



Figure 2. A schematic drawing illustrating the vegetation structure of Anchorage Bowl wetlands along a moisture gradient. Stars indicate the location of sample plots (relevés) along this gradient as determined from the differentiated table (Appendix B). Photo plate numbers refer to the approximate locations of vegetation types discussed in the text.

Each description indicates the most commonly associated species by layer in descending order of cover values. Although all species are not listed, conspicuous species of low abundance are included where they may aid rapid field identification (e.g. blueflag, Iris setosa setosa). All species are referred to by common name where known. Scientific binomials are found in Appendix B and a complete list of vascular plants, common mosses and total lichen cover values from each wetland and wetland type are found in the differentiated table (Appendix D).

Forest

1. Black Spruce Closed Needleleaf Forest (Plate 1).

Cool and humid closed black spruce (Picea mariana) forest occupies slightly elevated margins of many bogs and the centers of raised bog islands. Trees may be 20 m high and more than 30 cm in diameter at breast height (DBH). Evidence of frost activity includes tilting and upturned trees, deep (25-75 cm) depressions and hummocky ridges 2-4 m high. Although this type is never flooded, large depressions near upturned trees may have standing water into late summer. Forest peat (35-100 cm) occurs over peaty-mineral to gravelly soils and parent material. Remnant late summer ice layers are common at 5-10 cm depth in more closed stands. Dominant understory plants include: shrubs - thinleaf alder (Alnus tenuifolia), prickly rose (Rosa acicularis), labrador tea (Ledum palustre groenlandicum); dwarf shrubs - low-bush cranberry (Vaccinium vitis-idaea), bunchberry (Cornus canadensis), herbs - meadow horsetail (Equisetum arvense), woodland horsetail (E. silvaticum), cloudberry (Rubus chamaemorus); mosses - schreber feathermoss (Pleurozeum schreberi), green sphagnum.

2. Black Spruce Open Needleleaf Forest (Plate 2).

Open black spruce forest is similar to closed spruce forest but canopy cover is less (30-45%) and trees may be shorter (5-15 m). This type grades between closed forest and woodland (Figure 2). Sites are wetter with standing water between frost-heaved hummocks, and peat may be saturated to the surface year round. Peat depths exceed 1 m and late summer ice is sporadic. Dominant species include: trees - black spruce; shrubs - labrador tea, shrubby black spruce; dwarf shrubs - low bush cranberry; herbs - cloudberry; mosses, green sphagnum, schreber feathermoss. As the canopy opens up, the importance of horsetails and feathermoss decreases and the importance of labrador tea, shrubby spruce and green sphagnum increases. The most important understory dominants in Turnagain Bog are labrador tea and green sphagnum. Open forest types in Klatt and East Campbell Airstrip Bogs are recognized by shrubby black spruce and cloudberry. Low shrubs such as northern labrador tea (Ledum palustre decumbens) and dwarf arctic birch (Betula nana) are more important in Campbell Creek wetlands. Open forest types in Campbell Creek are very diverse and are influenced by substantial subsurface ice activity. Abrupt, deep hummocks and depressions (1 m x 2 m), tipping trees and trees sunken into the peat mat indicate extensive frost activity.

3. Paper Birch Closed Broadleaf Forest (Plate 3).

This pioneer community occupies the exposed peaty, sandy soil around Connors Lake that was exposed by lowered lake levels. It occurs between upland (Type UF) or low, wet, closed conifer forest (Type 1) and emergent (Type 13d) vegetation types. Paper birch (Betula papyrifera) and balsam poplar (Populus balsamifera) are entering the present open canopy of alder. The understory is sparse, although dense patches of willow and bluejoint

grass (Calamogrostis canadensis) fill openings, and alpine rush (Juncus alpinus) forms a narrow mat closer to open water. This type is partially maintained by a heavily used all-terrain vehicle road paralleling it along the north shore.

4. Paper Birch Broadleaf Woodland (Plate 4).

Woodlands are open stands of trees greater than 3 m high with a canopy cover of 10-24 percent. Broadleaf woodland is represented by a pioneer shrub/dwarf tree scrub community found in a 10-15 m (30-45 ft) band around Strawberry Lake in Connors Bog. It occupies the shallow-water zone along the pre-drainage lake margin. Here it grades gently towards the center of the lake from an abrupt bog mat lip of the former shoreline. Sweet gale (Myrica gale), shrubby cinquefoil (Potentilla fruticosa), tickle grass (Agrostis scabra) and tufted clubrush (Trichophorum caespitosum, T. alpinum) are common understory dominants giving the type a very soft-textured appearance. Birch contrasts dramatically with the black spruce forest margin (Type 2). The more than 100 cm (3 ft) of muck (sedge fen-aquatic peat) is saturated year round. Haircap mosses (Polytrichum spp.) and Cladonia lichens are conspicuous elements of this vegetation type. Shallow ponds (flarks) south of Strawberry Lake which have been lowered by nearby drainage ditches, exhibit a margin of this vegetation type but the birch and sweet gale are replaced by bog rosemary (Andromeda polifolia) with 40-60% cover.

5. Paper Birch-White Spruce Closed Mixed Forest Swamp (Plate 5).

This type is characterized by large (>13 cm DBH) birch and white spruce (Picea glauca) trees in hummocky terrain interspersed with patches of alder

swamp. Permanent standing water fills depressions to 15 cm in late summer. Alder and bluejoint grass mask hummocks up to 1 m high and 2-4 m in diameter. Shallow (20-60 cm) forest peat or muck occurs over mineral or gravelly soil.

Closed mixed forest swamp is rich in plant species because upland and wetland species mix over very short distances. Dominants include: trees - paper birch, white spruce, black spruce; tall shrubs - thinleaf alder, willows; low shrubs - highbush cranberry (Viburnum edule), prickly rose, American red current (Ribes triste); herbs - bluejoint grass, meadow horsetail, cloudberry, jacob's ladder (Polemonium acutiflorum), meadowrue (Thalictrum alpinum, T. sparsiflorum), wintergreen (Pyrola asarifolia), bunchberry; moss - big leaf moss (Mnium spp.), feathermoss, sphagnum, and brown fen moss.

Much of the Campbell Tract wetlands and the northern third of Klatt Bog are covered by this vegetation type. Riparian habitat along Campbell Creek is complex because of past beaver activity. Live and dead alder thickets, overturned trees, hummocks, and old dams and channels make a large portion of this type difficult to travel through.

6. Black Spruce Needleleaf Woodland (Plate 6).

These woodlands are found in areas between open needleleaf and dwarf tree scrub woodland and on bog ridges (strangs) in strangmoor complexes (Figure 2). Physical site characteristics and vegetation are similar to open black spruce forest (Type 2). The type is especially common in Klatt, Campbell Creek, Tudor Road and North Fork of Campbell Creek wetlands. Dominant species are: trees - black spruce; shrubs - shrubby black spruce, northern labrador tea; herbs - cloudberry; mosses - green sphagnum, brown sphagnum, feathermosses.

TADA PROJECT FOUND

Dwarf Tree

7. Black Spruce Dwarf Tree Scrub Woodland (Plate 7).

Dwarf tree scrub woodland is characterized by a 10-24% cover of trees under 3 m in height at maturity. Scattered small patches of prostrate black spruce and low, matted, dwarf shrubs cover a hummocky sphagnum peat mat. The peat mat is dry to saturated but rarely flooded in mid-summer. This is a common plant community on bog ridges (strangs). Species composition is variable, responding to small changes in soil moisture. Black spruce, northern labrador tea and brown sphagnum are common but other shrubs and mosses vary. On moister sites, sweet gale, bog rosemary, green sphagnum and red sphagnum are evident. On drier raised sites, crowberry (Empetrum nigrum), shrubby cinquefoil, feathermosses and lichens are common.

8. Black Spruce Open Dwarf Tree Scrub (Plate 8).

Dwarf tree scrub has 29-59% cover of black spruce trees less than 3 m high at maturity and borders open to closed forest stands. Sites are moist to continually saturated with peat depths exceeding 1 m. Dominant understory plants are: shrubs - sweet gale, northern labrador tea; herbs - cloudberry, tufted clubrush; mosses - feathermoss, green sphagnum.

Tall Shrub

9a. Alder-Willow Closed Tall Shrub Scrub (Plate 9).

This type covers large portions of riparian habitat along the feeder streams of Campbell Creek in the North Fork of Campbell Creek wetland. Dense (>75% cover) alder and willow to 8 m occur over an understory of bluejoint grass, swamp horsetail (Equisetum fluviatile), marsh fivefinger (Potentilla palustre), nagoon berry (Rubus arcticus), and green sphagnum. Terrain is very hummocky with seasonally flooded depressions. Numerous

small, slow streams course through the area, and small permanently flooded ponds may be concealed by the dense alder and willow growth. Portions of the area were previously flooded by beaver which killed the alder and willow and left many areas of standing dead trees and tall shrubs.

9b. Alder Closed Tall Shrub Scrub (Plate 10).

A thinleaf alder type occurs in Tudor Road wetlands with tree-size alder (15 cm DBH, 10 m high) and a sparse understory of bluejoint grass, bunchberry and woodland horsetail. There is no peat development over the upland mineral soil type and no evidence of seasonal flooding. The type occurs between a peat bog and forested upland.

10a. Open Tall Shrub Scrub (no plate).

This type is similar to Type 9a but is more open with 25-74% cover of tall shrubs.

10b. Open Alder Tall Shrub Scrub (Plate 5).

Type 10b is an alder swamp and is identical to Type 5 except the former lacks a tree layer. Sites have slightly deeper depressions and thus deeper (15-30 cm) standing water through the year.

Low Shrub

11a. Sweet Gale-Sphagnum Open Low Shrub Scrub Bog (Plates 11, 12).

Type 11a is the most extensive low shrub vegetation type in Anchorage wetlands and is most prevalent in low-elevation wetlands. It is the dominant type in Turnagain, Baxter and DeLong Lake bogs and also very important in Connors Lake and Lake Otis wetlands. The type is very wet

usually with standing water between hummocks into late summer and flooded after extended rainy periods. Water and exposed muck to depths of 20 cm may cover up to 15 percent of an area occupied by this type.

Two major subtypes exist. The first may form its own uniform coertype (Plate 11), or it may occupy ovoid to elongate depressions (flarks) between raised bog ridges (strangs). Sweet gale hummocks and mats (5-25 cm) within these areas are surrounded by standing water in early summer and later by exposed, saturated, moss-sedge fen peat. Tufted clubrush dominates tussocks, and squarrose sphagnum, flat leaf and common bladderworts (Utricularia intermedia, U. vulgaris macrorhiza) occupy depressions. Associated species include tall cottongrass (Eriphorum angustifolium), buckbean (Menyanthes trifoliata), long-leaf and round-leaf sundew (Drosera anglica, D. rotundifolia), livid and shore sedge (Carex livida, C. limosa), maritime arrowgrass (Triglochin maritima), northern asphodel (Tofieldia coccinea), and brown fen moss. This subtype is matted and springy, but the vegetation mat is not penetrable by walking across it.

The second subtype (Plate 12) has less exposed mucky depressional areas between hummocks and is most commonly found as a floating bog mat along lakeshores. Sphagnum moss masks standing water. Sweet gale and squarrose sphagnum are dominant but ericaceous shrubs are more important than in the first subtype. Associated species include: livid sedge, round-leaf sundew, bog cranberry (Oxycoccus microcarpus), rotund sedge (Carex rotundata), oeder sedge (C. oederi), cloudberry and brown sphagnum. Type 11a is generally less saturated with a very diverse mix of wet and dry-site species.

11b. Ericaceous Shrub-Sphagnum Open Low Shrub Scrub Bog (Plate 13).

Type 11b is found in Turnagain Bog and is a species-rich area between open black spruce forest (Type 6) and strangmoor (Types 8/11a). Black

spruce is present (<5%) and ericaceous shrub dominants include: crowberry, dwarf arctic birch, lowbush cranberry, and bog blueberry (Vaccinium uliginosum). Swamp horsetail and brown sphagnum are conspicuous codominants. Associated species include: sweet gale, cloudberry, bog cranberry, bog sedge (Carex magellanica irrigua), tall cottongrass and Alaska bog willow (Salix fuscescens). The type is wet with standing water present in low areas in early summer. A solid ice layer was encountered at 15 cm in mid-July.

11c. Ericaceous Shrub-Sedge-Sphagnum Open Low Shrub Scrub Bog (Plate 14).

Type 11c is a hummocky micro-ridged bog type found in Turnagain Bog. The saturated sphagnum peat is >90 cm deep with a fine, clay-like texture at 100 cm. Cloudberry and rotund, shore, livid, many-flower (Carex pluriflora) sedges form a conspicuous herb layer over a continuous squarrose sphagnum, brown sphagnum and brown fen moss mat. Associated species include: shrubs - northern labrador tea, bog rosemary, dwarf arctic birch, leatherleaf, crowberry, bog cranberry; herbs - tall cottongrass, swamp horsetail, buckbean.

11d. Sweet Gale-Sedge Open Low Shrub Scrub (Plate 15).

Type 11d occurs in Turnagain Bog and has been altered by blocked drainage. It was probably a strangmoor (Type 11a/8) in the past. Impounded water (10-35 cm) has left scattered, dead black spruce trees (10-15 cm DBH). Current vegetation consists of a floating mat dominated by sweet gale hummocks, bog sedge, silvery sedge (Carex canescens), rotund sedge, creeping spikerush (Eleocharis palustris), buckbean, water sedge (Carex aquatilis) and dwarf arctic birch.

11e. Shrubby Cinquefoil-Sphagnum Open Low Shrub Scrub Bog (Plate 16).

This shrub bog covers almost the entire south half of Connors and Klatt Bogs. Drainage ditches are most extensive in this part of Klatt Bog and are responsible for transforming this type to its present state. Prior to ditching, sites now occupied by Type 11e probably were covered by Type 7. Species compositions are similar but cover values have increased for drier-site species such as cinquefoil and dwarf birch. The top 10 cm of peat between hummocks is saturated but there is little standing water by mid-summer. A solid ice layer was encountered at 55 cm. The sphagnum peat is more than 4 m thick, as indicated by drainage ditch profiles. Dominant species are: shrub - shrubby cinquefoil, dwarf arctic birch, sweet gale, black spruce (<5% cover); dwarf shrub - northern labrador tea, bog rosemary, crowberry; herbs - cloudberry, clubrushes, capitate sedge (Carex capitata), bluejoint grass, tall cottongrass, blueflag, menzies burnet (Sanguisorba menziesii); mosses - green sphagnum, brown sphagnum, feathermoss.

11f. Dwarf Birch-Ericaceous Shrub-Sphagnum Open Low Shrub Scrub Bog
(Plate 17).

Type 11f is a low shrub, hummocky bog mat with a bouncy fibrous peat and small (50 cm²) hummocks with shallow water in depressions (10-20 cm). Flatleaf bladderwort and brown fen moss are found in these depressions. Bog birch, sweet gale, bog rosemary and willow species form a uniform 25-50 cm low shrub layer. Bog cranberry cover is conspicuously greater than in other types. Green sphagnum covers more than 50 percent of the ground surface. Other associated species include: bluejoint grass, bog blueberry, kellogg sedge (Carex kelloggii), buckbean and tall cottongrass.

Type 11f in Lake Otis and Tudor Road wetlands have been modified by blocked drainage and fire, respectively.

1lg. Sweet Gale-Sedge-Fen Moss Open Low Shrub Scrub Fen (Plate 18).

Type 1lg occupies seasonally flooded flarks with up to 35 cm of water present in mid-July in Connors Bog and Campbell/Klatt wetlands. By early August, standing water has disappeared but soils remain saturated year round. Low (<30 cm) sweet gale, sedge species and fen moss are dominant. Livid sedge, buckbean and bladderworts are ubiquitous; however, shore sedge, kellogg sedge, beaked sedge (Carex rostrata), bog rosemary, swamp horsetail, maritime arrowgrass and water sedge may be locally dominant. In some areas, horsetail and bog rosemary are cover dominants in spring and early summer. Horsetail is replaced by creeping spikerush in mid-summer. A springy fibrous mat covers the bottom of this type.

1lh. Shrubby Cinquefoil-Sweet Gale-Ericaceous Shrub-Feathermoss Low Shrub Scrub Bog (Plate 19).

Strangs (parallel bog ridges separating wet hollows) in the southcentral portion of Connors Bog are covered by Type 1lh. It is a very species-rich type and is notable for a diverse moss and lichen layer. Micro-ridges (long narrow strangs) are 30-50 cm high and 2-10 m long. There may be some moisture near the surface, but soil structure indicates better drainage. Depressions between ridges may have water in early spring, but it is gone by early summer. Islands of this type (2 - 10 m²) occur in Type 12 flarks (wet hollows between strangs). Feathermoss peat is more than 100 cm deep. Dominant species are: shrubs - shrubby cinquefoil, sweet gale, northern labrador tea, dwarf arctic birch, low bush cranberry, nagoon berry; mosses - feathermoss, cranesbill moss, brown fen moss; lichens - Cladina spp., Cladonia spp. In a variant of Type 1lh, cinquefoil has been replaced by black spruce, alder, bluejoint grass and labrador tea.

11i. Willow-Bluejoint Grass-Moss Low Shrub Scrub Bog (Plate 20).

Type 11i is a very complex, old, drained beaver meadow area in the North Fork Campbell Creek wetland. Numerous 1-m high dams crisscross the area and are being revegetated by upland plant species. Old pond basins on either side of the dams are dominated by willow species, bluejoint grass, and varying amounts of marsh five finger, dwarf arctic birch, and water sedge. Many dead birch cut down by the beaver and old, dead, drowned-out spruce occur sporadically across the entire area. Presently the type is very heavily used by moose. Type 11i is seasonally flooded, and Campbell Creek and its branch streams pass through it.

11j. Low Willow Shrub Scrub Bog (Plate 21).

Type 11j is similar to 11i, but predominantly covered by willow species. Conspicuous species in addition to those of Type 11i include sweet gale, prostrate black spruce, thinleaf alder, swamp horsetail, silvery sedge, peat moss and brown fen moss. The type occurs along Campbell Creek in Campbell Creek Marsh wetland and has been modified by beaver activity.

Dwarf Shrub

12. Ericaceous Shrub-Sphagnum Open Dwarf Shrub Scrub Bog (Plate 22).

Type 12 occurs in DeLong Lake Bog and the southern portion of Baxter Bog. A deep sphagnum peat mat is continually saturated, but there is no standing water. Low (5-10 cm) undulating hummocks are dominated by an open (35% cover), low (<20 cm), dwarf shrub layer composed of northern labrador tea, dwarf arctic birch, bog rosemary and scattered prostrate black spruce. Dominant herbs are rotund sedge, many-flower sedge, labrador lousewort (Pedicularis labradorica) and cloudberry over a continuous brown sphagnum, green sphagnum and squarrose sphagnum moss mat.

Sedge-Grass

13a. Sedge Tussock-Mixed Shrub-Sphagnum Wet Graminoid Herbaceous Bog

(Plate 23).

Small, abruptly-margined flarks in Turnagain Bog are dominated by Type 13a. These bowl-like depressions are permanently flooded throughout the summer to depths of 15 cm and have a very springy, fibrous, mixed peat mat. Tall (55 cm) cottongrass-sweet gale tussocks cover 25-50% of the type and are surrounded by water or muck. Buckbean, bog rosemary and brown fen moss occur in troughs between tussocks. Raised domes of green sphagnum and associated bog species occur sporadically throughout the type.

13b. Subarctic Lowland Sedge Wet Graminoid Herbaceous Bog Meadow

(Plate 24).

Livid sedge and buckbean dominate this type which occupies shallow 10-15 cm lenticular flarks in the northwestern portion of Connors Bog. generally small - 5x10 m - but may be as long as 30 m. Associated species include bog rosemary, livid sedge, buckbean, clubrush, tall cottongrass and flat-leaf bladderwort.

13c. Subarctic Lowland Sedge-Moss Wet Graminoid Herbaceous Bog Meadow

(Plate 25).

Type 13c is seasonally to permanently flooded. It occupies flarks or other ponded areas of Connors Bog, Campbell/Klatt and Northeast Campbell Airstrip wetlands. Different areas are dominated by different sedges and mosses.

Type 13c covers a large irregular area in the central part of Klatt Bog and the south end of Connors Bog. Drainage ditches have altered the original character of these wetlands which were more like adjacent Types 7, 11g, 13b and 13d in the past. Long, narrow, lenticular flarks are flooded in the spring but little standing water exists by mid-summer. The sedge and brown moss peat, however, remains saturated year round. Margins of surrounding strangs suggest that water levels may have been as much as 20 cm higher, prior to drainage. This vegetation type is easily recognized from a distance by its white to pale green color which is provided by the combination of livid sedge, spike rushes, tickle grass and shore sedge. Where water is closer to the surface, kellogg sedge and buckbean may be dominant. Other associated species include: beaked sedge, buxbaum sedge (Carex buxbaumii), alpine rush, marsh five-finger, brown fen moss and clubrushes.

A variation of this type occurring in the Northeast Campbell Airstrip is a permanently flooded wet meadow dominated by creeping spikerush, water sedge and squarrose sphagnum.

13d. Subarctic Lowland Sedge Graminoid Herbaceous Wet Meadow (Plate 26).

Type 13d is an emergent plant community occupying the shallow lake bottoms than have been exposed by lowered levels of Strawberry and Connors Lakes. Water depths vary from saturated sedge-fen peat to open water 75 cm deep. Various species form pure stands to 2 m high and include beaked sedge, great bulrush (Scirpus validus), awned sedge (Carex atherodes), swamp horsetail, lyngbye sedge (Carex lyngbyaei) and kellogg sedge. Bladderwort and brown fen mosses occur below.

Handwritten notes at the bottom of the page, including a signature and date: "Type 13d. Subarctic Lowland Sedge Graminoid Herbaceous Wet Meadow (Plate 26). 1/2/2002".

Moss

14. Wet Bryoid Moss (Plate 27).

A squarrose sphagnum peat mat dominates this type found in the Campbell Airstrip wetlands. Ericaceous shrubs (dwarf arctic birch, bog cranberry, bog rosemary and northern labrador tea) make up less than 10 percent total cover. Herb diversity is low but chamiss' cottongrass (Eriophorum russeolum), white cottongrass (E. scheuchzeri), rotund sedge, shore sedge and bog sedge may occur in dense patches. A large portion of Type 14 in East Campbell Airstrip wetland has an increased importance of bluejoint grass. Many dead standing trees suggest that the drainage of the area has been altered in the past. The peaty mat is springy and is saturated throughout the year.

Rooted Floating Aquatic

15. Pond Lily Freshwater Aquatic Herbaceous (Plate 28).

Type 15 rooted, floating, aquatic vegetation occurs in the shallow water (0.5-3 m) zone of all open bodies of water in the study area. Dominants include yellow water lily (Nuphar polysepalum), white water lily (Nymphaea tetragona) and pond weed (Potomegeton spp.).

~~DEAD TREES~~
16. CONIFER OR DECIDUOUS

Wetland Description and Bird Use

Connors Bog (#6)

Description

Connors Bog (Figure 3) is a concave patterned bog complex containing two lakes (Connors Lake and Strawberry Lake) and scattered forested bog islands. A series of string bogs and ericaceous shrub bogs occur between Connors Lake in the north and Strawberry Lake in the south. String bogs are