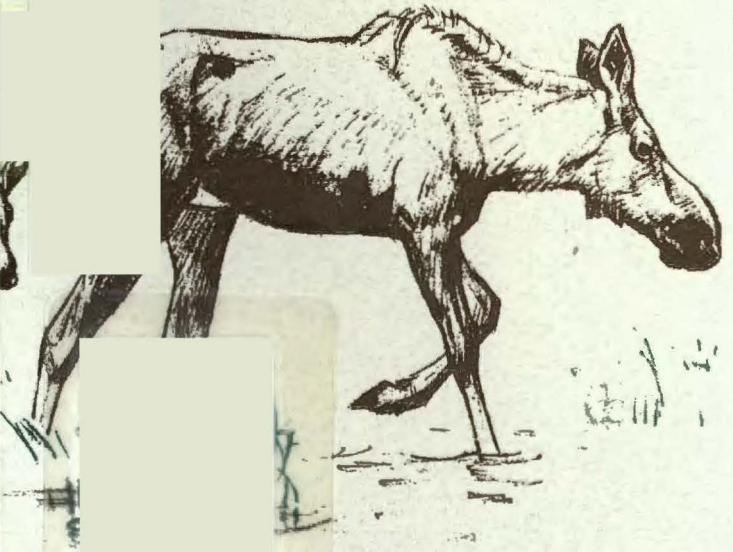
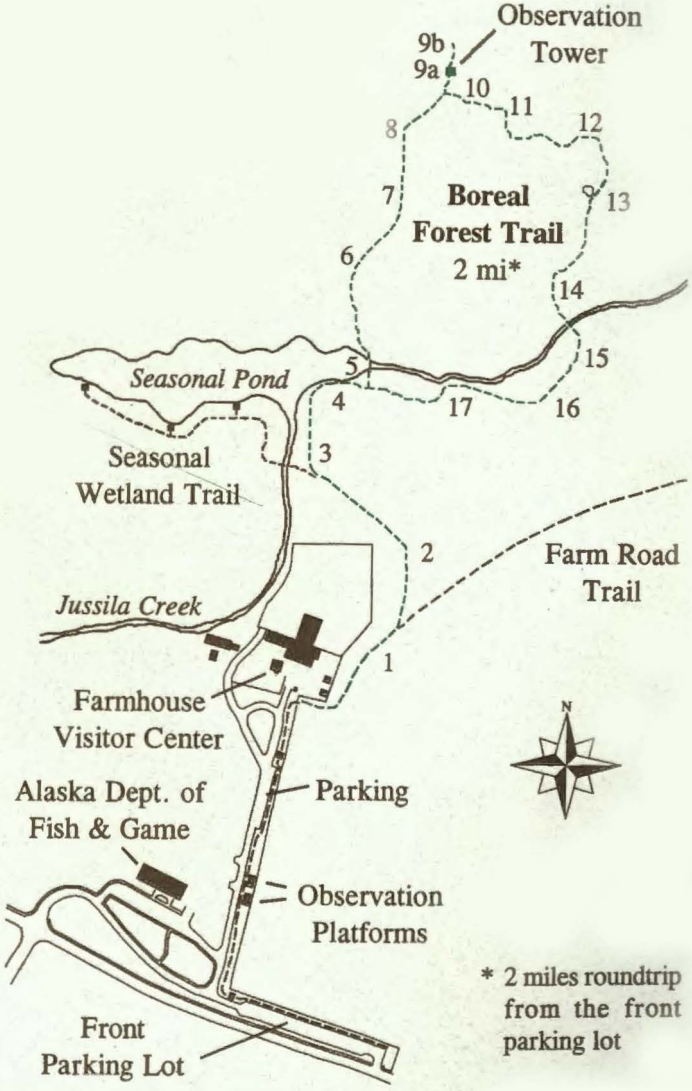
The Boreal Forest Trail

discover nature's treasures



Creamer's Field **Migratory Waterfowl Refuge**


Observation Tower
9b
9a
10
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Boreal Forest Trail
2 mi*
13
6
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Seasonal Pond
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4
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16
Seasonal Wetland Trail
3
2
Farm Road Trail
Jussila Creek
1
Farmhouse Visitor Center
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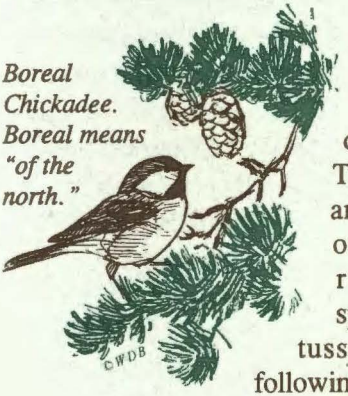
Alaska Dept. of Fish & Game
Parking
Observation Platforms
* 2 miles roundtrip from the front parking lot
Front Parking Lot

Welcome to

The Boreal Forest Trail



Boreal Chickadee. Boreal means "of the north."

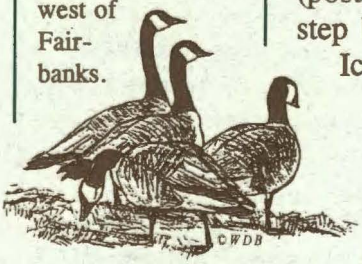
The 2 mile trail winds through a small sample of the largest land ecosystem on Earth ~ the boreal forest. This subarctic forest stretches around the northern latitudes of the world with habitats ranging from birch and spruce stands to bogs and tussock meadows. Use the following trail guide and key of local trees while you explore the "forest of the north."

Creamer's Field ~ A Changing and Diverse Landscape

For thousands of years, changing climate, geological activity, fire, ice, and people have been molding and shaping the land we now call Creamer's Refuge. Many of these influences continue to alter the landscape today. As a result, Creamer's now contains an extraordinary collection of plants, wildlife, and geologic features.

How do past conditions influence what's found here today? How is the landscape still changing? Creating a picture of the past will help give us clues to the answers. As you walk to the first stop (post #1), imagine taking a step back in time to the last Ice Age.

Spectacular concentrations of geese and ducks occur in these fields in spring and fall. Birds stop to rest and feed at Creamer's Field as they migrate to and from their nesting grounds north and west of Fairbanks.



1 A Dusty & Windy Past

It's a cool summer day about 18,000 years ago, and you are standing near a small herd of wild ponies overlooking an extensive, arid grassland called a

mammoth steppe. There are no forests like those you see today. The growing season is too short, and there isn't enough rainfall to support trees. Instead, patches of grasses, sedges, sages, and small willows fan out among the rolling sand dunes and rustle in the dry wind sweeping down from the Alaska Range.

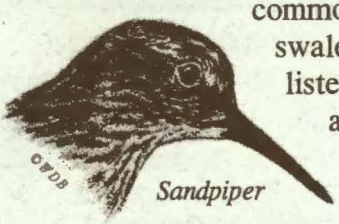
Scan the fields for sandhill cranes. For over 9 million years, cranes have followed the same migratory paths and gathered in grassy, open areas to feed on grains and insects.

2 *Rivers Fill the Valley*

As time passes and you return to the present, the land continues to change before you. Rivers meander through the valley, reworking the landscape and depositing gravel, sand, and silt. Depressions where the Tanana and its sloughs (slow-moving side channels) once flowed can still be seen today. The shallow depression (swale) in front of you is a remnant of one of the many channels left by a river. Look out over the fields. Can you find other abandoned stream channels?

In spring these swales still serve as local drainages and shallow, temporary ponds. They provide feeding sites for thousands of ducks, geese, cranes, and

shorebirds. Lesser Yellowlegs and sandpipers are commonly sighted in this flooded swale. In summer, look and listen for Savannah Sparrows and swallows.



Sandpiper

3 Interior Alaska ~ An Ice Age Refugia for Plants & Wildlife

During glacial periods when most of the northern world was buried under huge ice sheets, parts of Interior Alaska were free from glaciers and full of life. Interior Alaska is the only subarctic landscape in North America which has been continuously covered with vegetation throughout the past 3-4 million years. As a result, this area has served as a biological refugia, an isolated area where many plants and animals could survive through the glacial periods.

Interior Alaska's history as a refugia has had long-lasting effects. Vegetation has not had to reestablish itself following each glacial advance. This has helped create some of the greatest diversity of plants and wildlife found at this latitude.

Walk quietly to the next stop. In spring the seasonal pond attracts moose, songbirds, grebes, mallards, pintails, and other ducks.

4 Rushing River to Seasonal Pond ~ Wetlands Change Over Time

Ten thousand years ago, you would have been standing at the edge of a river. This long depression is all that remains today. After the river changed course, the old channel began to gradually fill in with dead plant material. This organic matter builds up because decay is slow in these cold, wet soils. As the depression continues to fill, new plants will dominate this site. Willows and alders are gradually replacing the grasses, sedges, and rushes growing here now.

Blooming wild irises line the pond edges June to mid July.

5 Where Did the Pond Go?

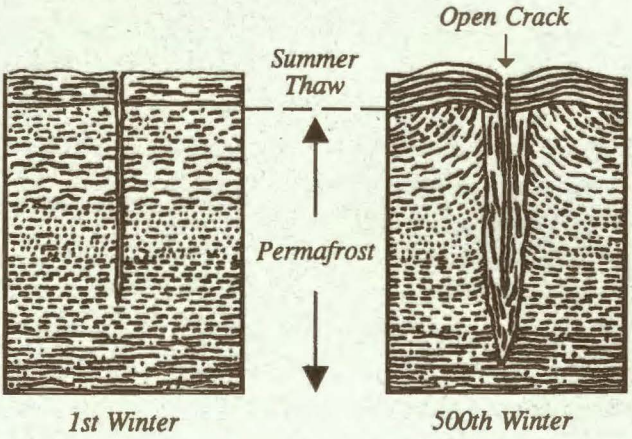
Each spring runoff water floods this low-lying wetland and forms a temporary pond. The frozen soil beneath the pond acts as a seal and prevents water from soaking into the ground. By mid June, the frozen ground thaws and the ponded water seeps into the earth, disappearing from sight.

When water is present, this pond is filled with life. From late April through early May, listen for the whistling of American Wigeon and the quacking of Mallards. Croaking wood frogs join the chorus in early May. Look for Lesser Yellowlegs catching aquatic insects along the pond edge.

6 Ice Wedges Shape the Land

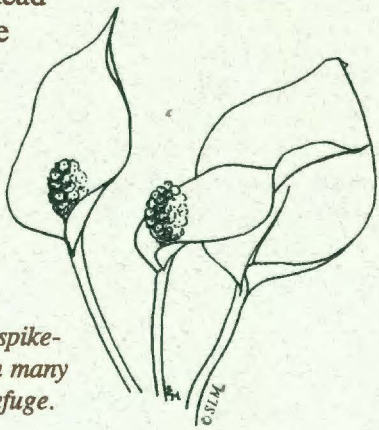
In the far north, ice wedges play an active role in forming the landscape. Ice wedges develop when the ground contracts and cracks during a cold winter. Water seeps into the cracks the following spring and freezes in the permafrost (permanently frozen ground). As the permafrost warms and expands during the summer months, it is unable to return to its former position because it has been displaced by the ice wedge. Instead, the expanding permafrost pushes upward and outward, causing the ground to rise and buckle around the ice wedge. Ice wedges slowly grow as the cycle is repeated over many years.

If ice wedges begin to melt, the overlying soil subsides and forms troughs like the one at this stop. This trough has become a drainage for rainwater and snowmelt. As water continues to melt the ice wedge, the ground may subside even further.



7 Can Fire Create Wetlands?

Subarctic forests frequently grow on soils underlain by ice-rich permafrost. Following a fire, the ground often warms up from increased exposure to sun and rain. Trees no longer shade the ground, and the insulating organic layer has been removed. After a fire swept through here in the early 1950s, permafrost near the surface melted. The soil subsided and left a depression which collects snowmelt and rainwater. This pond, called a thermokarst, has nearly filled in with dead vegetation. Soon the plants surrounding the pond may invade and take over the area. Look for other thermokarst ponds ahead.



Wild calla lilies with white spike-like flowers are abundant in many thermokarst ponds on the refuge.

8 Ice Wedges Influence Plant Communities

Over time, the cracking, thawing, freezing, and uplifting of soil associated with ice wedges gives the ground a hilly appearance. These slight differences in elevation provide a gradient of habitat conditions.

Dwarf Dogwood

Horsetail and mosses dominate the damper troughs, while grasses, wild rose, and dwarf dogwood grow on the drier mounds. Hills and troughs created by ice wedges dominate the landscape along much of this trail. As you continue along the path, can you find other ice wedge sites?

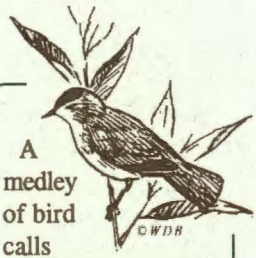
Horsetail's thin leaves grow from joints in their hollow stems. Tree-like relatives grew when dinosaurs still roamed the earth some 200 million years ago.

9A Transition Zones ~ A Diversity of Wildlife Habitats

Climb the observation tower to get a view of the transition zone (ecotone) between the birch forest you just walked through and the black spruce bog north of the tower. In an ecotone, a variety of food and shelter is found within a relatively small area. As a result, ecotones attract a diversity of wildlife.

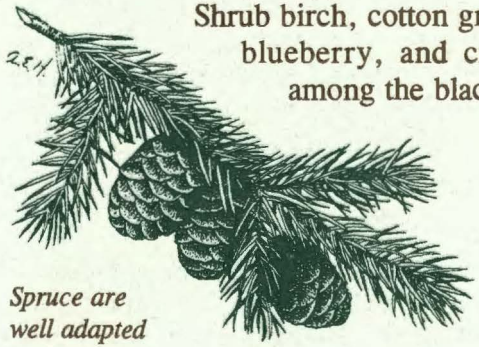
9B A Walk Through an Ecotone

As you walk north from the edge of the birch stand, you enter a tussock/shrub habitat. Cotton grass, a type of sedge, colonized this area following a fire and formed these tussocks or mounds over many years. Today a tangle of willow, dwarf birch, and Labrador tea grow atop many of the mounds. The young birch trees scattered in this area indicate the birch forest to the south is slowly extending northward into the tussock/shrub habitat.



A medley of bird calls greet you in spring and summer. Look for Alder Flycatchers and Orange-crowned Warblers in the shrubs and birch trees and Lincoln Sparrows in the black spruce bog.

Further on, you approach stunted black spruce. Shrub birch, cotton grass, bearberry, blueberry, and cranberry grow among the black spruce.



Spruce are well adapted to the limited nutrients of thin northern soils. Unlike deciduous trees which shed their leaves annually, spruce conserve energy and precious nutrients by keeping its needles for 4 years or more.

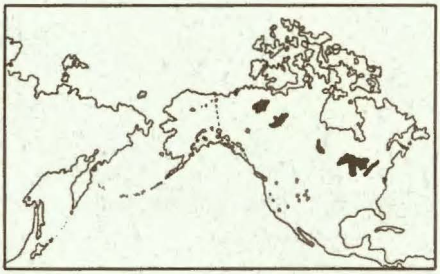
10 Birch ~ Evidence of Alaska's Past

Over the past 3 million years, Earth's climate has alternated between warm and cold periods. Glaciers melted and shrank in size during the warm periods and grew and advanced during the cold. As more water was trapped as ice in the expanding glaciers of the cold periods, the sea level dropped and the Bering Land Bridge was exposed (see map on next page). This bridge repeatedly connected Alaska with Asia and provided a migration route for plants, animals, and people.

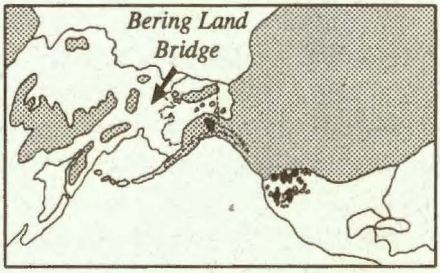
Today communities in Interior Alaska are made up of plants and animals from two different worlds. Birch, one of the many plants of Asian origin, invaded Alaska via the Bering Land Bridge some time ago. At the end of the last Ice Age, it began to flourish in the warm, moist climate and to dominate the new forests much like it does now in this area. Birch, along with plants and animals of North American origin, are part of the diverse communities of Interior Alaska.

Even though the Alaska paper birch now shares the same land mass as populations of birch further east, genetically, it is more closely related to birch in Siberia.

The earth has spent about 90% of the past 3 million years in glacial conditions. Two-thirds of the world's ice has melted since the height of the last Ice Age.



Present Conditions



Maximum Glaciations

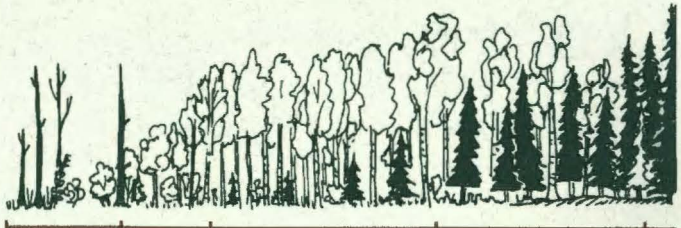
■ *lakes*

□ *glaciers*

11 The Boreal Forest ~ A Fire-Driven Ecosystem

Fire is a natural part of the boreal forest ecosystem. Most areas in Interior Alaska burn every 100-200 years. Because fire is now suppressed in the Fairbanks area, the small area to the left of the trail was burned to simulate a wildfire.

Nature's revegetation following fire is accomplished by a process called succession. Succession is a natural progression in which one plant community or successional stage gradually replaces another.



In Interior Alaska, succession typically begins with grasses and wildflowers colonizing the burn. Within a few years, a thicket of shrubs and saplings begins to overtake the colonizers. Eventually these saplings become a deciduous forest of birch, aspen, and poplar.

The stand to the right of the trail burned in the early 1950s and is presently in the deciduous forest stage of succession. In 50-100 years, the burn will probably look similar to this birch stand. Change, however, does not end here. The small, shade-tolerant spruce growing beneath the birch canopy will dominate the forest of tomorrow. Unless succession is interrupted by another fire or disturbance, a spruce forest, the final or climax successional stage, will eventually grow here.

12 Fire Maintains Habitat Diversity

Northern Harrier

Fire plays an important role in Interior Alaska ecosystems. It often follows an erratic path, totally burning some areas, while barely touching or completely skipping others. This behavior creates and maintains a mosaic of habitats at different successional stages. Each habitat attracts a different combination of wildlife. Some species, such as meadow voles, foxes, and Northern Harriers prefer the grass stage. Snowshoe hares and moose, on the other hand, find their food of willow, aspen, birch, and poplar most abundant and accessible during the shrub stage. Yellow-rumped Warblers, Black-capped Chickadees, and Northern Goshawks thrive in the birch forest stage.

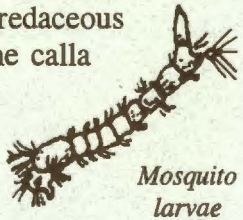
13 Wetlands and Wildlife

Here is another example of a thermokarst pond, only this one is larger and more pronounced than the pond at stop #7. Wetlands provide highly productive habitat for numerous plants, animals, birds, fish, and insects throughout Alaska. This pond is home to tadpoles and an assortment of adult and larval insects.

Savannah Sparrow

Some of these larval insects, such as mosquitos and mayflies, fly as adults and fill the air during the summer months. Each year, this bloom of insect life attracts thousands of flycatchers, warblers, and other insect-eating migratory birds.

Can you find insects, such as mosquito larvae, dragonfly nymphs, and predaceous diving beetles, hiding beneath the calla lilies of this pond?



Mosquito larvae

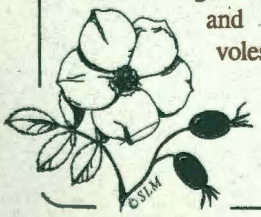
14 Snow Shapes the Forest

Northern Hawk Owl

Notice the broken limbs and leaning trees at this stop. Like fire, water, and ice, snow plays an active role in creating the forest structure. In 1992 Fairbanks received a heavy snowfall early in September. Helped by leaves still attached to the trees, the heavy, wet snow accumulated beyond what many trees could handle. Limbs broke, tops snapped, and trees were bent over.

Even though some trees are now dying, they are still an essential component of the forest. Dead, standing trees called snags provide critical habitat for birds and insects. Woodpeckers, chickadees, and other birds that nest in cavities depend on dying and dead trees for nesting sites. Owls, like the Northern Hawk Owl, may build their nests on top of snags. Still other birds feed on the insects inhabiting the trees.

Wild rose grows abundantly along this portion of the trail. Its thorny branches and bright pink flowers make it easy to recognize. Rose hips, the fleshy fruit, provide winter food for grouse and voles.



15 Remnants of Past Landscapes

As you approached this stop, did you notice the slight rise in elevation? You just walked onto the remnant of an Ice Age sand dune like those mentioned at stop #1. Sand at least 12,000 years old lies less than a foot beneath where you are standing! Over the years this dune escaped being reworked by river channels and retained much of its shape. Trees flourish on the warm, well-drained soils.

16 Who Uses the Spruce?

Spruce Grouse, red squirrels, and porcupines are among the animals dependent upon the spruce of late successional forests. Listen for chattering red squirrels and look for their underground, winter homes found in middens. From the surface, middens appear as piles of old cone scales with tunnels leading into them.

In late summer and fall, watch your head. Squirrels are busy clipping cones from the branches overhead for their winter food supply. After the cones fall to the ground, the squirrel gathers them, storing as many as 12,000 in one midden.

17 What's in Store for the Future?

From this stop, you can see much of the diversity of Creamer's Refuge. The farm fields, a band of poplar trees, a seasonal wetland, and a maturing spruce and birch stand growing on the ancient dune are all within view. Some of these habitats will continue to move forward in succession, while others may be interrupted or set back to earlier stages by fire, floods, or other disturbances. One thing, however, is certain ~ these habitats will change with time. Snow, permafrost, ice wedges, fire, human activity, and climatic conditions continue to act upon the landscape. Together, these forces helped create Creamer's Refuge, and together they will continue to shape its future.

We hope you enjoyed your walk through the boreal forest. To return to the parking lot, follow the trail back through the fields. If you do not plan to keep this trail guide, please return it to the trail guide box or the Farmhouse Visitor Center for the next person to use.

Trees of Interior Alaska

Six species of trees, along with two types of tall shrubs, live in Interior Alaska. Examples of each are labeled along the trail.

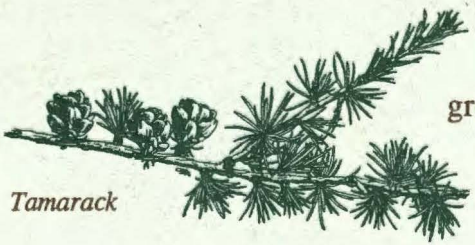
White Spruce

Conifers

White spruce (*Picea glauca*) is generally larger than black spruce and has longer needles. It has smooth twigs and cones longer than an inch. White spruce prefers well-drained sites.

Black spruce (*Picea mariana*) has rounded cones less than an inch long which may stay closed for years until they are opened by the heat of fire. Tiny hairs cover the twigs, but can be seen only upon close inspection. Black spruce commonly grows on cold, wet sites such as areas underlain by permafrost. (See p. 9 for picture.)

Tamarack (*Larix laricina*) grows clusters of needles along its branches rather than single needles like spruce. This unusual conifer looses its needles each fall. Tamarack ordinarily grows in the same areas as black spruce.



Tamarack

Hardwoods

Alder

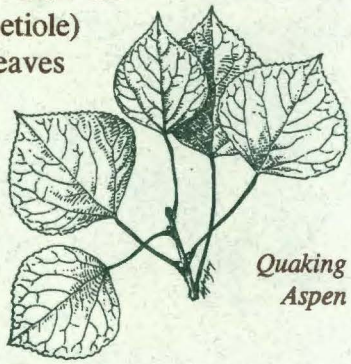
The two species of **alder*** (*Alnus spp.*) found in Interior Alaska have smooth gray bark with horizontal lines and conelike fruits. They are one of the few shrubs which have root nodules that turn nitrogen from the air into a form usable by plants and animals. Alder enriches the soil where it grows.

Paper birch (*Betula papyrifera*) is recognized by its white, flaky bark. Its leaves are wedge-shaped and have saw-toothed edges (see p. 10 for picture). Birch sheds its tiny seeds slowly throughout the fall and winter, providing a continuous food source for redpolls, voles, and other seed-eating animals.

Balsam poplar or **cottonwood** (*Populus balsamifera*) can be identified by its large leaves and sticky buds which emit a pungent odor. It has greenish bark which turns dark and furrows as the tree ages. In June, poplars shed cotton-like seeds that are carried by the wind. It also reproduces by sending out shoots from its roots.

Balsam Poplar

Quaking aspen (*Populus tremuloides*) leaves are smaller and more round than the poplar's. The leaf stem (petiole) is flattened so that the leaves flutter in the wind. Aspen's greenish-white bark remains fairly smooth throughout its life. Like the poplar, aspen may develop either from seed or as sprouts from the roots of existing trees.



Quaking Aspen

Thirty-three species of **willow*** (*Salix spp.*) grow in Alaska. These shrubs range in size from ground hugging dwarfs to small trees. Most, however, are shrub height. Willow leaves are usually long and narrow.

Willow

* shrub

Thank you for visiting Creamer's Field Migratory Waterfowl Refuge. Inquiries and comments may be sent to:

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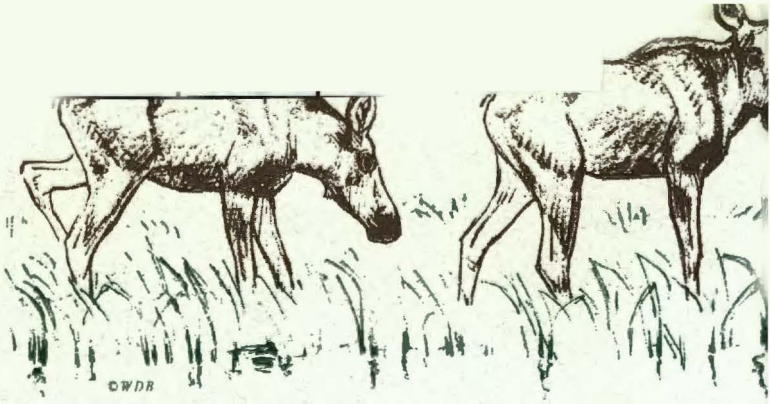

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