

LONG-TERM ECOLOGICAL MONITORING AT THE PEOPLE'S MILLENNIUM FORESTS

Project background

In 2003, an exciting research project began at four of the People's Millennium Forest (PMF) sites. This project involved setting up a monitoring programme in areas of conifer clearfell that were left unplanted and allowed to develop naturally. The four study sites were Rosturra Wood in Co. Galway, Coill an Fhaltaigh in Co. Kilkenny, Cullentra Wood in Co. Sligo and Ballygannon Wood in Co. Wicklow. In the first survey in 2003, a 200-m-long monitoring area called a 'transect' was set up at each site. A transect is simply a linear path along which data is recorded. Each transect was divided into 40 plots (each measuring 5 m × 5 m) from which data on vegetation, ground beetles and soils was recorded. The transects were then surveyed again in 2009 and 2019. This long-term monitoring project is providing us with an understanding of how native woodland is developing at sites previously afforested with non-native conifers.

Vegetation development

Since the first survey in 2003, the vegetation at the monitoring areas at Coill an Fhaltaigh and Rosturra have changed dramatically. These sites have progressed from open disturbed clearfells in 2003, to dense scrub habitat in 2009, to young native woodland in 2019. Grey willow and Ash are the main trees at Coill an Fhaltaigh, with Birch and Grey willow the main trees at Rosturra. The development of woodland has proceeded much more slowly at Cullentra Wood, where much of the clearfell area remains open because of heavy deer grazing, although some scattered Birch trees have established. Birch is a 'pioneer' species that readily establishes on open ground before other trees arrive, with Birch woodland often representing an early stage in the development of Oak or Ash woods. At Ballygannon, the site with the earliest felling date, and which was already immature Birch woodland in 2003, the rate of vegetation change has slowed down since 2009, not unexpected for a site that is closer to maturity.

Growth of non-native conifer seedlings and saplings at Cullentra Wood is a potential cause for concern as the aim at these sites is native woodland. Non-native tree regeneration is a feature of the other sites too, but it is low in comparison to the amount of native tree regeneration occurring.

Plant diversity

All plants along the monitoring transect, including higher plants such as trees, herbs and ferns, and lower plants such as mosses and liverworts, were recorded by field ecologists. They found that the number of lower plant species has increased steadily since the first survey in 2003. This is because the humid microclimate created by the tree canopy benefits species specially adapted to woodland, such as certain mosses. The presence of a new range of surfaces to attach to, such as tree bark, is also a factor. With the exception of Ballygannon Wood, the number of higher plants at the monitoring sites either showed a decrease or levelled out since 2003. Decreases in higher plants can be explained by the loss of light-demanding and weedy species that are typically associated with open disturbed clearfells. At Ballygannon wood, the number of higher plants increased between 2003 and 2009, before decreasing slightly again between 2009 and 2019.

Ground beetle diversity

Pitfall traps were used to catch and investigate ground beetle abundance. Ground beetles were chosen for study as they are considered good indicators of overall invertebrate diversity. At Coill an Fhaltaigh, there has been considerable change in the ground beetle community since monitoring commenced. Several large predatory ground beetles present in high numbers in 2003 were notably absent in 2019, with their absence forewarned by declines in 2009. An investigation of site conditions at Coill an Fhaltaigh might provide further insights into why this decline is occurring (e.g. prolonged seasonal floods) and future monitoring will assess whether this trend continues or reverses. At Cullentra, the ground beetle community changed very little since 2003. At Ballygannon Wood, there were slight shifts, with overall ground beetle diversity higher in 2019. At Rosturra, similar to the vegetation, there have been considerable changes in ground beetle diversity since 2003. Several ground beetles believed to be scarce in Ireland have been recorded by this project since monitoring commenced.

Fixed-point photography

Fixed-point photography involves taking photographs, from the exact same point, at different time intervals. This technique was employed during this project, with a photographic record taken for all plots along the monitoring transect in order to document vegetation change. The dramatic change between 2003 and 2019 in the open clearfells of Rosturra Wood and Coill an Fhaltaigh is apparent in these photographs, as is the slow rate of woodland development at Cullentra Wood due to heavy deer grazing. The self-thinning of the Birch trees at the earliest clearfell site, Ballygannon Wood, is evident, with increased light reaching the woodland floor in 2019.

Figure 1. Fixed-point photography from individual plots along the People’s Millennium Forest monitoring transects providing a visual record of vegetation change over time. These photographs were taken from the exact same position during the surveys of 2003, 2009 and 2019.



Practical applications

This project has demonstrated that natural regeneration is a viable tool that can be used to restore former conifer clearfells. Within a 20-year period, former clearfells can transform into young native woodland in the presence of a suitable seed source. It is a cost-effective technique requiring minimal input, where ecological processes select the correct mix of trees for the site (according to soils, natural hydrology regimes). Some level of intervention may be required to facilitate this process. For this reason, non-native tree removal (conifers, sycamore) and/or deer management should form an integral part of any natural regeneration plan. At sites where natural regeneration is being used as a management tool, some level of basic monitoring is required to ensure that nothing is impeding woodland development.

Long-term monitoring datasets like this are rare and highly valuable. These sites are still developing, and it is recommended that another resurvey is conducted in 6-10 years. This project is not only of considerable scientific value, but through its association with the high profile People's Millennium Forests project it contributes to the wider public debate on semi-natural woodlands and provides an important educational resource.

This project was conducted by



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The baseline survey in 2003 was conducted by Dr. Philip Perrin in association with Trinity College Dublin.

For further information on this project, reports are available online:

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