**Barker Hill Lot**

The project area is a white pine/red pine plantation and a naturally established mixed hardwood white pine stand. Previous silvicultural treatments have established an excellent cohort of white pine and mixed hardwood seedlings and saplings under the plantation overstory ready for release. The hardwood stand is composed of oak species with scattered white pine and other hardwoods. This stand has thick patches of mountain laurel throughout shading out tree regeneration. Scattered populations of invasive bittersweet and glossy buckthorn can be found within the plantation.

Climate Forestry Committee (“CFC”) Recommendations Concerning Resilience of Plantations as a function of their Structural Complexity and Susceptibility to Invasive Species:

* *“There was* ***Committee consensus*** *that* ***plantations should be converted to more compositionally diverse forests via harvesting****, and some also supported adaptive management of other stands with several risk factors, such as a dense stand of diseased trees that would represent a fire risk to nearby development.” (“Report of the Climate Forestry Committee: Recommendations for Climate-Oriented Forest Management Guidelines” hereafter referred to as “CFC Report”, page 38).*
* *“There was some* ***agreement on the Committee*** *that some* ***current forest conditions****, such as* ***plantation monocultures****, many compositionally and structurally simple second-growth stands,* ***forests heavily infested with non-native invasive plants****, or those lacking plants in the understory due to heavy deer browsing,* ***may not exhibit the same level of resilience*** *as forests with a higher degree of ecological integrity and absence of invasives.” (CFC Report, page 38)*
* “***CFC recommendations related to the overall missions and land management of the Divisions of Drinking Water Supply Protection, Fisheries and Wildlife, and State Parks and Recreation****…****Prioritize for active management*** *forest stands that have simplified structure and low species diversity, especially* ***plantations that are in poor health****. Seek to* ***enhance structural complexity*** *and propagate diverse species well-adapted to the site and predicted future conditions.”* *(CFC Report, page 45-46)*

CFC Recommendations Concerning Active Management: Multi-Aged Silviculture

* *“When forests are actively managed,* ***the Committee recommends*** *adopting ecological principles, including…Retaining some trees on site, particularly large mature ones, while* ***meeting species regeneration goals by using multi-aged silvicultural systems****.” (page 33)*

The above CFC recommendations have been acknowledged. The program feels it is in the best interest for overall forest resiliency considerations to amend and specify the language of the Barker Hill Lot project in accordance with the recommendations and move forward. The prescription has been amended to incorporate the following modifications:

* Allow for more **retention** than originally proposed with a focus on species better suited to climate change (e.g. oaks/hickory).
* Retain **dead trees** to provide short term carbon storage and habitat improvements.
* Create conditions for a **diverse suite of species, age classes and structural complexity**.
* Continue with **exotic invasive control**

**How these Practices Align with CFC Recommendations**

The major forestry practices that will be used to accomplish management goals in this project are summarized and the alignment of those methods with climate-oriented strategies and recommendations is as follows:

1. **Diffuse overstory removal, partial cut, late rotation regeneration related. (see prescription explanation of expanding gap irregular shelterwood favoring retention of vigorous overstory climate-adapted species, age class diversity, and wildlife habitat on pages 10-12)**

Partial cutting via single trees or small groups in a mature stand can advance a variety of management objectives as well as **climate-smart practices**. Single tree or very small group removals, if used exclusively and repeatedly, will perpetuate an **uneven-aged stand condition** with a species mix shifted towards higher shade tolerance. However, this type of harvest can also serve within an even-aged system to establish regeneration of species of lower shade tolerance under a partial canopy for subsequent release using larger group or patch cuts (irregular shelterwood) or complete-stand overstory removals. Advantages of partial overstory removals include, but not limited to:

* Partial cutting **retains carbon on the landscape** for extended periods while regeneration develops.
* Reducing competition for resources improves growth and **carbon sequestration** rates on residual trees.
* Promotion of a diversity of age classes enhances overall forest **resiliency**.
* Maintenance of continuous forest corridors provides for wildlife habitat.
* As part of a regeneration system this method can be used to help guide species diversity towards more **future-adapted mixes**.

1. **Full overstory removal, complete stand, plantation conversion to native species. (see prescription objective for partial red pine plantation removal in Stand 1 to prevent spread of pests and disease and to release and establish native regeneration on pages 10-12)**

Long considered a critical practice on agency lands to improve biodiversity and forest resilience, the **conversion of single-species conifer plantations** to more diverse mixes of native species has also been encouraged as a climate-smart practice by NIACS and other climate adaptation experts. Tree monocultures, intensively managed throughout the world to produce much of the wood we all use, are **highly vulnerable** to the kinds of **pest and disease** impacts that are likely to worsen as climate changes. Conversion of monoculture plantations aligns with many climate-smart forestry practices highlighted in the CFC report, including but not limited to:

* Improving **resistance to pests and pathogens**.
* Increasing resiliency by promoting **diversity of plant species**.
* Providing age class/**structural diversity**.
* Improving conditions for a wide variety of local wildlife through the creation of temporary **young forest** habitat.
* Promoting **future-adapted tree species** in the regeneration mix.

1. **Diffuse overstory removal, partial cut, mid-rotation thinning (see prescription explanation of follow-up thinnings to expand gaps favoring climate-adapted species on page 11)**

Classic thinnings are partial cuts implemented during the ‘middle years’ of stand development (‘intermediate treatments’) to **adjust species composition**, shift growth towards desirable and more vigorous trees, and maintain desired density and stocking levels. Stands may be thinned multiple times prior to initiating the regeneration phase near the end of a planned rotation. Time intervals between thinnings are generally considerations between rotation lengths and the response of the trees on the site.

Climate-smart practices that agency foresters keep in mind when conducting thinnings include:

* **Retaining higher residual densities** that maintain higher levels of carbon stocks on the landscape.
* Retaining better-formed and more vigorous individuals which will improve **carbon sequestration capacity**.
* Taking the opportunity to favor **desired species**, especially those species that are better adapted to **future climate scenarios**.

1. **Invasive plant control, including pre- and/or post-harvest and follow up treatments. (as necessary throughout management activities on prescription pages 11-12)**

Strong consensus exists among land managers and climate science experts regarding the **threat to future forest health** posed by the introduction and spread of invasive plants. **Invasive plants** can:

* aggressively **outcompete native plant species,**
* dominate understory communities, and even climb, kill, and topple mature trees,
* threaten overall **biodiversity**.
* threaten **soil health** and long-term **carbon storage**.

**Monitoring and controlling** invasive and interfering plant populations prior to and following forestry operations is a critical practice for **minimizing the risk of further impacts** inadvertently (though not unexpectedly) spread by harvesting-related activities.