

4.0 Effects of disturbances on the Forest

Disturbances are normal to the life of the forest. Forests are able to bounce back and will quickly have some sort of vegetation growing naturally on the site within a year or two of the disturbance.

Disturbances common to the Boreal Forest include:

- fire and wind throw
- flooding
- clear cut / harvest types
- tornado damage
- insect and disease outbreaks
- hail, freezing rain
- hurricanes

Most disturbances caused by weather are generally climate driven such as a tornado in the west.

If a flood occurs on the forest site and is only 3-4 days in duration, the trees are usually able to survive if there wasn't any mechanical damage to the trees.

If the flooding occurred during the dormant season, then there is a great chance of the tree's survival.

4.2 Harvesting techniques in the forest

The means of harvesting the wood in the forest (manual, mechanical, tree length, whole tree) is important, but what is more important is the harvesting method. This the approach used to get the merchantable wood harvested while considering the future stand in the future.

Regeneration

- Before most stands are harvested, there is a plan to visit the site to see if there is a future crop here or if the site needs to be planted.
- Most methods of harvesting try to encourage natural regeneration where possible.
- A downfall of this is that trees come back too thick and need to be thinned out later in life.
- The advantage of natural regeneration is that the genetics of the seed has proven successful in this site.
- Some plantation sites grow trees with strong traits and desirable characteristics. This means trees grow well and yields from typical forests are up to 50% higher.

a. Seed-tree method

-----This method is not used much in Canada.

- This method is used where most trees are harvested with a few superior trees left on the site to provide seeds for the forest to regenerate naturally.
- Trees should be located throughout the site to provide for uniform seeding.

Advantages of seed-tree harvesting:

- cheaper method of forest renewal
- trees are able to adapt to the site by the seed trees
- there is a chance to leave different species of trees on the harvested site
- usually get better genetics from the higher quality seed trees

Disadvantages of seed-tree harvesting:

- difficult to identify good seed trees or are not ideally located for natural seeding
- trees have to be old enough and healthy enough to produce seeds
- seed trees are usually most valuable trees and therefore there is pressure to cut them down
- there is the question of what to do with the seed trees after they perform their function
- the harvested site had to be ideally suited for natural seeding to occur—good soil seed bed, etc.
- this method is more suited for shade intolerant species

b. Shelterwood method

- This method is not used much in Canada.
- This system harvests a part of the stand providing shelter to an understory crop.
- This gives shelter to the understory of the tree until it is ready and large enough to be grown without any shelter.
- As the crop gets older, more of the tree stand is removed and once tall enough, the shelterwood is removed.

Advantages of the shelterwood method

- allows species of shade tolerant trees to grow
- very little erosion happens because there is always something growing there
- most young trees when they are more susceptible die then on this site

Disadvantages of the shelterwood method

- needs knowledge of “leave” trees and open spaces for sheltered trees
- more expensive harvesting because each time you see this site to harvest you need equipment, transportation, road maintenance, etc.

c. Selection Harvesting

- is the method used when only certain trees are selected to be harvested—the biggest and best trees on the site

-----is used in areas where one tree is worth thousand of dollars
-----this practice is used in B.C. and Ontario

Advantages of Selection Harvesting

- there is always a crop on the site so there is little erosion
- harvest takes place every few years because trees are always growing into larger sizes
- the stand will have many age groups and many species of trees
- many high-valued trees are here

Disadvantages of Selection Harvesting

- trees here aren't the best genetics because the best genetic trees get harvested as soon as they can and therefore no seeds were produced
- many forestry circle do not look favorably on "harvesting the best and leaving the rest"
- the return visits each year are expensive
- this site favors shade tolerant trees which means the shade intolerant trees won't reproduce this way

d. Clearcutting

-----this is the choice of most of Canada's forests
-----this is a system where all trees on an assigned area are cut
-----most provinces limit the size of clearcuts and require residual trees to be left on a site
-----these residual trees are for the benefit of wildlife
-----because each tree is not worth much money, it is more economical to harvest many trees as possible

Advantages of clearcutting

- *it allows for aerial seeding*
- *it enables shade intolerant trees such as Trembling Aspen and Jack Pine to grow on harvested sites with little help*
- *it mimics nature as a natural disturbance*
- *it allows a plantation to be established easily*
- *easier management when all species are of the same age and type*
- *is the most economical means of harvesting available*
- *larger areas for site preparation and planting make it cheaper per hectare*
- *less road maintenance costs*

Disadvantages of clearcutting

- could be more erosion if retention trees aren't planted and there is no crop on the site

- this method is not viewed well by the public
- the forest quickly changed, so the wildlife quickly changes too with some leaving and some coming
- this method is not completely understood by the public

4.3 Characteristics Common to Plants that come in after a Disturbance

Plants that come in after a disturbance vary greatly depending

- on the kind of disturbance
- how many damage was done
- in how large an area was the damage in
- For example, if a tree blew down in a storm and fell to the ground and exposed mineral soil, with a hole in the crown canopy, this would not allow light into the forest floor and therefore very few species would grow naturally.
- Species would be **shade tolerant** which means they would like mineral soil and would germinate on exposed soil. Examples would be Balsam Fir and White Spruce trees.
- This same situation would not be of benefit to areas that have been clearcut or burnt over which gives lots of light to the forest floor.
- The more damage there is to the forest floor, the **fewer species** are able to come back naturally. If a fire burnt off the vegetative and organic layer, then mosses would not be able to reproduce in the same way.
- **Plant succession** is the orderly process of one plant community gradually or quickly replacing another.
- **Pioneer species** are those species which first come in after a disturbance. They are usually short-lived, shade intolerant, reproduce quickly and adapt to a variety of sites.
- **Climax species** are the last species on the site and usually regenerate themselves. They are longer-lived, shade tolerant and produce seeds later in life.
- **Climax forest** will regenerate itself (if it does not go through a disturbance) because it has its own shade tolerant seedlings in its understory. It is easier for future vegetation to grow there.

4.4 Seed viability and seeds in the forest floor

- When seeds are able to germinate it is said that they are **Viable**.

- Trembling Aspen is viable for only 2-3 weeks after they have dropped in the spring. If these seeds don't germinate in this time then the seeds are not viable.
- Pin cherry trees can remain viable for over 100 years and because it is a pioneer species it can come in after a disturbance and if conditions are right, the seeds will germinate.
- There are up to 3000 seeds per square m on the forest floor. This means that there are a lot of seeds in the forest floor just waiting to germinate. As we know, different disturbances can cause different seeds to germinate and reproduce on a site.

4.5 Reasons why a forest site may not be naturally regenerated

- Not enough seed source—no seeds in the area
- Insufficient seedbed—the site is not able to grow or support a plant
- Insufficient space to grow—could be slash, blowdown or something that doesn't allow the growth of a seedling.