constructed to provide a visual overview of these issues to match a similar approach taken for the ERAMMP Evidence Pack for the Sustainable Farm Scheme (ERAMMP Report-10a: *Integrated Analysis*). A total of 14 woodland creation and management opportunities were considered for 7 categories of benefits (split into 11 subcategories). A colour code is used for each opportunity and benefit assessment:

- Blue: woodland creation and management opportunities considered are most likely to realise benefits
- Amber: benefits may be realized but evidence may be limited and/or there is a dependency which needs to be considered
- Pink: either expert judgement or evidence indicates little benefit is likely and/or there is an important potential trade-off to consider

The findings indicate in summary:

- No woodland creation or management opportunity was without some benefits. There is always some benefit to either woodland specialist species, timber production or other outcome.

However...

- Only 3 opportunities had no 'Pink' assessments indicating there may be important potential trade-offs for most opportunities which need to be considered before action is taken.

Overall, of the 14 opportunities and 11 benefits considered; 32 outcomes were 'Blue'; 86 were 'Amber' and 13 were 'Pink'. The dominance of 'Amber' assessments highlights the critical issue of context dependency for many opportunities which need to be considered before action is taken. The challenge is therefore to provide a framework where decision-making can be supported within a local, regional and national context ensuring there is sufficient cost-benefit outcomes to justify action; and there is due consideration of any trade-offs in the short and long term, across different spatial scales and for different sectors of the community.

2.1 Next steps

It is recommended the next steps should include further review and integration of evidence and opinion across a wide range of stakeholder ensuring there is clear transparency of where evidence is weak; where interpretation of this evidence base differs; and where different value-judgements need to be taken into account.

Table 1: A summary of the potential benefits of different woodland creation, expansion and management opportunities and their co-dependency with woodland type, management and their spatial and temporal context. A key assumption is all woodland actions would follow UK Forestry Standards.

Colour Key:

- **Blue** = Delivery of benefits accepted by the community at a magnitude which could lead to a step change relative to current rates if taken up at sufficient scale.
- **Amber** = A contribution to a step change in benefit delivery is possible but there is either some disagreement between communities as to trade-offs; and/or there is a dependency or a spatial or temporal context which would need consideration; and/or evidence is limited.
- **Pink** = either expert judgement or evidence does not support any significant contribution beyond a minor role to realising benefit; and / or there is a major trade-off or spatial or temporal dependency which limits the contribution to delivery of benefits; and/ or there are some potential disbenefits which must be assessed before any action is taken.

Note: '+’s indicate strength of benefit; '-’s indicate strength of disbenefit; '0' indicates no net benefit; '+/-’ indicates where both benefits and disbenefits can be realised (by definition this is an Amber code); '0/-’ indicates no net benefit or potential for disbenefit.

- **White** = not relevant to intervention or not considered due to time constraints.

Opportunity	Type	Management intensity	Biodiversity		Economic value of products ¹	Air quality		Climate mitigation	Water		Resilience	Cultural services	
			Native woodland associated species	Other native species		Highest potential from modelled range	Particulate removal ^{1,2}		Production of allergens / VOCs	Flood mitigation		Water quality	All aspects
Woodland creation	Production conifer	Thin/fell	+	0/-	+++	++		++	+	+/-	+/-	+	+/-
		No-thin/no fell	+	0/-	++	++		++	+	+/-	-	+	+/-
		LISS	+	0/-	++	++		++	+	+/-	+	++	++/+/-
	Productive broadleaf	Thin/fell	++	0/-	+++	++		++	+	+/-	+	++	++
		Low impact silvicultural systems	+++	0/-	++	++		++	+	+/-	++	++	+++

Opportunity	Type	Management intensity	Biodiversity		Economic value of products ¹	Air quality		Climate mitigation	Water		Resilience	Cultural services	
			Native woodland associated species	Other native species		Particulate removal ^{1,2}	Production of allergens / VOCs		Flood mitigation	Water quality		All aspects	Recreation / physical health ²
		Short rotation forestry	+++	0/-	++	+		++	+	+	0	0	+/-
		Agroforestry	++	+/-	++	++		+	+	+	+	+	++
	Amenity broadleaf	Thin/retention	+++	-	++	++		++	+	+	+	++	+++
		Low impact silvicultural system	+++	-	++	++		++	+	+	+	++	+++
Management of under-managed woodlands			+		+			0			+	+/0	+/-
Woodland expansion			++	-	++	++		++	+	+	+	++	+/-
Woodland creation for connectivity and small woody features			++	+	+	+		+	+	+	++/-		++
Urban and peri-urban trees			+	+		++	0/-	+	+	+	+		++/0/- ⁴
Adjustment of species and growth rates of existing woodlands			+/0/-		++	+		+++	+	+	+	+/0/-	

¹ Products covers a wide range of products from sawn timber, construction, pulp, fuel, fruit and nuts.

² Spatial dependencies and other contextual issues.

³ Dependent on what is considered the baseline or counterfactual. Plantation coniferous forest may be beneficial relative to some landscapes? For example conifers are better at air pollutant removal than broadleaf but both are significantly better than grass.

⁴ Urban trees can increase value of properties but also can provide a financial burden with respect to maintenance of infrastructure (leaves; root damage etc.)

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