

## Ireland

aFMM	Guidelines Deliverable D1.3 May 2020	Demonstrations sites Deliverable D1.4 July 2020
<p><b>Low-stocked lodgepole pine – fiber</b></p>	<p>Lodgepole pine planted for fibre production offers a low-intensity management option for blanket peat sites. Following clearfelling of the previous stand, the site is replanted using uniform spacing and a lower stocking than the regular 2,500 stems per hectare. Uniformity in spacing is important as this will ensure equal development of these trees destined to produce pulpwood. In practice, a density of 2,000, 1,800, or 1,600 stems per hectare can be used, with a 10% expected seedling mortality in the first 4 years. Differences in site productivity could determine the planting density, as well as what the Forest Service will approve for the site. Coillte have settled on planting 2,000 stems per hectare, and they have made it a company policy that low YC areas on blanket peat are now categorised for wood fibre production, rather than quality saw log production. The Forest Service have to accept the reforestation stocking at felling license application for wood fibre production.</p> <p>Following replanting, no management actions are required until clearfelling around age 50-60.</p>	<p>Located on the eastern edge of the Finnaun forest estate in Cloosh Valley Forest, Co. Galway, the demonstration site is 81.81 ha in size and composed of two adjacent stands. The stands are divided by a road, along which there are several wind turbines.</p> <p>The previous crop species was lodgepole pine and Sitka spruce, with a productivity of Sitka Spruce Yield Class (SS YC) 10 - 12 (YC 8 -10 for lodgepole pine). The main harvest assortment from the Sitka spruce was pallet wood, the crop did not yield any sawlog. New policies and best management practices has made fertilisation ineligible on this site, so planting lodgepole pine at a lower stocking was the best option. Alternatives considered were to retain the existing stand indefinitely, but the site was deemed productive enough to support a crop of low-stocked lodgepole pine.</p> <p>The previous crop was harvested full pole and extracted, with no following windrowing after. All the dead branches remained on ground, and planting took place in a brash free space. The site was planted in 2019, with a stocking of 2,000 stems per hectare, using lodgepole pine bare-root seedlings. The site is located on deep peat and has no special protection or designation. Coillte expects 10% seedling mortality within four years. This will leave 1,800 stems per hectare, which will ensure sufficient forest cover. Clearfell is expected at around 50 - 60 years. Some issues with using lower stockings is that the Forest Service has not issued clear guidelines on whether planting lower densities, such as 1,800 and 1,600 stems</p>

		per hectare, fulfil the requirements for bioenergy production or not, because the lower stockings are usually reserved to biodiversity and water protection management designations. Planting at lower stockings could result in higher maintenance costs to ensure forest cover.
<b>Low-stocked lodgepole pine – biodiversity</b>	<p>Lodgepole pine planted at 1,100 stems per hectare offers a cheap reforestation alternative that should be utilised to extract existing valuable timber on the site, or to transition the stand to a more natural, low-stocked forest, or both. This density is the lowest planting density approved by the Forest Service. Establishment of the stand should be done by creating an intimate mixture of planted group of trees, separated by open area. Normal planting density (i.e. 2,500 stems per hectare) should be used in the groups to allow more than half the site to effectively be open space. The exact planting pattern and size of groups should be varied until the best approach to promote regeneration of native plants, shrubs, and trees can be determined.</p> <p>Following planting, there should be no further management interventions. However, future naturally regenerating lodgepole pine should be removed if native trees and shrubs colonise the site. There may also be issues with rhododendron (<i>Rhododendron ponticum</i>) encroachment. If rhododendron is present in the area it will require management, and the best option might be to refrain from establishing this aFMM.</p>	No demonstration site for this aFMM exists in Ireland.
<b>Low-stocked lodgepole pine – Nephin thin</b>	A Nephin thin site can be established by heavily thinning an existing lodgepole pine dominated stand. Somewhere between 63-75% of trees should be thinned between age 26-50, and the around 450-600 stems per hectare should remain after the treatment. After the heavy thin, the stand should be	Located south of Bellacorrick and north of Newport, Co Mayo, the demonstration site is roughly 97 ha. The site comprises two stands that were afforested by double mould board ploughing of virgin blanket peat in 1977 and planted with south coastal lodgepole pine.

	<p>left to develop freely, and it is beneficial if the stand is on a fairly windfirm site. A potential concern is whether rhododendron encroachment hinder native ground vegetation establishment.</p> <p>The only costs are for felling, extraction, and transportation of the thinned trees. When these logs are sold, the transition to Nephin thin will likely result in a net profit. Management costs could be incurred for removing rhododendron. Natural regeneration of other tree species than lodgepole should be left on site.</p>	<p>Productivity of both sites are YC 10. The first thinnings were heavy and took place 2015 and 2017, at the ages of 38 and 40, respectively. Both stands had around 1,800 trees per hectare at the time of thinning, and the thinning operation uniformly removed 75% of the stems, leaving around 450 stems per hectare.</p> <p>This site was established as a transition area to wilderness where an increase in light would improve floral biodiversity on the site. However, this is very much a pilot project and opening the canopy and increased light has caused rhododendron to creep in. There were signs of lodgepole pine naturally regenerating, but those saplings performed poorly due to:</p> <ul style="list-style-type: none"> <li>a) Heavy frost, resulting in frost heave where the roots are pushed up and exposed to the air and die;</li> <li>b) Weevil attacks killing saplings.</li> </ul> <p>Thus, overall regeneration is not happening on the demonstration site. Some of the mature trees on site have snapped halfway up the stem, indicating the site is actually windblow stable.</p>
<p><b>Modified Kronoberg system – Sitka spruce and downy birch mixture</b></p>	<p>The Modified Kronoberg (MKB) aFMM is suitable for blanket peat sites with a peat depth of no more than 0.5 m. Peat depth is a major factor affecting site productivity and crop survival. The 0.5 m depth is based on the BOGFOR project, where Sitka spruce-birch mixtures were established on cutaway peat sites with a 0.3-0.6 m peat depth.</p> <p>Once suitable sites are found, the first step of MKB is to plant a mixture of 54% Sitka spruce and 46% downy birch in alternating rows, with some double rows of Sitka spruce, at 2 by 2 m spacing, resulting in 2,500 trees per hectare. After reforestation, three thinnings are applied at ages 21, 27, and 34, and the stand is eligible for clearfelling at age 40. The first</p>	<p>The test site was established in 2000 on previous industrial cutaway peat (milled peat, mainly <i>Phragmites</i>) and is thus an afforested site. The afforestation was a part of the BOGFOR project that investigated the potential to afforest decommissioned industrial cutaway peats. Although this site is not located on blanket peat, this demonstration site is the closest thing existing in Ireland.</p> <p>To date, no thinning has been done in the Sitka spruce and birch mixture, but the next thinning will remove one line of birch from centre of each bay with some selective thinning of larger birch (i.e. negative selection). The post-thin birch stocking should be maintained to ca 600 trees per hectare. Thinning of Sitka spruce should be delayed.</p>



	<p>thinning involves harvesting of the birch, and all the remaining birch and some of the Sitka spruce are harvested in the second thinning. The third thinning only removes some Sitka spruce trees, and all remaining Sitka spruce trees mature to clearfell.</p>	
<p><b>Bog restoration</b></p>	<p>Many of Ireland’s current forests were established on natural bog habitats that were drained prior to afforestation. After clearcutting, the site is not replanted with trees. Instead, site operations are done to fill in drains and installing dams on slopes to help the rewetting process. This allows natural bog vegetation to recolonise the site.</p> <p>Suitable sites for bog restoration involve areas with environmental policy designations (e.g. Natura 2000 sites), sites that have low productivity, and sites where certain <i>Sphagnum</i> mosses and other indicator plant species are already present. Management interventions might be necessary to remove regenerating trees on the site.</p>	<p>The Emlaghdauroe demonstration site is located on the southwestern slopes of Ben Gleninsky, on the southern edge of the Twelve Bens mountain range in the Connemara region of Co. Galway. The site is surrounded by the Twelve Bens/Garraun Special Area of Conservation (SAC) and the area with restored bog will be subsumed into the SAC once restoration has been shown to be successful. In total, the site is 90.3 ha in size and was restored as a part of the EU LIFE project LIFE02 NAT/Ire/8490, which restored around 2,000 ha of blanket bog in Ireland.</p> <p>Emlaghdauroe was partly chosen as a demonstration site since areas of montane heath habitat are relatively rare in Ireland. The site will serve as a good demonstration of how many similar conifer plantations in Connemara can be managed for environmental benefits. Recolonisation by regenerating blanket bog vegetation has been a relatively slow process, but recolonisation has taken place. <i>Juncus effusus</i> has developed extensively in sloping areas and/or areas subject to flushing by flowing surface waters. The other parts of the site are currently dominated by <i>Molinia caerulea</i> and the moss <i>Hypnum cupressiforme</i>.</p>

