

Prairie Fire: Windbreak and Shelterbelt Rejuvenation

Prairie fires play an important role in healthy prairie ecosystems by rejuvenating native vegetation, speeding up plant decomposition and return of nutrients to soils as well as slowing invasion of trees. Prairie fires are also a destructive force to our homes, livestock, infrastructure and our livelihood.

All native plants and shrubs are well-adapted to prairie fires and thrive after the fires. Large native trees are usually contained along the large rivers (cottonwoods, black poplar and willows) and prairie coulees (usually on northern slopes dominated by aspen, and in very rare occasion white spruce).

Majority of other trees and shrubs have been planted as shelterbelt and windbreaks. Most common trees species planted in shelterbelts in southern Alberta are:

- spruces (white and Colorado blue spruce),
- pines (Scots, Lodgepole and Jack pine)
- Hardwood species: Cottonwoods, variety hybrid poplar, Manitoba maple, ashes, elms and variety of willows
- Shrub species are dominated by caragana, lilacs, silver buffaloberry, sea buckthorn, saskatoon's and hawthorns

Fire and windbreaks

Planted windbreaks and shelterbelts provide many functions from slowing wind, keep moisture, increase crop yields, protect livestock, reduce snowdrifts and providing wildlife habitats.

One function which is often forgotten is that windbreaks and shelterbelts slow down fast moving and high intensity prairie fires. This slowing down is giving a chance for a fire crew to combat prairie fires. The wider the shelterbelt, the more impact on slowing down the fire. Windbreaks by keeping moisture longer on field and soil will slow down the spread of fire. Keeping these shelterbelts around homes and windbreaks on fields will greatly reduce the impact of the prairie fires.

Fire prevention in shelterbelts

Fire can start in shelterbelts around farmyard. Equipment or tool spark or from firepit can catch dead tree branches or shrub and spread around shelterbelt. Alberta Agriculture and Forestry [FireSmart for Homeowners](#) and [FireSmart Begins at Home Manual](#) - publications are good tools as starting point. There are several activities you may able to do to reduce fire hazards in your shelterbelts including:

- Prune lower dead branches on trees. There is a lot of interior dead branches that needs to be removed as they would be first to catch flames
- Prune tree branches up to 2 meters from ground in yard
- If you have older shrub row with lot of dead stems – remove dead stems individually or cut whole shrub row to be rejuvenated by suckering
- Do not prune during strong winds and low air moisture.

- Avoid using power tools (eg. Chainsaws) as the spark can ignite fire during dry weather conditions
- Use hand tools (pruners, loppers and handsaws)
- Remove branches or tops close to powerline – you may call utility company to perform pruning
- Clean woody debris and combustible shrubs from the ground
- Avoid planting flammable trees next to your house

Rejuvenation of trees and shrubs affected by prairie fire

Depending on the fire intensity and damage, many trees and shrubs may recover naturally either by root suckering or by the seed that falls on the ground. Some non-native shrubs such as Caragana is a nitrogen-fixing legume. After fires, they usually have increased growth which helps restore nitrogen back into the soil.

Management options for windbreak species after fire. Most of the shrubs will regenerate by either root suckering or seeds. The biggest impact for natural regeneration will be how much damage the fire created to shrub stems and roots in soil. If there is a significant shrub stem damage, cutting them to the ground would stimulate roots suckering. If there is little stem damage, new leaf and growth will show up immediately after fire.

Caragana is a hardy non-native shrub that rejuvenates by producing huge annual seed production and by root rhizomes. It is a medium fire-resistant species. It is a prolific seed producer and seeds may stay in soil for years. Once conditions are favorable, new plants will grow from seeds. Roots are dense and wide spread:

- Wait until spring to see how many stems will produce new leaves, flower and later in year seed pods
- If there is no new leaf growth, you may cut burnt stems to ground and new growth should be sprung up either from rhizomes or seeds.



Photos by Garry Murray -MD of Willow Creek – Burnt caragana row

Lilac is also a hardy non-native species that rejuvenate usually by suckering. Roots are dense but shallow. Cut stems six inches above ground to stimulate root suckering and new growth. If there is no suckering, new planting is necessary.

Sea buckthorn is a hardy non-native shrubs. Rejuvenated mostly through profusely suckering. Natural tree regeneration will depend on the species type and amount of damage that the fire caused on trees. Each tree will respond differently when it comes to natural regeneration.

Pines rejuvenation by fire is one of the most common ways to get new pine trees. Heat from fires force pine cones to open and release seeds. Seeds fall on very fertile ground and start growing almost immediately after the fire. Pine bark can sustain some damage by fire. Burnt trees can be used for firewood purposes. Be careful with charred dust particles while cutting wood.

Spruces are not adapted to fire rejuvenation as pines. Fires of almost any intensity kill spruce which include cones and seeds. The natural regeneration from seeds is only occurring when surrounding live trees produce seeds that land on burnt area. Spruce trees produce seeds every 4-8 years. If all spruce trees are burned in fire, the only way to get spruce in your shelterbelt is through tree planting. Use wood for firewood.



Photos by Garry Murray -MD of Willow Creek – Burnt spruce trunks and lower branches

Cottonwoods, hybrid poplars, aspen and willows have an incredible root system and suckering is almost guaranteed after the fire. You will end up with thousands of young suckers.

Manitoba maple is prolific seed and sucker producer. It naturally establishes by seed under a wide range of conditions including immediately after fire disturbance on moist disturbed soil. Suckering is also quite common way to reproduce Manitoba maple. If whole tree burnt roots

will stimulate suckering and roots sprouting. It is also very common that new shoots will come from stump or root crown. Natural regeneration should occur after fire by either seeds, suckering and sprouting

Ash (green and black) trees is also prolific seed producer. Ash seed remains viable in the soil likely for up to 3 to 4 years in the seed bank. Suckering is less common way of regeneration. Stump sprouts are occasionally after tree was cut. Natural regeneration should occur after the fire most likely through seeds.

Elm trees are more fire resistant due to tick bark. American elm is a prolific seed producer. Very seldom stump sprouts development. If whole trees is burnt, tree planting is recommended

Conclusion

Prevention of fire is first step to consider. Proper pruning and maintenance of shelterbelts and windbreaks is key to reduce possible fire in your yard. Most of shrubs either naturally occurring or planted would be able to natural recover after fires either through seeds and suckering. Harwood species are fairly fire resistant due to high level of moisture in them. Coniferous species like pines, spruces, firs, junipers and cedars are more fire susceptible. Except pines most of the coniferous species may need to be replanted. Use wood for firewood with caution due to burnt particles.

Do not remove windbreaks on your field as they will slow down the spread of the fire. You may consider to plant trees and shrubs(green belt) around rural communities to protect communities from fast moving prairie fire.