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Industrial Forests and Mountain Goats in North Central British Columbia

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Summary

The conversion of natural forests to industrial tree plantations occurs below alpine zones, but can affect mountain goats in the alpine and low-elevation cliff habitats. Logging roads and forest harvesting activities provide easy human access to mountain goat habitat. Forage and browse that mountain goats rely on near alpine and low-elevation cliff habitats are lacking in industrial forests. Roads and cutblocks may block mountain goat travel from one mountain range to another.

Industrial Forests

Forestry policy throughout British Columbia is formulated with the goal of converting accessible timber lands to industrial forest plantations. After the initial harvest, new trees - conifers only - are planted approximately 2.5 meters apart, optimal spacing for full utilization of available sunlight, resulting in a straight tree stem with small branches. When a plantation is ready for harvest in 60 to 80+ years, it will be replaced by another plantation with trees planted 2.5 meters apart. Industrial tree plantations are designed to replace most of our primary natural forests permanently.

Mixed ages

The planted trees of an industrial forest plantation are all the same age and will be harvested at the same time, before the trees' natural end of life. Aside from scattered natural regeneration, there is no mix of ages that allows some trees to grow old, die and fall to the ground to make space and light available for shrubs, forbs and other understory vegetation. When planted trees are small in height, shrubs, forbs and other

vegetation have enough sunlight to grow vigorously, often exceeding the rate of growth of understory plants in the original forest. But when the planted trees close shoulders and are several meters in height, they begin to shade out all other vegetation, other than shade-tolerant herbs, mosses, ferns and club mosses. When the ground is totally shaded, growth of the planted trees is maximized, and productivity and diversity of understory vegetation is greatly reduced.

Plantation trees can mature in 80+ years, so if understory vegetation is shaded out at the 40-year mark, there is still another 40+ years of tree growth before the plantation is harvested. During that time, scant understory vegetation grows. The main source of organic matter from planted trees is litter (twigs and needles), slow to decompose and a poor source of soil nutrients.

Any substantial growth of shrubs or non-marketable trees in an industrial forest is treated as unacceptable, unless there is legal direction otherwise. Tree plantations may only support mammal species that can survive in a shaded industrial forest such as voles, mice, snowshoe hares and squirrels.

Figure 1 38 year-old industrial forest plantation at 29 km on the Babine Lake Road – note lack of vegetation on ground

Industrial forests will cover all accessible forest lands up to approximately 1400 meters (4500 feet) elevation, or up to whatever elevation it is economical to log, considering stem diameter, tree height and wood quality. Utilization of smaller and marginal timber, as is happening now with the demand for wood pellets as a source of bioenergy, may result in industrial logging to the edge of alpine at generally 1520 meters (5000 feet).

Wildlife

Mature industrial forests will not provide enough browse and forage for ungulates such as deer, moose, or elk. In turn, the lack of ungulates may reduce populations of predators such as wolf, bear, coyote, mountain lion and wolverines. Food for bears such as berries, sedges and forbs will only grow in the early seral stage in an industrial forest. The late seral stage, when berries and forage are often at their best, is eliminated in an industrial forest.

Figure 2 Natural forest at 26 km on the Babine Lake Road – note rotting logs, openings and mix of tree ages,

Third Pass

In north-central British Columbia, the first and second passes of logging over the last 70 years are now ending. With the high demand for wood, the third pass will convert the remaining natural forest between cut blocks to industrial forests over entire watersheds. When the third-pass logging in the original forest is complete, the first commercially viable plantations will be harvested and replanted. Industrial forestry is designed to maximize and sustain a single value, the production of conifer wood, with the implication that plantations will permanently replace original natural forests

Monocultures

Industrial plantation forests are no longer a mix of species and habitats but resemble monocultures, with one, two or three marketable tree species (pine, spruce, larch). Once the conversion is complete, the only natural forests left will be in wetlands, riparian zones, parks, conservation areas, inaccessible areas and recreation sites.

Industrial plantation forests are vulnerable ecosystems with less resilience to stresses such as drought, extreme temperatures and severe wind/rain storms. Outbreaks of insect damage and fungal disease are more extensive where there is an abundance of the same tree species. Planting of species in locations where the species does not grow naturally, such as pine in subalpine fir forests, is questionable at best. Fire spreads easily across a continuous forest of coniferous trees. The number of species of plants and animals that can survive and flourish in an industrial forest is limited, leading to a decline in regional biodiversity and ecosystem health.

Industrial forest plantations serve the private wood-processing industry and generate income for workers and government. But the efficiency of an industrial forest comes at a price.

Industrial forestry relies on the soil fertility of our original forests. It has taken more than 10,000 years since the last ice age for soil in our forests to develop by recycling all available biomass. In contrast, industrial forestry removes most biomass from the land at harvest in the form of logs, leaving only stumps, ground cover and logging debris. Over time, the size and health of trees in an industrial forest can diminish as the soil is slowly depleted of organic material and nutrients. There is no practical way for industrial forestry to renew nutrients and organic material; fertilization and organic amendments are too costly. If an industrial forest is subject to a severe wildfire, the vegetation may become dominated by grasses and shrubs that can grow in degraded soils.

Mountain goats

An important impact of industrial logging on mountain goats is access by the public. As more logging roads are built close to alpine and low-elevation cliff habitats, mountain

goats will suffer increased displacement by human activities, unless those roads are promptly deactivated and restored to forested conditions.

Over the last decade, we have documented the collapse of mountain goat populations where the public gained easy motor vehicle access to goat habitat via logging roads. We have also seen evidence of reductions in use of low-elevation cliff habitats used by mountain goats for dispersal, along with reduced populations in isolated low-elevation cliff habitats.

Conversion of natural forests to industrial forests near alpine and low-elevation cliff habitats increases visibility of mountain goats to predators in the short term and reduces forage opportunities in the long-term.

Movement of mountain goats between mountain ranges occurs within low-elevation forests and provides transfers of genetic materials during both the rut and periodic dispersals of young adults. Increased road density and visibility within industrial forests can effectively stop mountain goat movements over long distances.

Mountain goats travel on established trails through forests to mineral licks. The goats need to be isolated from the sounds of nearby logging machinery by a natural forest buffer on both sides of the trail. Otherwise the goats may abandon the trail. The buffer needs to be wide enough to eliminate open sight lines for predators and to reduce the probability of wind-thrown timber over the trail.

Reduction of either goat movement or genetic exchange as a result of industrial forestry will have a profound impact on mountain goat viability over the long term.

Discussion

Unfortunately, there is no commitment to date in B.C. to practice alternative methods of managing our forests other than clear cutting followed by planting. Tree plantations may be an efficient way to renew the supply of wood. But government must be aware of the adverse effect of industrial forestry on soil, wildlife species and biodiversity.

Not all harvested forests need to be replanted on a 2.5 meter grid pattern; natural tree regeneration still works. Some old cut blocks from the 1950's that were never replanted are now healthy forests of mixed species, and do not suffer the adverse effects of an industrial plantation.

Harvesting methods can be modified with partial cutting, patch retention or other approaches that mitigate adverse effects. Natural forest corridors can be left between cutblocks that extend the edge of the natural forest and provide long-term safe paths for wildlife, including mountain goats.

Tree planting, brushing and spacing can allow a greater mix of plant species. Forests do not need to be brushed to leave only commercial conifers. Aspen, birch and willows are valuable browse species, sequester carbon and can even enhance conifer growth.

Recommendations

We recommend that motor vehicle access on logging roads within one kilometer horizontal distance of a Mountain Goat Ungulate Winter Range, and on logging roads near low-elevation cliff habitats, be controlled year-round by erecting gates or barricades immediately after the Forest Harvest Completion Date, in advance of mandatory road deactivation.

Movement of mountain goats between mountains requires a precautionary management approach. We recommend canopy retention and a harvest of less than 30% standing volume within the one-kilometer wide buffer area for a Mountain Goat Ungulate Winter Range. For a harvest of more than 30% standing volume, we recommend provision of a continuous natural forest corridor, with a minimum width of 350 meters, on the upslope between adjacent cutblocks that extend into the one-kilometer wide buffer area for a Mountain Goat Ungulate Winter Range. See graphic below.

We further recommend that a 700 meter leave strip of natural forest be provided on each side of an established mountain goat trail through a forest to a mineral lick.

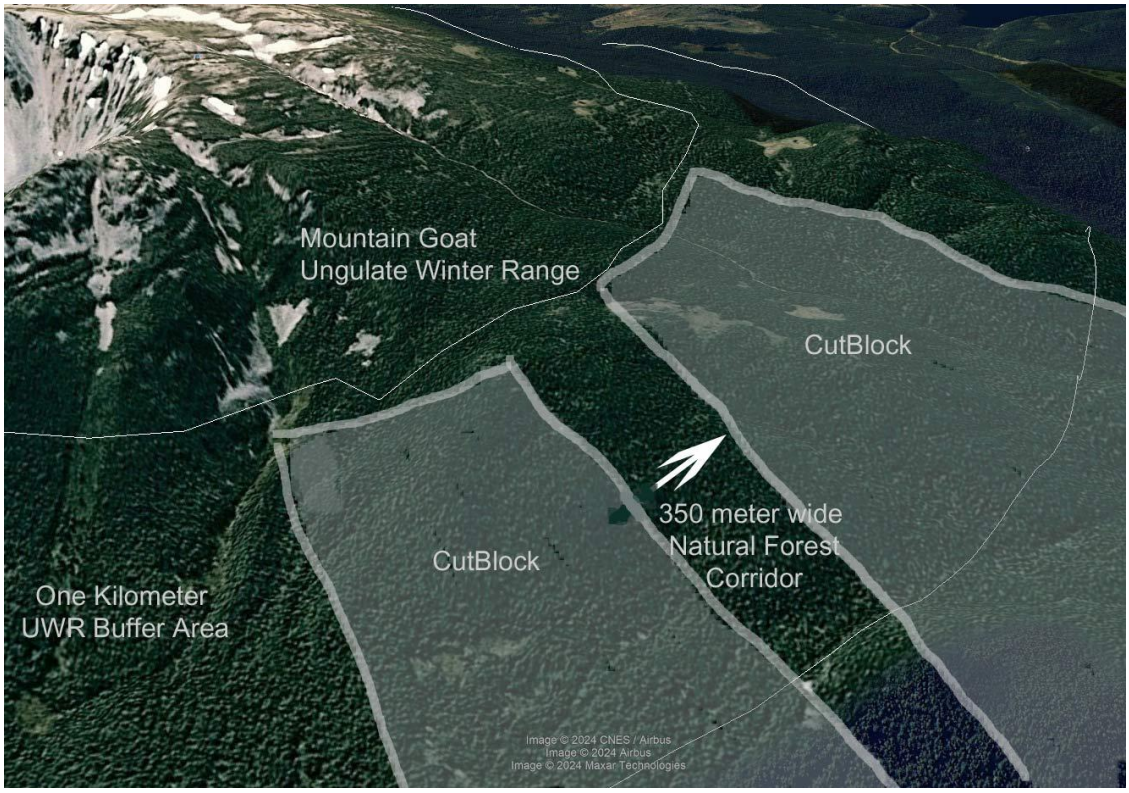

Figure 3 A 350 meter wide natural forest corridor between cutblocks with >30% standing volume harvest provides a safe path for mountain goat dispersal or rut

Mountain Reports inform BC Wildlife Branch biologists of field observations made by members of the British Columbia Mountain Goat Society and affiliates.

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