

Old-Growth Forests in Alberta

Defining Characteristics:

- The unifying feature of old-growth is not age per se, but the set of characteristics shared by most forest types in the later stages of maturation. In Alberta, early-maturing species such as aspen achieve old-growth characteristics by 100 years of age, whereas slower-maturing species such as white spruce may require 140 years to reach the same stage.
- Trees in old-growth stands are larger than those in younger stands, and the structure of old-growth stands is also more complex, leading to more unique habitat types. The structural complexity of old stands results primarily from the mortality of individual trees as they reach maturity. Fallen trees cause openings in the forest stand and result in the accumulation of large logs on the forest floor. With time, the stand is comprised of trees of many different ages.

Ecological Importance:

- For some species, advanced tree age is itself a critical attribute. For example, plant species that require a long time for colonization and growth, such as lichens, are often only found in abundance in old-growth stands.
- The accumulation of large dead wood, characteristic of old-growth stands, supports unique groups of wood-decomposing species, as well as providing shelter and food for many other species.
- In more general terms, the complex structure of old-growth stands provides a large variety of habitat types for use by species with specialized requirements. Consequently, old-growth stands in Alberta have the highest diversity of species, relative to other age classes, with representation of many rare species. Furthermore, many species have their greatest abundance in old-growth.

Current Age Structure of the Forest:

- The likelihood of a stand achieving old-growth status depends on the rate of maturation and probability of burning. Both of these factors are influenced by the type of tree species comprising the stand. Aspen stands, which are relatively resistant to burning, are also lost from the old-growth pool through conversion to white spruce stands (which usually takes more than a century).
- In stands that do reach the old-growth stage, the sporadic mortality of individual large mature trees produces gaps that are repopulated by new trees, enabling the stand to persist indefinitely.
- 26.5% of commercial forest stands in Alberta are currently in the old-growth stage, based on government Phase 3 inventory data, and assuming that the old-growth stage is reached by 100 years for aspen, 120 years for pine, and 140 years for white spruce. This is a conservative estimate because the age of old stands is generally underestimated by the inventory interpretation process used to derive stand age from aerial photographs.
- The amount of old-growth predicted on the basis of the known rate of fire is greater than the amount recorded in the inventory. This is additional evidence that our estimates of 26.5% old-growth is quite conservative.

Current Management of Old-Growth:

- Alberta does not have an old-growth conservation policy. Forestry companies preferentially select the oldest stands for harvest because these stands have the greatest tree volume and are at risk of being lost to fire or insect damage.
- The two most progressive forestry companies in Alberta, Alpac and Daishowa-Marubeni, have old-growth retention targets of only 8% for the tree species they primarily harvest. Neither company has an old-growth management plan for achieving these targets. Most other forestry companies have no targets for maintaining old-growth on the landscape.
- Field studies in Alberta on forest birds, insects, and nonvascular plants have all concluded that population declines of specialist species are likely to occur if old-growth is eliminated from the landscape. Other species that are not restricted old-growth, but have their highest abundance in it, will also be affected.
- Finnish and Scandinavian forests, where old-growth stands have been greatly reduced, provide evidence that concerns about old-growth species are well-founded. Overall, it is estimated that forestry operations in these countries have resulted in the decline of many hundreds of species.

A Strategy for the Maintenance of Old-Growth:

- The appropriate quantity of old-growth is defined by the natural disturbance model of forest harvesting. Under this model the target is the amount of old-growth that occurs as a result of natural cycles of disturbance (fire) and forest regeneration. In practice, the best available guide to the natural amount of old-growth, on a provincial scale, is provided by the government's Phase 3 inventory (see above).
- The natural disturbance model can also be used to define targets for the spatial distribution of old-growth. Because individual sites differ in their susceptibility to burning, harvesting should be concentrated where the probability of burning is highest, and sites that are unlikely to burn should be harvested at a very low rate (if at all).
- Another aspect of spatial pattern that needs to be considered is patch size. Large old-growth patches are of particular concern because they are eliminated from the landscape with conventional harvesting practices that utilize small uniformly-sized cutblocks. To avoid such problems, the management objective should be to maintain a natural distribution of patch sizes.
- Achieving management goals for old-growth requires sophisticated long-term planning. Harvest rates and the selection of stands must achieve the desired quantity of old-growth in perpetuity, for all stand types. This implies the need to plan for a constant supply of old-growth to replace old stands that are inevitably lost to fire. Special effort is required to maintain and renew large old-growth patches, as these patches are highly susceptible to fragmentation.
- Until sufficient capacity for long-term planning has been developed, a system of old-growth reserves should be established. Existing riparian buffers and remaining large patches of old-growth provide a natural core for such a system.