

## of wagner natural area

If you look to your left as you approach Wagner Natural Area heading west on the Yellowhead Highway (Highway 16) from Edmonton you will see the unmistakable dark-green shapes of coniferous trees.



What are these trees doing here in the middle of farmland and the industrial hinterland of a large city? Well, they are here because of water. The trees grow on a very gentle slope (northwards towards Big Lake). On this slope underground water issues from the ground surface in springs. It saturates the soil and pools in shallow, clear, ponds with a whitish bottom known as marl ponds. In these waterlogged soils plant remains cannot decay and so build up as peat. The result is a mixture of treed and open wetlands like those you are more likely to see farther north, in the northern, or boreal, forest. The land is too wet for farming, although some of the trees were logged in the past. In drier surrounding areas, poplars and other broad-leaved deciduous trees grow. As long as the springs continue to flow, Wagner's mix of conifers and deciduous trees, and the many other living things that find a home here, will continue to thrive!

WAGNER NATURAL AREA SOCIETY

**Wagner Natural Area Society**

Provincially-appointed Stewards of Wagner Natural Area

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Wagner Natural Areas Society is a non-profit society. All donations to the Society are greatly appreciated and are used for public education and maintenance of the Natural Area

CRA B/N 119287522 RR 0001

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**COVER PHOTO** Boardwalk along the Marl Pond Trail in Wagner Natural Area (early spring)

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## Key to Tree Species

### Conifers

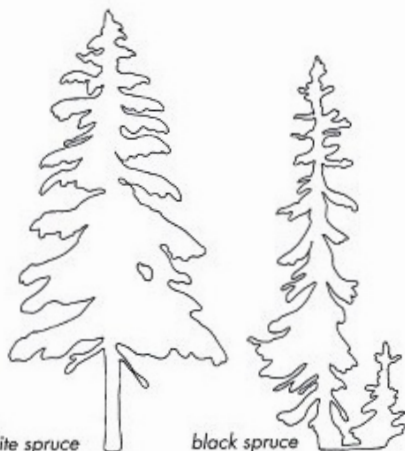
*Leaves needle-like, seeds in cones; evergreen except for tamarack*

- ① Needles in bundles of 10-20, soft, bright-green; turning yellow in autumn and falling all at once off tree (deciduous).....tamarack
- ① Needles single on the twig; dark-green, not falling all at once in autumn (evergreen)..... ②
- ② Cones 2.5 – 5 cm long, cylindrical to long-egg-shaped, young twigs pale brown and smooth..... white spruce
- ② Cones about 2.5 cm, egg-shaped; twigs dark and hairy..... black spruce

### Deciduous Trees with True Flowers (Flowering Plants)

*Leaves broad, thin and flat; seeds enclosed in fruit (although fruits of alder resemble cones)*

- ③ Trees with white, papery bark peeling in strips.....Alaskan birch
- ③ Bark not white and papery and peeling in strips..... ④
- ④ Leaves deeply cut and toothed, with obvious veins, fruits in small woody "cones" ..... river alder
- ④ Leaves not deeply cut, veins not so obvious; fruits in long catkins, seeds with cottony tufts for dispersal..... ⑤
- ⑤ Leaves triangular, with flattened stalks; trunk smooth, whitish or yellowish (at least higher up, and in younger trees)..... aspen
- ⑤ Leaves broadly oval, with round stalks; trunk furrowed .....balsam poplar



white spruce

black spruce

## White Spruce *Picea glauca*

### PINE FAMILY – PINACEAE

You can easily tell a white spruce by grabbing hold of its twigs! Did you say "Ouch"? Yes, those narrow leaves are called "needles" for a reason. They end in a point that is stiff enough to be prickly. See if you can find a twig that has lost its needles. Do you notice the little bumps or pegs along the twig? The needles were attached to them, and these little pegs give you another clue that you are looking at a spruce tree.

Spruces are evergreen, cone-bearing (or *coniferous*) trees with needle-like leaves. They don't have proper flowers like, say, mountain ashes or poplars, but instead produce cones that will either produce pollen or seeds. In June look for the small narrow cones that produce yellow pollen (these are the

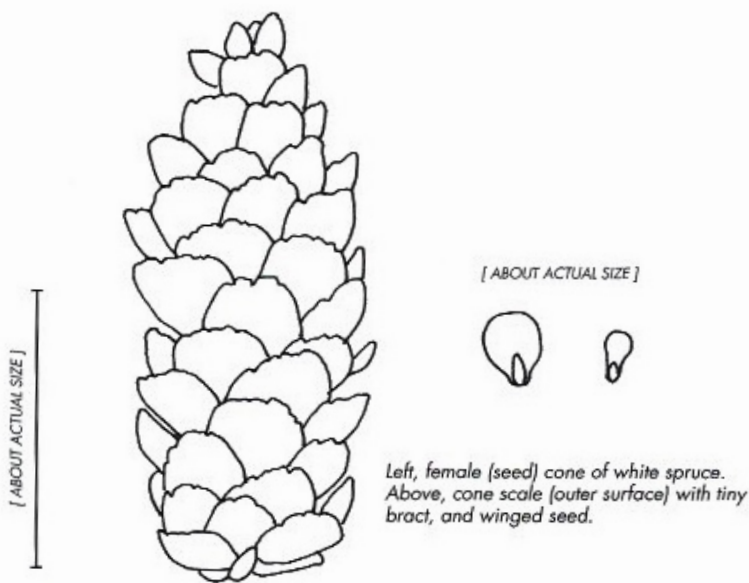


*White spruce twig with male (pollen) cones*

male cones) and the larger purplish cones that will become the brown, seed-bearing cones that litter the ground in the fall. Prise open the woody cone scales (they look a bit like overlapping tiles) of a recently fallen cone to find the seed. It consists of a tiny nut at the bottom of a brown, papery "wing." Why might it be a good idea for a seed to have a wing?

You often see whole twigs with cones lying on the ground in the fall – the work of red squirrels stocking up food for the winter. As you walk along the Marl Pond Trail look for signs of the squirrels' hoards – piles of cone scales, often around the base of spruce trees. It takes the seeds from about 12,000 spruce cones to sustain a squirrel through the winter.

White spruce does not like the ground to be too soggy, so you will find it at the edge of the forest in Wagner and along the fields. As you drive home, notice how many white spruce are planted around farms and in gardens; their lovely spire shape makes them good ornamental trees and they provide shelter from the wind.



Left, female (seed) cone of white spruce.  
Above, cone scale (outer surface) with tiny  
bract, and winged seed.

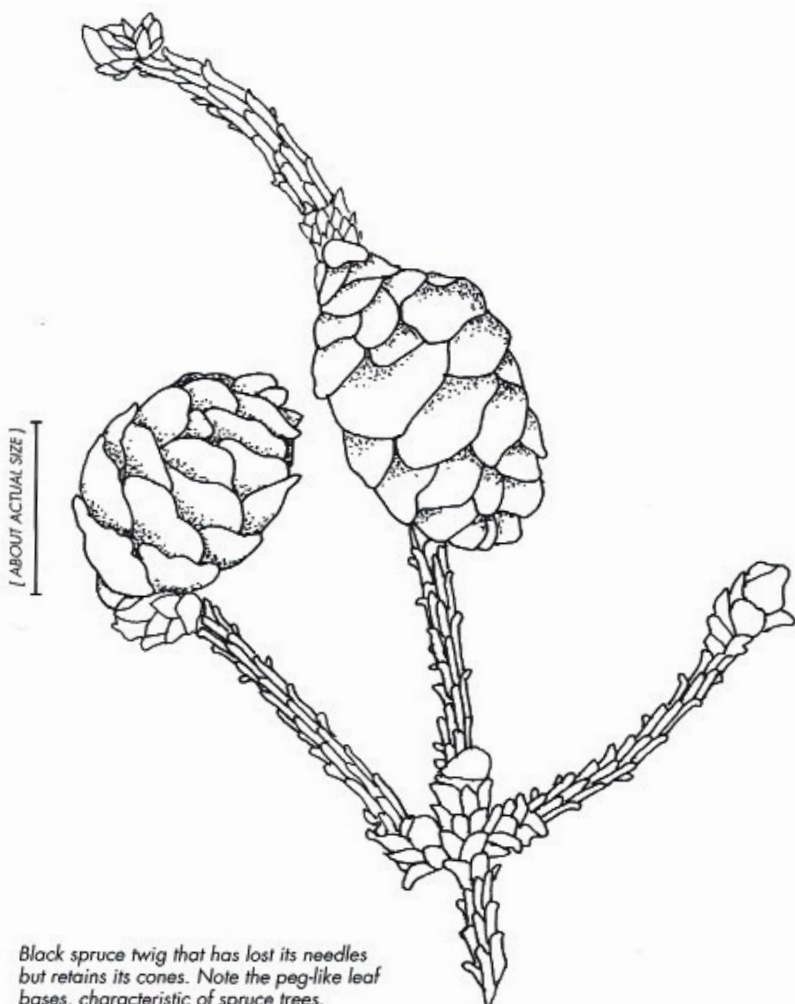
## Black Spruce *Picea mariana*

### PINE FAMILY – PINACEAE

This is the spruce you see in Wagner fens (open grassy or bushy areas, with marl ponds). It is a narrower tree than white spruce, and is often topped by a cluster of branches that look a bit like a crow's-nest. Pick up a twig from each of black spruce and white spruce and compare them. The twigs of black spruce will look dark and hairy; those of white spruce are smooth, glossy and lightbrown. Their cones are different, too. Black spruce cones do not fall off the tree when they are ripe, so look for them on old branches that have been blown off the tree, or on fallen trees. Black spruce trees often grow in sphagnum moss, which can grow very fast and smother their roots. If their lower branches get overgrown by moss they can put out new roots and shoots enabling the tree to keep pace with the moss growth.

Notice how lumpy the ground is under many of the black spruce trees. This is because the soil is very wet. Freezing and thawing during winter and spring cause the ground to heave and form these hummocks and hollows. The trees sometimes lean because of this heaving. If the ground gets too wet, for example, if beavers build a dam and cause flooding, the tree roots will die from lack of oxygen. Have you ever noticed a "forest of sticks" (dead trees) standing in the middle of a beaver pond?

Black spruce have very shallow roots. What do you think is the advantage of this, and what would be the disadvantage?

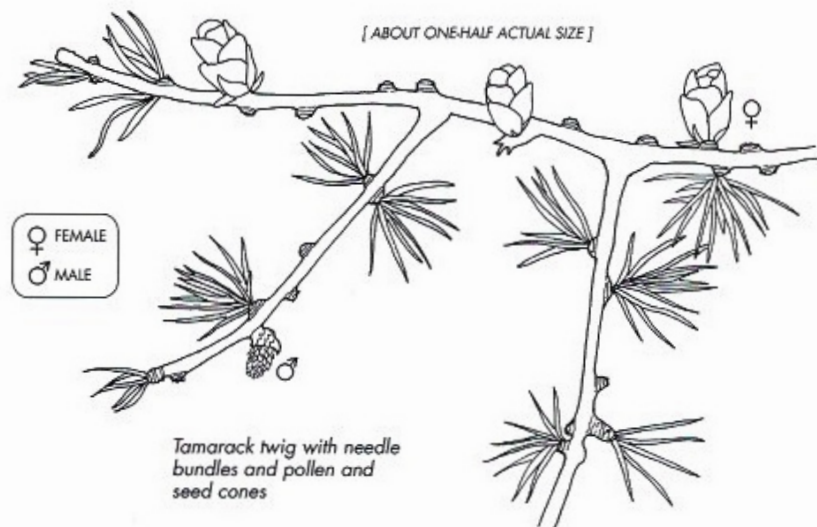


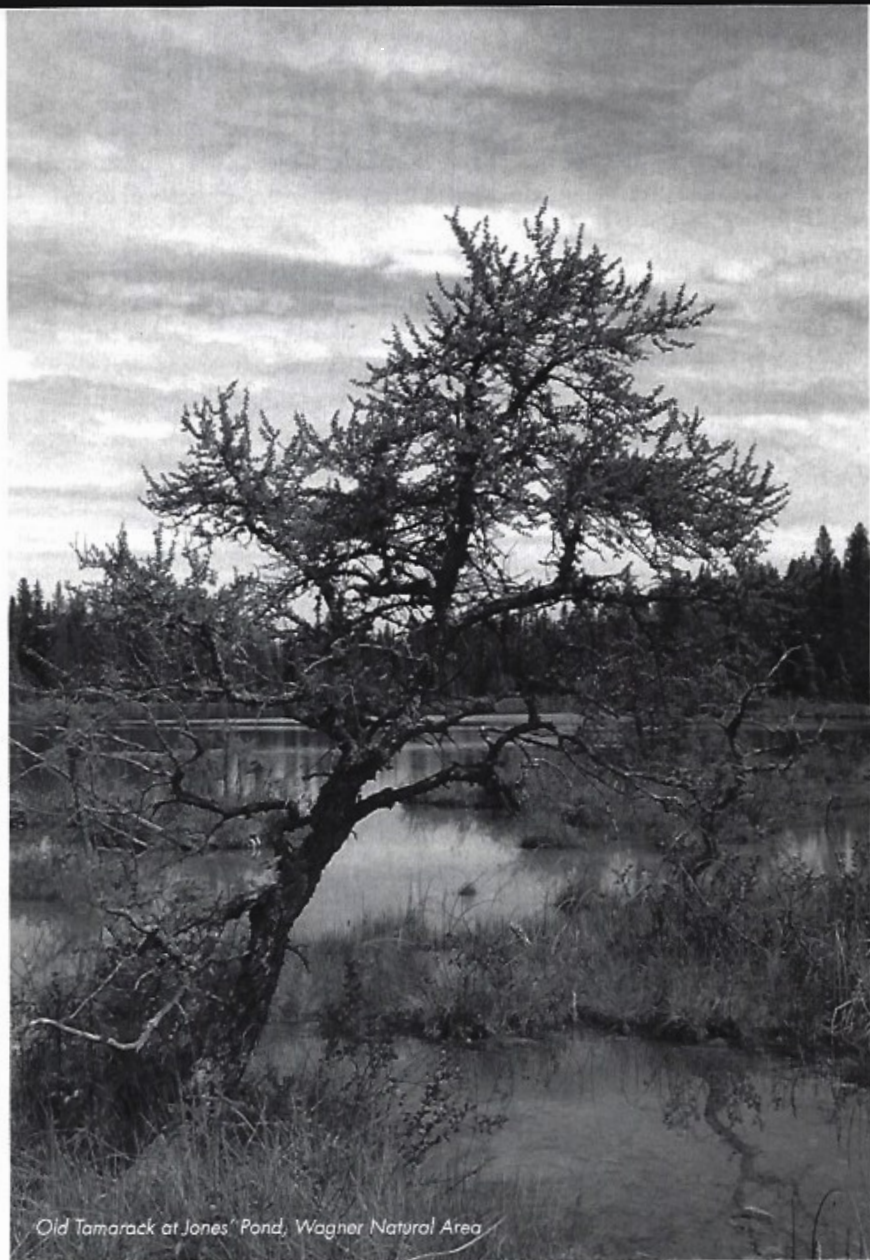
## Tamarack *Larix laricina*

### PINE FAMILY – PINACEAE

Black spruce and white spruce are evergreen trees, that is, they do not lose all their leaves at once in autumn and get a whole new crop in the spring. (The trees that do this are called deciduous, and they usually have broad, flat leaves, not needles.) Tamarack, a member of the larch (*Larix*) genus, is unusual for a coniferous tree because it does lose its leaves all in one go. In the fall the needles turn a beautiful golden-yellow before falling off, and in the spring you can easily pick out the tamaracks because they are draped in a lovely fresh green. Another difference is that the needles of tamarack are formed in clusters of about 10 to 20 on short shoots, and they are flat and soft. Like the spruces, they have shorter pollen-bearing (male) and seed (female) cones on the same tree, and winged seeds within the cones. Like black spruce, their habitat is the fens or the wetter forests.

Take a moment to admire some of the old, gnarled and twisted tamaracks at the marl ponds along the Marl Pond Trail. Some of the tamaracks in Wagner Natural Area are known to be older than 300 years!



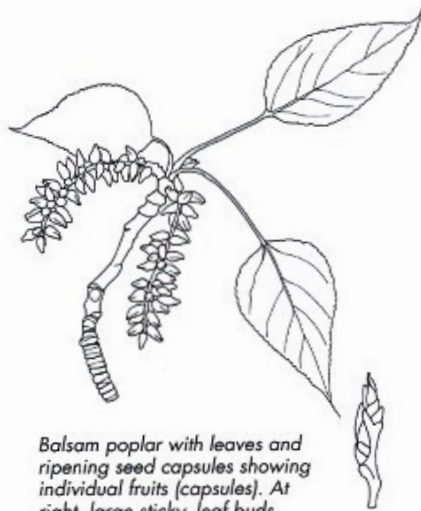


*Old Tamarack at Jones' Pond, Wagner Natural Area*

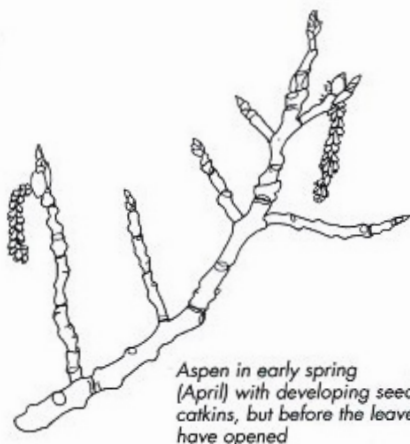
## Balsam Poplar and Trembling Aspen

WILLOW FAMILY – SALICACEAE

The poplars are deciduous trees, losing their leaves all at once in the fall. Two species of poplar tree grow in Wagner: balsam (or black) poplar and aspen poplar, the latter also known as trembling aspen. They may grow together, such as at the beginning of the Marl Pond Trail but, generally speaking, balsam poplar likes wetter ground than aspen. (To see some really old balsam poplar trees, check out the flat bottomlands of the river valley in Edmonton.) You can easily tell the two poplar species apart by their differently shaped leaves. Balsam poplar also has the large, sticky brown buds that smell so nice in the spring and summer. How might stickiness help the tree? (Think



*Balsam poplar with leaves and ripening seed capsules showing individual fruits (capsules). At right, large sticky, leaf buds.*



*Aspen in early spring (April) with developing seed catkins, but before the leaves have opened*

[ ALL ABOUT ONE-HALF ACTUAL SIZE ]



*Aspen twig with leaves*

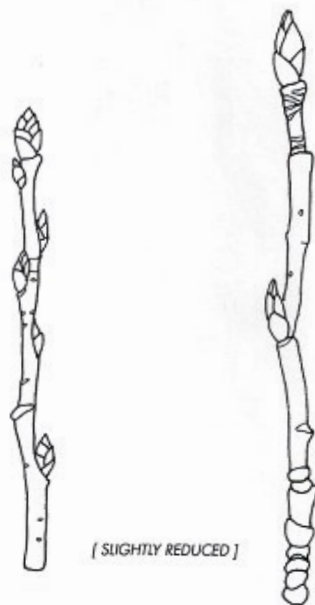
*Populus balsamifera* and *Populus tremuloides*

about varnish on wood.) Balsam poplar has a grey, deeply grooved bark, whereas aspen has smooth whitish bark (except at the base of the trunk in older trees). Both poplars produce their flowers (tiny and numerous) in catkins, with the pollen-bearing catkins on one tree, and the fruit-bearing catkins on another. The seeds have little tufts of hairs to help them disperse by wind. When the small green fruits (called capsules) open all at once in June the air may be filled with poplar "fluff." Both trees flower in April before their leaves are out. Can you think why the tree might want to shed its pollen before the leaves get in the way? (Pollen, like the seeds, is dispersed by wind.)

And why might it want to scatter its seeds so early in the summer?

Although they produce lots of seeds, neither kind of poplar relies on them to reproduce, because the conditions required for germination are tricky. Instead they produce shoots (suckers) from their roots. These suckers are easily seen as the young trees at the edges of the fields and at the start of the Marl Pond Trail in the woods.

Birds, such as ptarmigans, grouse and even waxwings, eat the buds of poplars, and many insects feed on their leaves. Beaver love to eat the bark of both types of poplar. Like the conifers, these trees are also killed by flooding caused by beaver dams.



Winter twigs of aspen (left) and balsam poplar (right)



*Pollen-bearing catkin of aspen, showing emerging stamens and hairy bracts*



*Balsam Poplar with young leaves and seed catkin showing individual fruits (capsules) before they split and disperse their seeds. Note the deeply furrowed bark on this mature tree.*

## Alaskan Birch *Betula neoalaskana*

### BIRCH FAMILY – BETULACEAE

A slender, deciduous tree, Alaskan birch is very similar to paper birch (*Betula papyrifera*). Both are easy to recognize because of their white, papery bark, peeling in strips. The twigs are usually densely covered with resin dots. In the birches, the tiny flowers also develop in catkins but, unlike the poplars which have separate sexes, here the pollen-producing and seed-bearing catkins are produced on the same individual tree. Watch for the long yellow tassels of the pollen-shedding catkins in mid-May, and the shorter, narrow, upright, green seed catkins as they swell during the summer and eventually droop and turn brown.

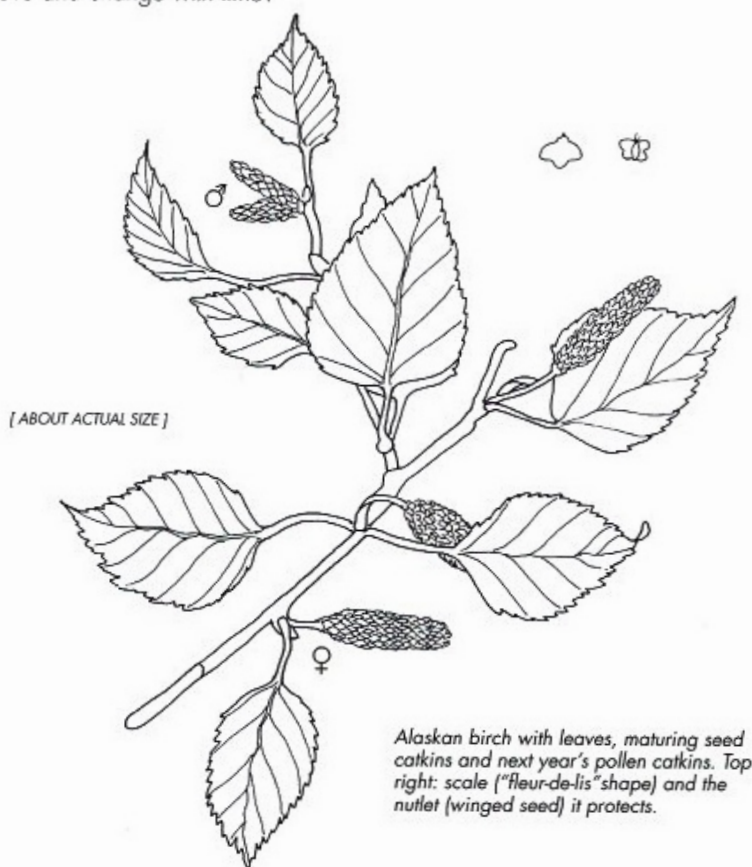


[ ALL ABOUT ONE-HALF ACTUAL SIZE ]

Alaskan birch twig in May, showing pollen-bearing catkins, young seed-bearing catkin below it and opening leaves. Note the resin dots on the twigs.

Break apart a seed catkin to find the tiny brown fruits, called nutlets, consisting of a central seed with a thin wing on each side, and the thicker, three-lobed scales, like miniature fleur-de-lis, that hold them in place. Seed catkins often stay on the tree all winter and provide food for birds such as pine siskins and redpolls.

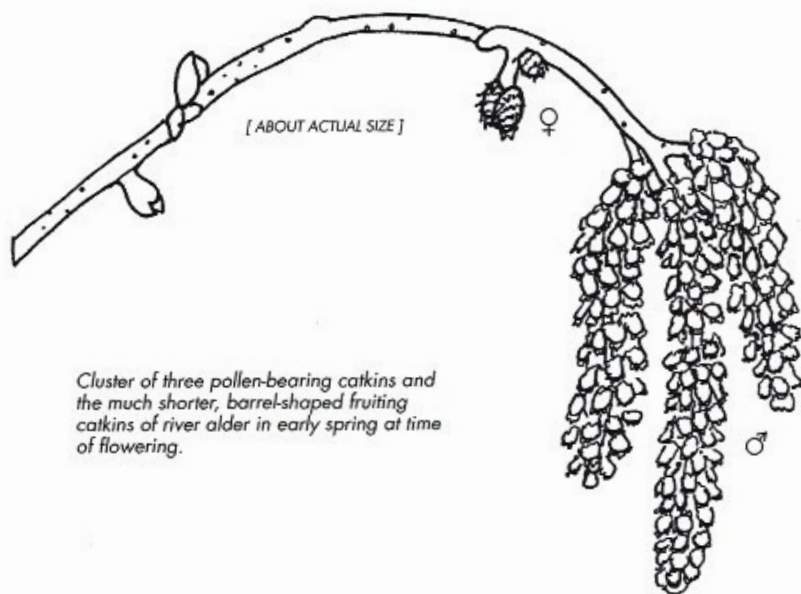
Notice that there are some old, dying birch trees near the north end of the Marl Pond Trail and young birch growing in the fields or at their edges. Why do young birches grow in more open ground? Do you think the forest can move and change with time?



## River Alder *Alnus incana* subspecies *tenuifolia*

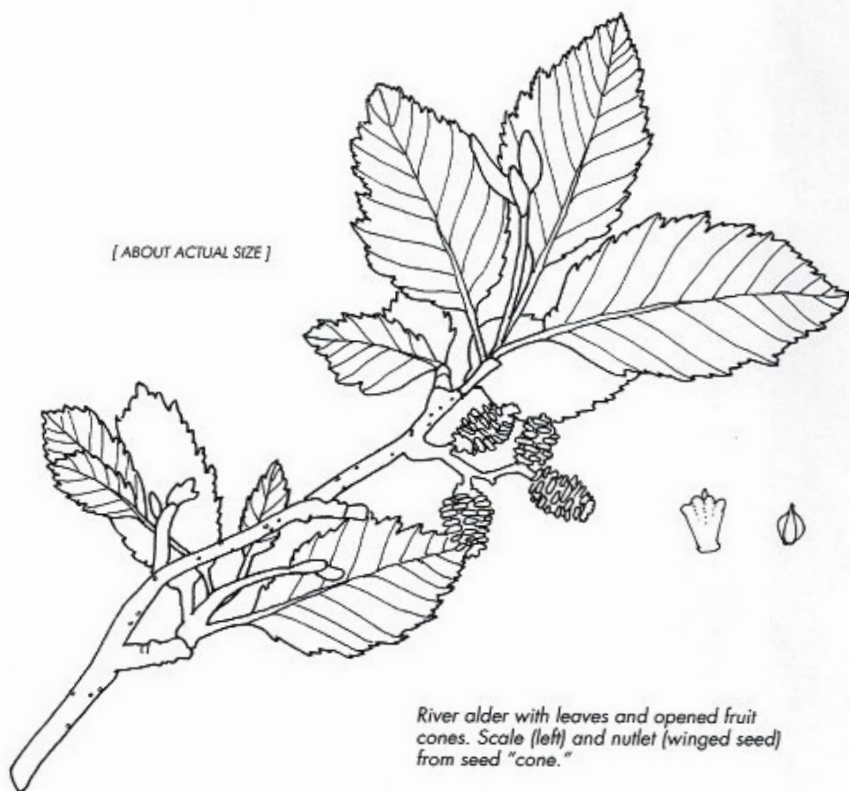
BIRCH FAMILY – BETULACEAE

Look for this tall shrub or small tree around the edges of the field at the north end of the Marl Pond Trail. Its leaves are a bit like those of the birch (to which it is related) in size and shape, with obvious teeth and veins. Male (pollen-bearing) and female flowers occur in separate catkins but on the same tree. They can be in flower as early as late March, but always open before the leaves appear. The male catkins are long and dangling at the time of pollen-shedding. The shorter, crimson, female catkins, usually on the same twig as the males and like them occurring in small clusters, develop into little barrel-shaped "cones" that are not the same as the true cones of spruce and tamarack. (They are condensed, woody versions of the seed catkins of birch.) The "cones" contain many nutlets (which are fruits, each consisting of a seed with a narrow wing), each one sitting inside a protective woody scale.



Cluster of three pollen-bearing catkins and the much shorter, barrel-shaped fruiting catkins of river alder in early spring at time of flowering.

Notice the smooth, dark bark of this tree, which is dotted with obvious white lines, or lenticels, which help the bark to breathe. This tree grows well in waterlogged soils, having an ability to fix atmospheric nitrogen by means of bacteria living in its roots. River alders are common along creeks flowing through the ravines and on the floodplains of the North Saskatchewan River.



## Further Reading

- Johnson, D., L. Kershaw, A. MacKinnon, J. Pojar. 1995. *Plants of the Western Boreal Forest and Aspen Parkland*. Edmonton, Lone Pine Publishing.
- Farrar, J.L. 1995. *Trees in Canada*. Markham, Ontario, Fitzhenry and Whiteside, and Ottawa, Ontario, Canadian Forest Service, Natural Resources Canada.

*Mature cones of  
White Spruce,  
Wagner Natural  
Area*





## trees of wagner natural area



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