Example Carbon and Climate Sections (Resource Category 9)

Carbon Sequestration/Climate Resilience Example 1

Resource assessment

While the climate has always exhibited variability and major climatic shifts have occurred throughout geological history, warming this century is likely to occur 10 times faster than during any climatic shift in the past 65 million years. In the coming century, average annual temperatures in Washington are projected to rise at a rate of 0.2 to 1.0 °F per decade. Although there is more uncertainty in projected changes in precipitation, in general, winters are projected to be wetter and summers are projected to be drier2. These changes will most likely effect forest growth over time. It is expected there will be changes to the length of growing season, species (plant and animal) composition and distribution, water availability and duration and an increase in drought conditions during the summer/early fall months.

Forests mitigate climate change by reducing the concentration of carbon dioxide, a key "greenhouse gas," in the atmosphere. As trees grow, they take in carbon dioxide from the atmosphere and, through photosynthesis, release oxygen and create sugars to feed themselves. Through this process, the carbon that was in the atmosphere in the form of carbon dioxide becomes part of the tree's wood and other tissues. This conversion of carbon dioxide to wood and other solid materials is known as carbon sequestration. Trees will continue to sequester carbon as they grow. When trees are harvested and milled for lumber, the carbon remains sequestered in long-lived wood products incorporated into buildings, furniture, etc. Snags, downed logs, and soil organic matter (the "duff" layer) also provide key long-term carbon storage.

Stands 2 and 3 are well-stocked and growing vigorously after thinning, providing the greatest level of carbon sequestration. Stand 1 is not fully stocked and thus not providing optimal carbon sequestration, but we are balancing this with the need for more open conditions to provide for wildlife biodiversity. Stand 4 is lacking trees and needs to be reforested.

Management recommendations

We will continue to maintain proper spacing in Stands 2 and 3 to promote vigorous growth and carbon sequestration. Maintaining vigorous growth will help these stands be resilient to climate change stresses like increased heat and drought. We will plant trees in Stand 4 to build carbon sequestration capacity. We will ensure adequate spacing to maintain tree vigor, and we are planting a mix of species that are well-suited to the site

conditions for long-term resilience. We will underplant shade tolerant species like western redcedar in Stand 1, increasing carbon sequestration while continuing to provide diverse structure for biodiversity. When planting in drier areas, we will favor more drought-tolerant species and/or seed sources. We will aggressively control invasive species to reduce stress on natural vegetation.

When harvesting trees, we will focus on producing long-lived wood products (e.g. lumber) to maintain sequestered carbon, and then we will replant a fully-stocked stand to sequester more carbon in the new trees. After harvest we will avoid slash burning as much as possible as this causes immediate carbon release. Rather, we will use “lop and scatter” techniques to spread the slash around for incorporation into soil organic matter where slow decomposition will lead to carbon release over a long period of time. If there is excess slash, we will look into chipping it and distributing across the site to build carbon-rich organic matter and reduce the risk of wildfire that would cause massive carbon release back into the atmosphere.

Carbon Sequestration/Climate Resilience Example 2

Resource assessment

Climate change is expected to bring warmer and drier summers. Maintaining tree vigor and diversity is the best defense against climate change. It is essential to maintain adequate spacing so that trees are not overly competing for resources. It is also important to appropriately match tree species to the site, such as ensuring that species that have some drought tolerance are planted on dry sites or excessively drained, droughty soils. Maintaining a diversity of tree species provides a “buffer” against different stressors as different species have different levels of drought tolerance, wind resistance, and susceptibility to insects and diseases. In other words, don’t put all your eggs in one basket.

Forests mitigate climate change by reducing the concentration of carbon dioxide, a key “greenhouse gas,” in the atmosphere. As trees grow, they take in carbon dioxide from the atmosphere and store that carbon in their wood and other tissues. This is known as carbon sequestration. Maintaining tree vigor and strong growth will maximize carbon sequestration. Snags, downed logs, and organic matter also provide long-term carbon storage.

Our stands, especially Stand 2, are overstocked and thus losing vigor, which make them vulnerable to climate stressors and reduces the potential for carbon sequestration. Alder is not a long-lived species (60 to 80-year lifespan) and will eventually need to be replaced to provide long-term forest cover and carbon sequestration. The current species mix on the property does not provide a lot of diversity.

Management recommendations

Thinning our stands will increase their vigor, resistance to stress, and capacity for carbon sequestration. Stand 2 is our first thinning priority. Replacing red alder with longer-lived species will be necessary once it begins senescing. That is still several decades away, though, and beyond the scope of this current plan. Our plans to maintain snags and organic debris will contribute to carbon sequestration. Our plans to plant additional species to increase diversity will add resilience to our forest.

Carbon Sequestration/Climate Resilience Example 3

Resource assessment

Climate change is expected to bring warmer and drier summers. Maintaining tree vigor and diversity will promote resilience in a changing climate. Tree vigor is maintained by ensuring adequate spacing and that the tree species are appropriate for the site. Since our soils are excessively-drained, we need to make sure we have species with some degree of drought tolerance in the drier areas. We may need to avoid western hemlock in these areas.

Forests mitigate climate by sequestering carbon. Trees sequester carbon by taking in carbon dioxide for photosynthesis and ultimately storing that carbon in their wood and other tissues. Maintaining tree vigor and keeping stands well-stocked will maximize carbon sequestration. Snags, downed logs, and organic matter also provide long-term carbon storage. Our areas of aging alders and areas where trees have fallen because of root disease are becoming understocked.

Management recommendations

Underplanting under the aging alder and replanting the areas where trees have fallen will increase long-term carbon sequestration potential. We plan to plant a variety of different conifer and hardwood species, which will increase diversity. We will make sure that our species choices are appropriate for each area relative to available water and sunlight.