

Yukon's forests: Built for fire and bugs



Hilary Cooke / WCS Canada

WHEN fires leave blackened stands of trees or insects chew through vast areas of forest, there is a tendency to think of these forests as having been “destroyed” and dead and dying trees being “waste.” But wildfire and insect outbreaks are a natural part of life in Yukon’s boreal forests (although climate change may be changing frequency and intensity). Indeed, some plant and animal species have evolved to be fully dependent upon stands killed by fire or insects or the early-successional growth that follows.

The complex relationship between natural disturbances like fire or insect outbreaks and various ecological processes and species communities means that rather than seeing disturbed areas as “dead zones” or places with “wasted wood” we should see them as an integral part or stage of the broader boreal ecosystem that needs to be treated with the same care as mature forests.

“Salvage” logging must take into account the ecological values of burned and insect-damaged forests

The concept of “salvage” logging suggests that we are taking trees that otherwise have no value. But even standing dead trees play important ecosystem roles and overharvesting such areas can cause damage to habitats that are valuable for species survival, habitat, and recolonization of species. In certain places, removal of vegetation, including standing or downed dead trees, alters the availability and diversity of habitats for all kinds of organisms, alters ecosystem recovery, and can undermine the resilience of the system to future disturbances.

For the regenerating plant community, post-disturbance logging can lead to damage to existing seedbeds, compaction of substrates vital to germination, and destruction of plant material that survived the initial disturbance or is in the early stages of regeneration. Plant communities can also be altered by microclimatic shifts brought about by the removal of standing dead trees.

Insect life thrives in areas rich with dead or dying trees. Up to 25% of Yukon boreal insects are saproxylic, meaning they are dependent on dead or dying wood



Many insects and birds specialize in post-disturbance forests. Top: white spotted sawyer beetles are among the 25% of Yukon insects that depend on dead or dying wood. Left: Three-toed woodpeckers are drawn to the pulse of insect life in disturbed forests.

Woodpecker: Jukka Jantunen; Beetle: Lynette Elliott

for part of their life cycle. Similarly, pyrophilous — or fire-loving — beetles are some of the first organisms to colonize burned forests, sometimes even before the fire is completely out. Removing large numbers of trees over large areas of a disturbance can have a major impact on invertebrate populations that play key roles in the broader forest ecosystem.

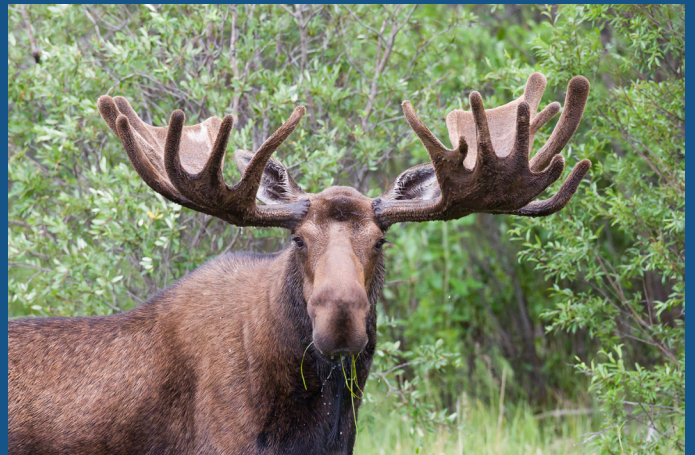
Birds are drawn to insects, while mammals are drawn to new growth

Linked to the fire-loving and deadwood eating invertebrates are the woodpeckers that follow them. Two woodpeckers in particular, black-backed and American three-toed, are specialists of burned forests, taking advantage of the pulse of beetles for food as well as the standing dead trees that can be used for their tree cavity nest. As these and other woodpecker species create a jump in the availability of cavity nests, secondary cavity nesters take up residence.

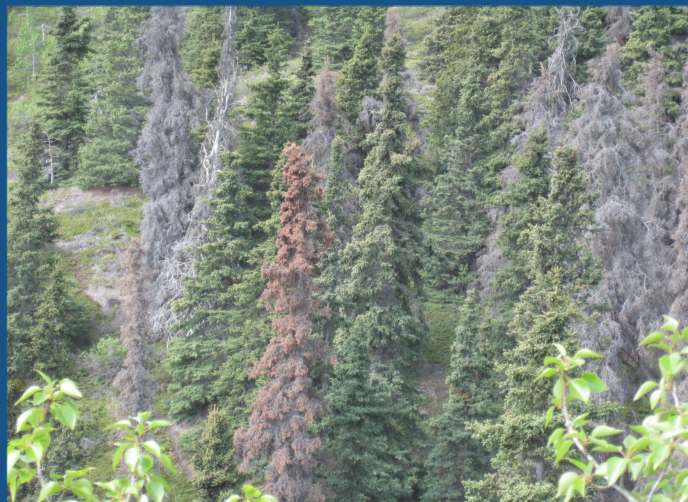
Other birds that benefit from recently disturbed forests include those that hunt insects on the wing (aerial insectivores). They may increase in abundance as regenerating vegetation supports new communities of flying insects and standing dead trees provide foraging perches. Meanwhile, the presence of birds that nest and/or forage on the ground or in shrubs increases once grass, herb, seedling, sapling, and shrub layers have developed. The timing, amount, and type of deadwood removed from post-disturbance forests can have varying effects on the composition and abundances of these different bird groups.

A key species of the boreal food web — the snowshoe hare — also prefers mid-successional forest stands (~15-35 years post-fire), which provide an abundance of food and cover. While not a specialist of recently disturbed forests, hares depend on the early-mid successional stands resulting from natural disturbance events.

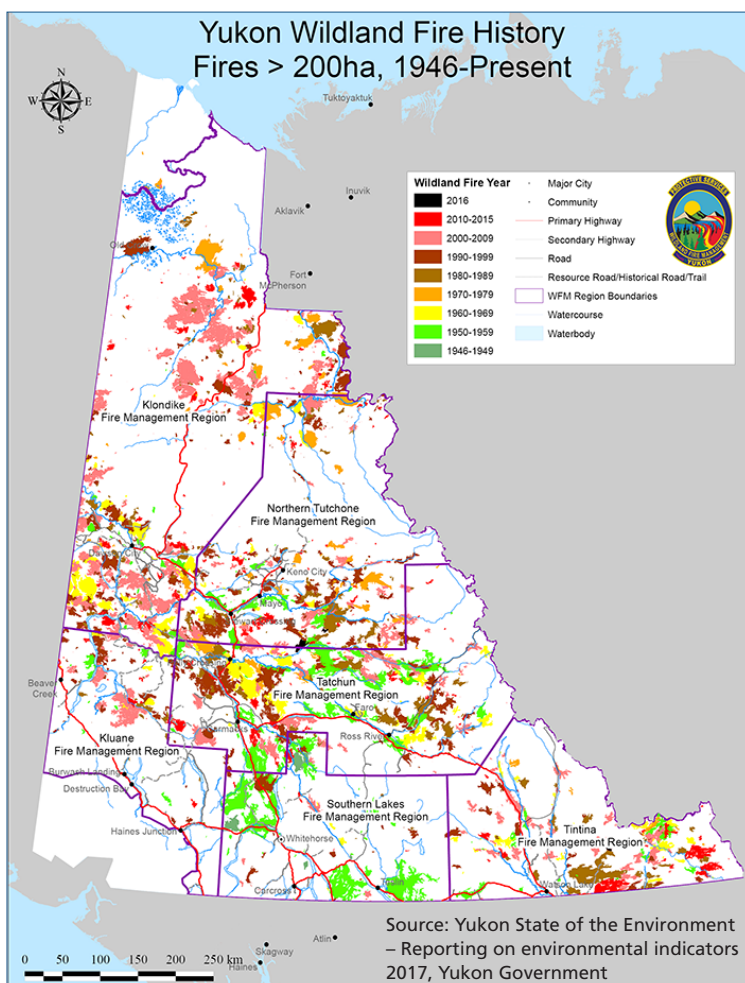
Almost all wood harvesting in Yukon takes place in post-disturbance forests.



Species such as snowshoe hare, moose and tree swallow will move into disturbed areas as habitat conditions change and evolve to take advantage of browse or abundant insects and tree cavities.



Beetle-killed forests (left) will have different conditions than fire-killed forests (right). In particular, beetle killed forests retain more ground and shrub cover and live trees.



Disturbance-generated increases in both grazing and browsing opportunities are generally thought to benefit populations of most large ungulates such as moose, deer, elk and bison. Early- and mid-successional forests (within 1-5 decades post-fire) are particularly favourable due to abundant regenerating grass, aspen, birch, and willow.

With nearly all timber harvest in Yukon taking place in recently disturbed forests, we need to plan ahead in order to not significantly alter the natural processes at work in these areas. And with growing interest in using biomass for heat and energy production in Yukon, we need to think carefully about the consequences of additional – and different – harvest pressures. In comparison to harvest for personal fuelwood, biomass harvesting may include the removal of more small woody debris, such as small diameter tree limbs, that are important to soil building and nutrients.

And while biomass-based systems can be characterized as using a renewable resource, it is the regenerating forest that will ultimately absorb the carbon released by such systems (which can take as long as 75 years). Therefore, it is vital to ensure that sufficient healthy regeneration takes place to more than offset the carbon released by biomass systems, particularly given slower rates of growth in northern forests.

Climate change may lead to more frequent and intense fires. While this may seem like an opportunity to increase salvage harvest, care should be taken to keep natural recovery processes intact.

Fire and Insects:

Managing Naturally Disturbed Forests
to Conserve Ecological Values



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WCS Canada has developed a detailed scientific report on the values of burned and beetle killed forests in Yukon and how we can shape timber harvest (including biomass harvesting) in these areas to protect these values.

Broadly, the report's recommendations include:

- Leave at least 50% of the total Yukon landbase of recently (<10-year) disturbed forests unharvested, while also being sure to preserve a full cross section of forest stand and age types.
- Delay harvest in recently burned or beetle-killed forests for at least three years to allow the pulse of post-disturbance new life to naturally peak.
- Retain patches of live and dead trees (as well as individual live and dead trees), and allow live patches to continue to age and evolve.
- Pay special attention to protecting seeps, springs, ponds, lakes, wetlands, streams, and rivers and other aquatic resources in or near disturbed area as well as other rare or sensitive areas.
- Restrict access to sensitive areas and limit roads. Take particular care not to create erosion problems by harvesting on steep slopes.
- Restrict most harvest to winter and only allow while snow depth is sufficient to protect regenerating seedlings.
- Prohibit harvest from April through July (inclusive) when most reproduction and growth of young-of-the-year occurs.

For the full set of more detailed recommendations, please download the full report at WCSCanada.org.



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