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First name: Kate
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Comments: Edge effect in harvesting forests should be included in all four alternatives. It may already be there. Dr. Jerry Franklin did several studies on it, noted below in the bibliography. I did this summary of edge effect research, research mostly done in Pacific Northwest forests.

Edge effect is important to consider in protecting old-growth forests. Not only do the forests themselves need protection, but many species of animals and plants need interior-forest habitats to thrive and survive.

During the past 30 years, a number of studies have been done about edge effect, an important landscape feature of the fragmented forests of the Pacific Northwest. Scientists have measured microclimate variables, influenced by edge exposures and local weather, along transects from recently clear-cut edges into old-growth Douglas-fir forests. Mostly during summer months, they have collected data on air temperature, soil temperature, soil moisture, relative humidity, short-wave radiation, and wind speed. Edge effects typically extend 30 to 240 meters into the forest. [3]

SUMMARY OF RELATED STUDIES

On south-facing edges, daytime temperatures get warmest near forest edges. Temperature peaks last longer and affect more of the forest interior from 60 to 120 meters into the forest. Soil temperatures are affected in a similar way but for shorter distances, 60 meters or less. Relative humidity is affected 30 to 240 meters into the interior. Solar radiation effects vary during the day with canopy structure, decreasing 30 to 60 meters inside the forest, reaching farther into the forest on south and southwest-facing edges. Low levels of soil moisture persist 90 meters into the forest on south-facing edges. [3] Wind speed generally decreases from edge into forest. There are various estimates of how far into a forest wind velocity reaches equilibrium. For old-growth Douglas-fir forests, an estimate is up to 240 meters when the wind is strong. [3] In short, the air inside a forest is cooler, more humid, and less turbulent than in a clear cut or edge, and the soil is moister. Greater distance and magnitude of edge effects for microclimate and wind throw are found at south and southwest-facing edges in the northern hemisphere. [5]

Ecological features in old-growth forests near clear cuts include increased numbers of Douglas fir and western hemlock seedlings and saplings, and increased growth of Douglas firs and western hemlocks, as well as increased wind throw and dead wood caused by strong winds and environmental stress. Flying insects such as Douglas-fir beetle may follow microclimatic gradients extending 240 meters into the forest. Litter decomposes faster near forest edges, and organic layers in old-growth forests may be much thinner near edges. To maintain biological diversity in old-growth forests, there has to be space in the interior (beyond 240 meters) for plant and animal species that need interior forest habitat. [3] In a songbird study related to forest edges, predation increased until 300 to 600 meters into the forest. [4]

Wind speed and relative humidity have the strongest responses to clear-cut edges, with effects extending 180 to 480 meters into the forest. Again, edge effects are strongest near south and southwest-facing edges. [3]

Edge influence of past clear cuts on the structure of neighboring uncut old growth is widespread and persistent in the Pacific Northwest. Areas of forests within 75 meters of clearcut edges appear to have 4 to 6% less basal area than interior forests. At higher elevations, reductions approach 10%. [1] Greater mortality and basal area declines are likely due to more exposure to wind and storm damage and also possibly to hazard-tree cutting. Wind throw brings more wind throw. [1] Edge effect for wind throw is likely to be greater as the stand matures and trees grow larger and are sometimes weakened by damage. [5] Evidence suggests edge effect is stronger in the canopy and extends farther into it. [1]

Lower basal area in old-growth forests could reduce habitat for some plants and animal species, and reduce the forests' ability to sequester carbon. [1] A study focusing on vegetation in more detail found that basal area increased 20% from edge into interior forest, and canopy cover increased from 35% to 75% within 60 meters into

forest. Many trees near edges were uprooted or broken off by wind: 110 snags and fallen boles per 10-meter X 100-meter plot at the edge, 68 at 30 meters from the edge, 52 at 120 meters, 35 at 240 meters. [4]

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