Introduction

The Sitka spruce is one of the most popular hardwoods used in the timber industry, and the most profitable globally. Its wood is light, and flexible giving it uses in many industries such as construction, ship building, paper, and musical instruments. Dense Sitka stands can limit the diversity of vegetation, therefore limiting wildlife habitats (Deal). But mixed stands are beneficial by increasing habitats for multiple species like black-tailed deer, grizzlies, black bear, and many other smaller creatures that can reside below the canopy (Fig. 1.3).

Sitka spruce grow naturally in temperate zone rain forest, which include the coastal areas of the Pacific Northwest, with three other dominant species; Douglas fir, Western Red cedar, and Western hemlock. It grows 70 to 90 meters tall, and 2.5 to 5 meters across, making it the largest species of spruce available and the best for yield; and has been regarded in the Chehalis River Basin as a highly profitable timber harvest since the timber industry began here. Sitka spruce can thrive in poor soil, and previous studies have shown that it also regenerates itself well in the right conditions. The Sitka spruce also has unique ability to take in minerals from the fog, making it an ideal species in plantations for harvest (1) around the Chehalis River basin.

Over the last decades Sitka spruce has become unpopular in plantations due partly to slow growth in its early ages, and the top kill created by the Spruce weevil. The Spruce weevil burrows into the main vein, through the terminal bud killing the top. It lays its eggs in this vein, and when temperatures warm they hatch. This burrowing causes the top to split, stopping that year worth of growth for that specimen, greatly reducing the yield of timber, and also effecting the possible mortality of the specimen, in turn effecting habitats of the above-mentioned species, and making it difficult to maintain.

Cool ocean breezes and fog deter weevil infestations among coastal Sitkats (3). Lowering temperatures in stands of Sitkats needs to be explored to evaluate whether these temperatures are in fact a deterrent to this destructive weevil. Previous studies have shown that Sitka spruce can be grown in stands beneath faster growing beech trees (6). This implies that there is the possibility that lowering temperatures among Sitka stands could reduce infestation, in poly cultured plots. The Red alder is a fast growing, broad leaved species that also grows well in the Pacific northwest and will be tested for these purposes in the research.

The Chehalis river basin is a culturally diverse community that depends on the fruits of the environment for sustainability. The Sitka sprue, grown in polyculture stands, helps maintain stability of habitats for food sources that are staples in the local community diets, through hunting, and fishing.

By learning how to grow disease free, Sitka spruce, in abundance, of poly cultured stands it will also help to sustain timber industries that support the local economies. These intercrops of Sitka spruce and Red alder, offer the potential of surplus timber by harvesting two species on one plot, making a better facilitating of land use that is more cost efficient to maintain. A strong timber industry helps stimulate the standard of living for inhabitants of the Chehalis River Basin through increases in employment opportunities.