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Ancient Woodland Restoration Case Study
Coed Buchesau

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Ancient Woodland Restoration Case Study: Coed Buchesau

Location & background

Coed Buchesau is a privately owned woodland of circa 10.12ha located a few miles east of Dolgellau, Meirionnydd. The site contains areas categorised as *ancient semi-natural woodland* (ASNW) and *plantation on ancient woodland* (PAWS) under the ancient woodland inventory for Wales (AWI). The woodland occupies a small, steep-banked valley which collects streams issuing into the Afon Wnion below. These streams and tributaries really give the site its character, with riparian flush zones displaying interesting hotspots of floral diversity as well as wet woodland areas at lower elevations.

The site is unusual compared to other PAWS locally as it retains significant areas of ASNW. These areas of semi-natural habitat display flora characteristic of National Vegetation Classification categories W7, W9 & W11[1]. In the past these habitat types would have covered the whole site, however, in the first half of the 20th century, the broadleaf canopy across most of the site was removed and replanted with stands of non-native conifers. Today, the site supports stands of Western hemlock *Tsuga heterophylla*, Japanese larch *Larix kaempferi*, Western red cedar *Thuja plicata*, Lawson's Cypress *Chamaecyparis lawsoniana*, Norway spruce *Picea abies,* and some very large Grand fir *Abies grandis*. Beech (*Fagus sylvatica)* was also planted in the past, and there are some large specimen trees present within the woodland, particularly along the boundary.

None of the site is designated as a Special Area of Conservation (SAC) or a Site of Special Scientific Interest (SSSI). However, the woodland is located within 100m of the Meirionnydd Oakwoods and Bat Sites SAC, which is why it was eligible for support through the Celtic Rainforests Wales Project.

Previous management and issues identified

Coed Buchesau was surveyed by Celtic Rainforest project staff in 2019. The survey found that very little management had taken place in the dense PAWS stands within the centre of the site since their establishment. The understorey in these compartments was sparse and smothered by a dense layer of conifer needle litter. The few remaining mature broadleaf trees were being suppressed by the competing conifers planted close to their crowns. Recent strong winds had toppled some of the large grand fir in the western, windward compartments. Also, beech and conifer regeneration was beginning to spread into the eastern ASNW compartment. Due to the proximity of the site to part of the Meirionnydd SAC, the project was able to offer some resources and support to the owner to overcome some of these issues and reduce threats to areas of semi-natural woodland habitat.

One of the objectives of the Celtic Rainforest Wales project is to reduce the impact of non-native plantation tree species on areas of the designated, priority habitat "*91AO Old Sessile oak woods with Ilex and Blechnum in the British Isles*". This can be achieved by reducing the seeding potential of conifers and beech within a 100m buffer zone of SAC sites. Also, where fragments of oak woodland and associated plant assemblages cling on within and adjacent to plantation stands, actions can be taken to maintain and

1. National Vegetation Classification – available on JNCC website https://jncc.gov.uk/our-work/nvc/

enhance these features by gradually reducing the density of the plantation canopy and increasing light levels.

Restoration plan: requirements and costs

The site survey report provided a habitat condition assessment as well as a set of prioritised management recommendations, both of which have enabled a discussion between the owner and project staff about how to instigate a programme of restoration at Coed Buchesau. The project advocates a gradual approach to restoration of broadleaf woodland habitats through careful management of the plantation in order to make slow changes to dominant species whilst retaining woodland conditions. The survey identified the critical threats to the semi-natural woodland features, these are:

- Excessive shading from dense, even aged plantation.
- Thick conifer needle or beech leaf litter smothering ground flora.
- Suppression of remnant mature broadleaves.
- Spread of conifer or beech regeneration into ancient woodland habitat.

Luckily, the site owner spent a long career working in the forestry sector and coupled with this knowledge and experience, he also owns a tractor with a forwarding trailer, alongside other useful forestry kit. The project therefore decided to enter into a management agreement with the owner whereby, rather than recruit an external contractor via a tendering process, the owner retained control over the restoration management actions. Taking into account the above threats, the agreed actions were:

- Halo thin around mature broadleaves through a process of phased release.
- Extract large windblown stems taking up space in the understorey.
- Where possible, reduce conifer shade by gradually thinning plantation stands.
- Remove conifer and beech regeneration.

The above actions, and especially the halo thinning, required a skilled chainsaw operative to carry out directional felling safely and accurately in dense conifer stands. Stems were then winched to the tractor and picked up with the grab to be placed in the forwarding trailer and moved to a loading area. The thinning of the wider conifer plantation, also known as the “matrix,” was carried out selectively, i.e. stems were selected for removal based on tree by tree decision making rather than a systematic approach such as line thinning. A selective approach was used because of the age of the stand and maturity of the trees. This also enables a very gradual opening up of unmanaged stands which protects against wind blow. Harvested timber is being milled and sold into local timber supply chains or split for firewood.

Monitoring

Two types of monitoring will be undertaken at the site; compliance monitoring (of the actual works themselves) and monitoring the impacts of the work on the woodland. The former will largely be undertaken by project staff by the way of regular site visits with the woodland owner, ensuring works are progressing in line with the agreed management plan. These visits largely correspond to when works on a specific compartment are completed. Once a monitoring visit is undertaken and a subsequent payment is made to the woodland owner, a monitoring form will be completed and saved on file in order to create an adequate paper trail for the project.

Monitoring of the impacts of the work will largely be done by the way of fixed-point photography across the site. Pre works photos will be taken by project member of staff, with the location of each photo recorded (usually an 8 figure grid reference), and the direction in which the camera is pointing. Repeat photos will then be undertaken upon completion of works, and at annual intervals for the duration of the project in order to visually capture changes happening within the woodland as a result of our direct interventions.

Impact of works and challenges encountered

The dense, dark PAWS areas of the woodland are now looking a lot more open and there is light around the crowns of the remnant mature broadleaves. Recent high winds have not affected the site and it seems as though thinning works has retained stability in the stands.

The owner has noticed that bluebells and other woodland specialist ground flora, once confined to the semi-natural compartments, are now are now appearing in the adjacent PAWS compartments that have been thinned. It is too early yet to see evidence of advance broadleaf regeneration across the compartments but we will be monitoring the woodland for this over the next few years, there is certainly a good broadleaf seed source within the woodland and the surrounding landscape. If there is not enough regeneration of desired site native species forthcoming, then a decision will need to be made about enrichment planting, especially within the PAWS compartments. There are concentrated areas of Western hemlock regeneration which will need removal and this will be a constant action over the years as the seed source is gradually removed from the canopy.

One concern that exists in the encroachment of scrub as a result of higher light levels reaching the woodland floor. Unless managed, the likes of bramble and other species may become dominant in the understorey, to the detriment of natural regen and ground flora. One option as a way of managing scrub levels is the introduction of livestock to the site as part of a sustainable grazing regime. Given the location and size of the woodland, with good access points and suitable terrain throughout much of the site, the introduction of livestock would be a highly feasible option. However, the need for infrastructure works would mean considerable up-front costs, whilst on-going management and maintenance payments would likely be needed to incentivise grazing of the site for conservation, rather than economic, purposes.

Thinning a mature stand is always presents a wind throw risk, especially when there has been very little thinning work carried out over the life of the plantation. The proximity of the owner means that he has been able focus on the site and carry out manage operations to remove small volumes regularly over a period of a few years. This adaptive approach enables a care and sensitivity that is really important when beginning thinning work after a long period of under-management.

One big issue is that the site supports a number of mature ash especially along flush lines and in areas of more neutral to base-rich soils. *Chalara fraxinaea* (ash dieback) is evident across the site from young ash saplings to mature trees. The site type supports ash and the species currently makes up a large component of the semi-natural areas of the woodland, however, it is very likely that ash will either disappear completely or become a much smaller part of the species mix at Coed Bucheasau in the future. This is a sad reality that we have to face across woodlands all over Wales. It is too early to predict the exact impact of

ash dieback on the woodland's species composition. Halo thinning around mature ash might seem futile but creating more air flow around the crowns of ash will hopefully reduce the spread of the disease and the thinning work has the added benefit of opening up stands to light and heat, kickstarting long dead ecological processes such as nutrient cycling and natural regeneration across the once-shaded plantation understorey.

Figure 1. Photo of site taken in September 2020. The area to the left (up-slope of the track) had been subject to thinning earlier in the year, whilst the area to the right (down-slope of the track) had yet to be thinned.

Future plans

Funding from the Celtic Rainforest Wales project and support from project staff has enabled the owner to carry out much needed phase one restoration work. Close observation of the impact of this will be needed to maintain this positive trajectory. Conifer seed, especially Western hemlock will continue to drift across the site and this will need to be removed through regular tending operations.

Over time, the even age, single species plantation stands will develop more complex irregular structures with multiple species and diverse ages of tree. The key will be to continue the selective thinning method and to manage the site using continuous cover forestry principles which will maintain forest conditions whilst removing timber volume. The selection of which trees to remove through this process will give the owner the chance to shift the emphasis away from conifer monoculture and towards more mixed species stands that make space for rejuvenation of the ancient woodland features of the site and the gradual spread of ancient woodland specialist flora into areas where they have been absent due to plantation establishment.

As time progresses, we will see the impact of thinning on natural regeneration. It is likely that we will see both desirable and undesirable regeneration and this will need management. Western hemlock regeneration will need to be removed and areas of broadleaf regeneration will need to be released through targeted thinning in the future. It could be that enrichment planting is necessary if there is not enough broadleaf regeneration forthcoming and this could be an opportunity to diversify the species mixture with something

that could replace ash. As possible choice could be aspen *Populus tremula*, which could fill a similar habitat niche to ash along riparian edges and flushes.

Summary

- The ancient woodland at Coed Buchesau is in a critical and threatened condition due to management choices which were made in the 20th century. However there are several factors which have set the site on a positive trajectory in terms of restoration and resilience.
- The owner has been able to focus his previous forestry experience onto the management of the site. The fact that he lives nearby has enabled close observation and an adaptive approach to management.
- A gradual approach has enabled mature un-thinned stands to be selectively thinned whilst maintaining forest conditions, vital for preserving ancient woodland features.
- The project has been able to award a grant based on a signed-off management agreement with regular monitoring from project staff.
- Subsequent management will required in the medium (0 - 5 years) to long term (5 - 25 years) to aid further recovery of the site. Funding sources to aid this work have yet to be identified.
- The areas of ASNW at either end of the site provide a seed bank for the gradual restoration of the central PAWS compartments which will gradually begin to support more semi-natural species assemblages over successive thinning operations.

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