Figure 23—*Salix barclayi/Carex sitchensis* c.t. on distal outwash below the Sheridan Glacier.

***Salix barclayi/ Carex sitchensis* Community Type**
Barclay Willow/ Sitka Sedge Community Type
SALBAR/CARSIT
G3; S3

Other studies—Shephard (1995) describes a similar *Salix barclayi/Carex sitchensis* (Barclay willow/Sitka sedge) c.t. from the Yakutat Foreland in the Tongass National Forest. The Copper River Delta and the foreland are the only places this community type has been reported in the state, although various *Salix barclayi* types are described from southeast and south-central Alaska (Viereck and others 1992).

Vegetation—The overstory is dominated by *Salix barclayi* (Barclay willow), and *Myrica gale* (sweetgale) is a common associate (fig. 23). Height of the tallest shrub layer ranges from 3 to 8 feet. *Salix barclayi* was heavily browsed within several plots. The diagnostic understory species *Carex sitchensis* (Sitka sedge), *Menyanthes trifoliata* (buckbean), and *Potentilla palustris* (marsh fivefinger) dominate the herbaceous layer. Bryophyte cover is highly variable.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 8; species richness = 32):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Shrubs:			
Alnus crispa var. *sinuata*	50	3	0-10
Myrica gale	63	31	0-50
Salix barclayi	100	40	0-60
Salix commutata	50	21	0-30
Forbs:			
Equisetum palustre	63	17	0-30
Menyanthes trifoliata	13	20	0-20
Potentilla palustris	50	18	0-30
Rubus arcticus	63	6	0-10
Trientalis europaea	63	1	0-3
Graminoids:			
Calamagrostis canadensis	63	17	0-60
Carex sitchensis	100	27	3-50

Environmental characteristics—This is a major type found on the uplifted marshes and an incidental type on the outwash plains. Depth to water table typically ranges from near the surface to more than 16 inches, and the presence of mottles indicates that the water table fluctuates. Consistent vegetation zonation patterns are associated with different water depths. Vegetation zones of ponded basins typically change, moving from wet (standing water) to dry, from emergent vegetation, to herbaceous wet meadow, to shrub-dominated wetland, and to forest. The forested portions usually are associated with levees.

Soils—The soils are characterized by a mat of roots and organic matter 1 to 4 inches thick over silt or sand. The pH ranges from 5.5 to 7.1, and salinity is low. One plot is a Terric Borohemists with an organic layer 16 inches thick.

Succession—This type ranges from early to mid seral. On levees, the presence of young *Picea sitchensis* (Sitka spruce) indicates the sites are seral to various *Picea sitchensis* communities and eventually to *Tsuga heterophylla* (western hemlock) communities. On sites with saturated soils, it is seral to peatland communities. The organic mat will continue to thicken, and *Sphagnum* (peat moss) will invade. To develop, peatlands require saturated soils or depressions in level areas that once supported ponds but are now filling with organic matter.

***Salix barclayi/ Equisetum variegatum* Community Type**
Barclay Willow/ Northern Horsetail Community Type
SALBAR/EQUVAR
Not Ranked

Other studies—No other studies have described a S*alix barclayi/Equisetum variegatum* (Barclay willow/northern horsetail) c.t.

Vegetation—The overstory is dominated by various *Salix* (willow) species, predominantly *Salix barclayp* (Barclay willow). *Myrica gale* (sweetgale) is a common associate. Height of the tallest layer ranges from 2 to 4 feet. *Equisetum variegatum* (northern horsetail) dominates the herbaceous layer. Bryophyte cover is high, dominated by various *Sphagnum* (peat moss) species.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 3):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Shrubs:			
Myrica gale	67	7	0-10
Salix alaxensis	67	5	0-10
Salix barclayi	100	28	3-50
Salix commutata	67	10	0-10
Salix hookeriana	67	7	0-10
Forbs:			
Equisetum arvense	67	5	0-10
Equisetum variegatum	100	43	20-80
Potentilla egedii	67	1	0-1
Graminoids:			
Carex lyngbyaei	67	7	0-10

Environmental characteristics—This is an incidental type found on slacks and the high tide line on beach fronts and newly developing tidal marshes. It occurs as stringers and patches and is typically poorly drained. The slope is less than 1 percent, and the surface topography is hummocky because of raised root wads of willow and sweetgale.

Soils—The soils are classified as Typic Cryaquents or Typic Cryorthents characterized by an organic mat 1 inch thick overlaying silt or sand. The pH of the mineral soil ranges from 6.5 to 8.0 and from 5.5 to 6.7 for the organic layer. Salinity is high, indicating salt inputs from either ocean spray or high tides. The sites are poorly drained; however, mottles in one soil profile indicate a fluctuating water table.

Succession—This is a mid-seral community. On slacks, the sites are initially invaded by primary colonizers such as the *Equisetum variegatum* (northern horsetail) c.t. Willow and sweetgale soon follow. As the slack matures, species composition may change dramatically and eventually develop into a tidal marsh. Adjacent dunes also may migrate and cover the sites.

***Salix barclayi/ Lupinus nootkatensis* Community Type**
Barclay Willow/ Nootka Lupine Community Type
SALBAR/LUPNOO
G3; S3

Other studies—This community type is not reported in the literature, although several *Salix barclayi* (Barclay willow) types have been reported (Viereck and others 1992). The *Salix barclayi/Lupinus nootkatensis* (Barclay willow/nootka lupine) c.t. is somewhat similar to a *Salix barclayi/Fragaria chiloensis* (Barclay willow/beach strawberry) c.t. reported for the Yakutat Foreland by Shephard (1995).

Vegetation—This community is dominated by *Salix* (willow) species, primarily *Salix barclayi* (Barclay willow) and *Salix sitchensis* (Sitka willow), although *Alnus crispa* subsp. *sinuata* (Sitka alder) may be a strong codominant. Height of the tallest shrub layer ranges from 4 to 6 feet. *Lupinus nootkatensis* (nootka lupine) and *Agrostis alaskana* dominate the understory. Composition and cover of other herbaceous species are highly variable. Bryophyte cover is variable.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 5; species richness = 47):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Trees:			
Picea sitchensis	60	4	0-10
Shrubs:			
Alnus crispa var. *sinuata*	100	13	1-30
Salix barclayi	100	14	1-40
Salix sitchensis	100	19	3-30
Forbs:			
Achillea borealis	60	4	0-10
Fragaria chiloensis	20	1	0-1
Lupinus nootkatensis	100	40	10-80
Graminoids:			
Agrostis alaskana	80	15	0-30
Calamagrostis canadensis	60	5	0-10
Deschampsia beringensis	60	2	0-3
Festuca rubra	60	2	0-3

Environmental characteristics—This is a minor type found on well-drained slacks, dune edges, and levees of outwash plains. It occurs as stringers and patches and is typically well drained. The slope is less than 1 percent, and the surface topography is level.

Soils—The soils are characterized by a duff layer 1 to 2 inches thick overlaying silt or sand. Horizon development is common. The pH of the mineral soil ranges from 5.5 to 7.9, and soil salinity is low. The sites are well-drained; however, mottles in one soil profile indicate a fluctuating water table.

Succession—This is a mid-seral community. The sites are initially invaded by various herbaceous primary colonizers. Willow and alder soon follow. In time, *Picea sitchensis* (Sitka spruce) likely will invade these sites.

***Salix barclayi*/ Mixed-Herb Community Type**
Barclay Willow/ Mixed-Herb Community Type
SALBAR/Mixed Herb
Not Ranked

Other studies—This type is similar to the *Salix sitchensis*/mixed-herb (Sitka willow/ mixed-herb) c.t. described by Shephard (1995) for the Yakutat Foreland in the Tongass National Forest. A related type is reported from Dude Creek Flats near Gustavus south of Glacier Bay National Park (Bosworth 1985).

Vegetation—The shrub layer is dominated by *Salix* (willow) species, primarily *Salix barclayi* (Barclay willow) and *Salix commutata* (undergreen willow), although *Myrica gale* (sweetgale) may be a strong codominant. Height of the tallest shrub layer ranges from 4 to 15 feet. *Equisetum arvense* (meadow horsetail) dominates the understory, and *Calamagrostis canadensis* (bluejoint), *Potentilla palustris* (marsh fivefinger), and *Angelica genuflexa* (bent-leaved angelica) may be strong codominants. Composition and cover of other herbaceous species are highly variable. Bryophyte cover is variable.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 10; species richness = 73):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Shrubs:			
Alnus crispa subsp. *sinuata*	70	16	0-30
Myrica gale	60	35	0-70
Salix barclayi	80	35	0-70
Salix commutata	50	34	0-50
Forbs:			
Angelica genuflexa	60	4	0-20
Equisetum arvense	90	47	0-80
Iris setosa	50	2	0-3
Potentilla egedii	50	1	0-3
Potentilla palustris	70	8	0-20
Pyrola asarifolia	50	8	0-20
Sanguisorba stipulata	50	1	0-3
Graminoids:			
Calamagrostis canadensis	70	11	0-20
Ferns:			
Athyrium filix-femina	50	1	0-3

Environmental characteristics—This is a minor type found on slacks of coastal dunes and levees of the uplifted marsh. It occurs as stringers and patches. The surface topography often consists of low hummocks interspersed with small depressions containing standing water. The slope is less than 1 percent.

Soils—The soils are characterized by an organic layer 0 to 5 inches thick overlaying silt or sand; horizon development is uncommon. The pH of the mineral soil ranges from 6.0 to 6.7, and soil salinity is low. The sites are poorly drained to moderately well drained with the water table ranging from 13 inches below the soil surface to 6 inches above.

Succession—This is a mid-seral community. On slacks, the sites are initially invaded by primary colonizers such as the *Equisetum variegatum* (northern horsetail) c.t. Willow and sweetgale soon follow. As the slack matures, species composition may change dramatically, eventually developing into a tidal marsh. Adjacent dunes also may migrate and cover the sites. On the levees of the uplifted marsh, it is a mid-successional type. It is seral to various *Picea sitchensis* (Sitka spruce) communities, as indicated by the presence of *Picea sitchensis* (Sitka spruce) and *Populus trichocarpa* (black cottonwood) in several of the sites.

Salix hookeriana Community Type Hooker Willow Community Type SALHOO Not Ranked

Other studies—Shephard (1995) describes a *Salix hookeriana* (Hooker willow) from the Yakutat Foreland in the Tongass National Forest. The Copper River Delta and the Foreland are the only places Hooker willow types are described for Alaska.

Vegetation—The overstory is dominated by *Salix hookeriana* (Hooker willow), although *Myrica gale* (sweetgale) and *Salix sitchensis* (Sitka willow) may be strong codominants. Height of the tallest shrub layer ranges from 6 to 15 feet. *Equisetum arvense* (meadow horsetail) typically dominates the understory. Composition and cover of other herbaceous species and bryophytes are variable.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 5; species richness = 57):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Shrubs:			
Myrica gale	60	53	0-80
Salix hookeriana	100	60	20-80
Salix sitchensis	60	14	0-30
Forbs:			
Equisetum arvense	100	24	1-60
Potentilla palustris	60	10	0-20
Rubus arcticus	60	5	0-10
Sanguisorba stipulata	60	2	0-3
Graminoids:			
Calamagrostis canadensis	80	18	0-50

Environmental characteristics—This is an incidental type located on levees of uplifted marshes, terraces in the transition zone between the uplifted marshes and outwash plains, and near the high tide line on newly developing tidal marshes of the Copper River Delta. Soil surface topography often consists of low hummocks interspersed with small depressions. The sites are poorly drained to moderately well drained with the water table ranging from 10 inches below the soil surface to at the surface.

Soils—The soils are characterized by an organic layer 1 to 4 inches thick overlaying silt or sand; horizon development is common. The pH of the mineral soil ranges up to 5.6, and soil salinity is low.

Succession—This type originally develops as a late-seral type on levees of tidal marshes. After the uplift of the tidal marshes, *Salix hookeriana* (Hooker willow) has persisted but appears not to be regenerating. The drier sites may be seral to various *Picea sitchensis* (Sitka spruce) communities; most sites, however, are relatively wet and are likely seral to peatland communities.

Salix sitchensis **Community Type**
Sitka Willow Community Type
SALSIT
Not Ranked

Other studies—This type is similar to the *Salix sitchensis* (Sitka willow) c.t. described by Shephard (1995) for the Yakutat Foreland, Tongass National Forest.

Vegetation—The overstory is dominated by *Salix sitchensis* (Sitka willow), and *Alnus crispa* var. *sinuata* (Sitka alder) and other *Salix* (willow) species may be strong codominants (fig. 24). Height of the tallest shrub layer ranges from 4 to 15 feet. Composition and cover of herbaceous species are highly variable. Bryophyte cover ranges from sparse to dense.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 7; species richness = 62):

Figure 24—*Salix sitchensis* c.t. on a distal outwash levee below the Sheridan Glacier.

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Shrubs:			
Alnus crispa subsp. *sinuata*	57	16	0-60
Salix barclayi	71	15	0-40
Salix sitchensis	100	47	10-80
Forbs:			
Equisetum arvense	57	30	0-80
Galium trifidum	57	3	0-10
Sanguisorba stipulata	57	20	0-50
Graminoids:			
Calamagrostis canadensis	57	23	0-80
Ferns:			
Athyrium filix-femina	43	17	0-20

Environmental characteristics—The *Salix sitchensis* (Sitka willow) c.t. is a minor type occurring on glacial outwash plains, floodplains, and the inland portions of uplifted marshes. It colonizes a wide range of sites including relatively dry levees along rivers and streams, lake shorelines, and abandoned river channels. The sites are moderately well drained with the water table greater than 16 inches. Soil mottling indicates a fluctuating water table. Soil surface topography ranges from level to sloping on stream banks.

Soils—The soils are classified as Typic Cryumbrepts or Typic Cryaquents. They are characterized by an organic layer 0 to 1 inch thick overlaying silt or sand. Soil horizons are typically present. The pH of the mineral soil ranges from 5.2 to 7.4, and soil salinity is low.

Succession—This is an early- to mid-successional type that follows various pioneer communities on new alluvial surfaces and uplifted marsh levees. It is seral to various *Picea sitchensis* (Sitka spruce) communities, as indicated by the presence of *Picea sitchensis* (Sitka spruce) in one site.

Undersampled *Salix* (Willow) Community Types

***Salix commutata* (undergreen willow) c.t.—**Reconnaissance information indicates this community is an incidental type on the Copper River Delta (no sites were sampled). It occurs on levees of the uplifted marsh and moist, relatively young, distal outwash deposits. The community is dominated by *Salix commutata* (undergreen willow), although other willow species may be common. Not ranked.

***Salix setchelliana* (Setchell willow) c.t.—**Reconnaissance information indicates this community is an incidental type on the Copper River Delta (no sites were sampled). It occurs on new alluvial deposits of the Copper River and on disturbed sites of dunes. The community is dominated by *Salix setchelliana* (setchell willow), and the soils are well drained sand or silt. Not ranked.

***Vaccinium uliginosum/ Empetrum nigrum* Community Type Bog Blueberry/ Crowberry Community Type VACULI/EMPNIG G5; S5**

Other studies—Shephard (1995) previously documented this type for the Yakutat Foreland, Tongass National Forest. It bears strong similarities to an *Empetrum nigrum-Vaccinium uliginosum/Eriophorum angustifolium* c.t. described by DeVelice and others (1994) for the Chugach National Forest. The *Vaccinium uliginosum/Empetrum nigrum* type may be similar to Neiland's (1971) *Empetrum nigrum-Vaccinium uliginosum/ Eriophorum angustifolium-Carex pluriflora/Sphagnum recurvum-Pleurozium schreberi* c.t. for southeast Alaska. Other related types include *Empetrum nigrum/Carex pluriflora-Carex pauciflora/Sphagnum* species (Batten and others 1978, Dachnowski-Stokes 1941, Heusser 1960, Scheierl and Meyer 1977), and *Empetrum nigrum-Eriophorum angustifolium/Sphagnum magellanicum-Sphagnum warnstorfii* (Reiners and others 1971, Streveler and others 1973). Ericaceous shrub types such as the *Vaccinium uliginosum/Empetrum nigrum* (bog blueberry/crowberry) c.t. are common in the maritime climate of southeastern and south-central Alaska and the Aleutian Islands (Viereck and others 1992).

Vegetation—The shrub layer is dominated by *Vaccinium uliginosum* (bog blueberry). *Empetrum nigrum* (crowberry) is often a strong codominant (fig. 25). *Eriophorum angustifolium* (tall cottongrass) and *Carex sitchensis* (Sitka sedge) are common herbaceous species; bryophytes, primarily *Sphagnum* (peat moss) species, blanket the ground.

The following tabulation lists the common species, and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 5; species richness = 27):

Figure 25—A mixture of *Fauria crista-galli* (deer cabbage) c.t., *Carex sitchensis* (Sitka sedge) c.t. and *Vaccinium uliginosum/Empetrum nigrum* c.t. on a domed peatland below Kushtaka lake.

Species	**Constancy**	**Average**	**Range**
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Trees:			
Picea sitchensis	80	3	0-10
Shrubs:			
Empetrum nigrum	80	43	0-70
Oxycoccus microcarpus	80	8	0-10
Vaccinium uliginosum	100	46	20-70
Vaccinium vitis-idaea	60	5	0-10
Forbs:			
Drosera rotundifolia	60	2	0-3
Graminoids:			
Carex pluriflora	60	17	0-30
Carex sitchensis	100	28	1-50
Eriophorum angustifolium	60	40	0-70
Mosses and lichens:			
Hylocomium splendens	20	10	0-10
Sphagnum fuscum	40	35	0-60
Sphagnum pacificum	20	98	0-98
Sphagnum papillosum	20	40	0-40
Sphagnum spp.	40	50	0-80

Environmental characteristics—This minor type occupies old undisturbed sites of distal outwash plains and floodplains. These are bogs, or ombrotrophic fens, typically dominated by *Sphagnum* (peat moss) species. The sites are nutrient poor and acidic, and the water table is at or close to the surface most of the year. Surface topography is level with minor hummock formation. Consistent vegetation zonation patterns are found within peatlands. Near water tracts or streams, herbaceous types such as *Carex sitchensis* (Sitka sedge) or *Calamagrostis canadensis* (bluejoint) dominate. Moving to higher and presumably drier sites, the vegetation changes to herbaceous-dwarf shrub, to shrub and dwarf tree communities. Where peatlands abut upland forests, the eco-zone consists of mature, typically slow-growing, needleleaf trees growing on a thin peat layer overlaying mineral soil.

Soils—The soils are characterized by an organic layer, ranging from 16 inches to greater than 40 inches thick, over silt or sand. One stand had an organic layer only 2 inches thick over sand. The pH ranges from 4.2 to 4.7, and salinity values are low. The soil is likely saturated throughout much of the growing season; the water table depth, however, can drop in excess of 16 inches during dry spells.

Succession—This is a late-seral type. To develop, it requires saturated soils or depressions in level areas that once supported ponds but are now filled with organic material.

Graminoid Community Type Descriptions

Arctophila fulva Community Type Pendent Grass Community Type ARCFUL G5; S5

Other studies—*Arctophila fulva* (pendant grass) c.t. is a widespread community type in northern and western Alaska (Viereck and others 1992). It has been reported from Dixon Harbor, Glacier Bay National Park, by Streveler and others (1973).

Vegetation—*Arctophila fulva* (pendent grass) dominates the community, although *Eleocharis acicularis* and *Equisetum fluviatile* (swamp horsetail) may codominate (fig. 26). *Arctophila fulva* (pendant grass) height ranges up to 2 feet; however, it is often prostrate and less than 8 inches in height. Bryophyte cover ranges from absent on wet sites to 90 percent on better drained locations.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 6; species richness = 11):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Equisetum fluviatile	50	12	0-30
Ranunculus reptans	33	7	0-10
Graminoids:			
Arctophila fulva	100	63	30-80
Eleocharis acicularis	33	27	0-50

Figure 26—Prostrate culms of the *Glyceria pauciflora* (weak manna-grass) c.t. in front of an *Arctophila fulva* c.t. near Bering Lake.

Environmental characteristics—This is a minor type found on the uplifted marshes and outwash plains of the Copper River Delta. *Arctophila fulva* (pendent grass) is located on sites with permanent to semipermanent standing water, such as the edge of ponds, lakes, and freshwater sloughs and streams. Water depth varies depending on flooding and precipitation can range up to 6 inches above the soil surface. Consistent vegetation zonation patterns are associated with different water depths. Vegetation zones of ponded basins typically change, moving from wet (standing water) to dry, from emergent vegetation, to herbaceous wet meadow, to shrub-dominated wetland, and to forest. The forested portions usually are associated with levees.

Soils—The soils are classified as Typic Cryaquents. They are typically silt and sand with no horizon development, except for a surface organic layer ranging from 0 to 2 inches thick. The pH ranges from 6.4 to 6.9, and salinity values are low.

Succession—This is an early-seral community. On pond edges, the root mat will thicken and eventually develop into a peatland. On slough and stream edges, the sites are primary colonizers of shallow water.

Figure 27—The taller *Calamagrostis canadensis* c.t. adjacent to the *Carex lyngbyaei* (Lyngby's sedge) c.t. near Bering Lake.

***Calamagrostis canadensis* Community Type Bluejoint Community Type CALCAN G5; S5**

Other studies—*Calamagrostis canadensis* (bluejoint) meadows have been described throughout the state (Viereck 1992) and occupy large areas of south-central and southwestern Alaska. The *Calamagrostis canadensis* (bluejoint) c.t. for the Copper River Delta is similar to *Calamagrostis canadensis* (bluejoint) type reported for Prince William Sound (Batten and others 1978, DeVelice and others 1994) and the Yakutat Foreland (Shephard 1995).

Vegetation—*Calamagrostis canadensis* (bluejoint) dominates the community and ranges from 2 to 5 feet in height. Bryophyte cover ranges from absent to 50 percent (fig. 27).

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 4):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Galium trifidum	50	5	0-10
Graminoids:			
Calamagrostis canadensis	100	89	70-99

Environmental characteristics—This is a widely distributed but incidental community found on the uplifted marshes, outwash plains, spits, and coastal dunes of the Copper River Delta. Site characteristics are highly variable. Adjacent to streams, including streams flowing through peatlands, it occurs as small discontinuous stringers on well-drained to moderately well-drained substrates. On ponds, it may form floating or anchored root mats that are very poorly drained; the environmental characteristics of the poorly drained sites are more closely aligned with that of the *Calamagrostis canadensis/Potentilla palustris* (bluejoint/marsh fivefinger) c.t. The bluejoint community also occurs on the crest or backside of dunes; sites are typically well drained for much of the year. The surface topography is level, and the slope is typically less than 3 percent.

Soils—Well-drained to moderately drained sites are characterized by a litter layer ranging from 1 to 2 inches thick, over silt and sand often with horizon development. The pH of the mineral soil ranges from 4.3 to 6.5, and salinity values are low. Soils of the poorly drained sites are root mats up to 16 inches thick over silt or sand.

Succession—This is an early-seral community. On poorly drained sites, the root mat will thicken and eventually develop into a peatland. On well-drained sites it may eventually progress through a shrub and *Picea sitchensis* (Sitka spruce) stage, although sites adjacent to peatlands likely will be encroached on by peat.

***Calamagrostis canadensis/ Potentilla palustris* Community Type Bluejoint/ Marsh Fivefinger Community Type CALCAN/POTPAL G5; S5**

Other studies—The *Calamagrostis canadensis/Potentilla palustris* (bluejoint/marsh fivefinger) c.t. is similar to a *Carex lyngbyaei*/Grass (Lyngby's sedge/grass) type previously reported for the delta by Batten and others (1978), and a *Calamagrostis canadensis/Equisetum fluviatile-Potentilla palustris* (bluejoint/marsh horsetail-marsh fivefinger) c.t. described for upper Cook Inlet by Ritchie and others (1981). Many *Calamagrostis canadensis* and *Calamagrostis canadensis*/herb (bluejoint/herb) c.t.'s are documented for coastal Alaska (Viereck and others 1992) and vary from permanently flooded types to more mesic grass forb meadows. Shephard (1995) describes a species-rich *Calamagrostis canadensis/Potentilla palustris* type for the Yakutat Foreland comparable to a coastal forb meadow of the Juneau area (Stone 1993).

Vegetation—*Calamagrostis canadensis* (bluejoint) dominates the sites, and *Potentilla palustris* (marsh fivefinger), *Carex sitchensis* (Sitka sedge), *Carex lyngbyaei* (Lyngby's sedge), and *Equisetum palustre* (marsh horsetail) are often strong codominants. Bluejoint ranges from 3 to 5 feet in height, and bryophyte cover ranges from absent to 90 percent.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 6; species richness = 24):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Equisetum arvense	50	10	0-20
Equisetum fluviatile	83	3	0-10
Equisetum palustre	50	30	0-60
Potentilla palustris	83	30	0-50
Graminoids:			
Calamagrostis canadensis	100	67	40-100
Carex lyngbyaei	50	17	0-20
Carex sitchensis	67	15	0-20

Environmental characteristics—This is a minor type widely distributed throughout much of the Copper River Delta. It occurs on wet terraces, wet levees, and lake edges of outwash plains and uplifted marshes. The soil is likely saturated throughout much of the growing season; the water table depth, however, can drop in excess of 16 inches during dry spells. Surface topography is often hummocky because of the raised root wads of bluejoint. Consistent vegetation zonation patterns are associated with different water depths. Vegetation zones of ponded basins typically change, moving from wet (standing water) to dry, from emergent vegetation, to herbaceous wet meadow, to shrub-dominated wetland, to forest. The forested portions usually are associated with levees.

Soils—The soils are characterized by an organic mat ranging from 2 to 15 inches thick overlaying silt or sand. The pH of the organic soil ranges from 5.2 to 6.0, and 5.5 to 6.6 in the mineral soil. Salinity is low.

Succession—This type is mid seral on the uplifted marshes and outwash plains. It may have occurred before the 1964 uplift within the uplifted marsh. The organic mat will continue to thicken, *Sphagnum* (peat moss) will invade, and it eventually will develop into extensive peatland. To develop, peatlands require saturated soils or depressions in level areas that once supported ponds but are now filling with organic matter.

***Carex lyngbyaei* Community Type**
Lyngby's Sedge Community Type
CARLYN
Not Ranked

Other studies—*Carex lyngbyaei* (Lyngby's sedge) c.t. forms the main body of coastal marshes occupying tidal flats in Alaska, and many community types have been described for the state (Viereck 1992). A *Carex lyngbyaei* (Lyngby's sedge) c.t. is reported for coastal south-central Alaska by Batten and others (1978), Crow (1968, 1977), and DeVelice and others (1994) and for the Yakutat Foreland by Batten and others (1978) and Shephard (1995).

Vegetation—*Carex lyngbyaei* (Lyngby's sedge) dominates the community and ranges from 1 to 3 feet in height (fig. 28). Bryophyte cover ranges from absent to 90 percent; *Sphagnum* (peat moss) is present in some sites.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 13; species richness = 49):

Figure 28—*Carex lyngbyaei* (Lyngby's sedge) c.t. on the uplifted marsh landscape below Sheridan Glacier.

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Cicuta douglasii	38	2	0-3
Epilobium palustre	31	1	0-1
Pedicularis parviflora	31	1	0-3
Potentilla palustris	31	2	0-5
Graminoids:			
Agrostis alaskana	31	6	0-10
Carex lyngbyaei	100	80	40-97
Eleocharis palustris	31	1	0-3

Environmental characteristics—The *Carex lyngbyaei* (Lyngby's sedge) c.t. is a minor type found on root mats or mineral soils on uplifted marshes of the Copper River Delta. It is located on nontidal sites with permanent to semipermanent standing water (ponds and lakes). On peat deposits, site characteristics range from that of bogs to fens. Within bogs, the sites are nutrient poor, acidic, and the water table is at or close to the surface most of the year. Whereas, within fens, precipitation and ground-water flow are both water sources; consequently nutrient availability, pH values, and biomass productivity are all higher than in bogs. Consistent vegetation zonation patterns are associated with different water depths. Vegetation zones of ponded basins typically change, moving from wet (standing water) to dry, from emergent vegetation, to herbaceous wet meadow, to shrub-dominated wetland, to forest. The forested portions usually are associated with levees.

Soils—The upper soil layer is a mat of roots and organic matter, or a mixture of roots, organic matter, and silt ranging from 3 to 18 inches thick. The underlying mineral soils are typically silt and sand with no horizon development. The pH of the organic soil ranges from 2.8 to 7.1, and 3.5 to 7.9 in the mineral soil. Salinity is low.

Succession—This type is a remnant of the *Carex lyngbyaei* (Lyngby's sedge) tidal marsh that was uplifted by the 1964 earthquake, thereby removing it from tidal influence. The tidal marsh extended far inland from the foreshore levee on the Copper River Delta. Freshwater-tolerant species such as *Potentilla palustris* (marsh fivefinger) are invading, and the *Carex lyngbyaei* c.t. stage of succession may soon cease to occur on the Copper River Delta until the next tectonic uplift of a *Carex lyngbyaei*-dominated tidal marsh. Otherwise, succession appears to be progressing much as one would expect in a ponded basin. Herbaceous species invade the emergent vegetation (*Carex lyngbyaei* [Lyngby's sedge]), and eventually form thick mats of root and organic matter at or above water level. The vegetation on the root mats are in turn invaded by low shrubs. The organic mat will continue to thicken, and the sites eventually will develop into extensive peatlands, including bogs and fens.

***Carex lyngbyaei-Lathyrus palustris* Community Type**
Lyngby's Sedge-Vetchling Community Type
CARLYN/LATPAL
G2; S2

Other studies—The *Carex lyngbyaei-Lathyrus palustris* (Lyngby's sedge-vetchling) c.t. has been previously described for the Copper River Delta by Batten and others (1978) and Crow (1968).

Vegetation—*Carex lyngbyaei* (Lyngby's sedge) and *Lathyrus palustris* (vetchling) codominate the community. The canopy cover of *Lathyrus palustris* (vetchling) can be variable seasonally and yearly (Thilenius 1990). Various herbaceous species, including *Calamagrostis canadensis* (bluejoint), have high cover values in several sites. Height of the *Carex lyngbyaei* layer ranges from 1 to 3 feet. Bryophyte cover ranges from sparse to high; *Sphagnum* (peat moss) cover is high in most sites.

The following tabulation lists the common species, and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 13; species richness = 51):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Galium triflorum	62	3	0-10
Iris setosa	54	13	0-70
Lathyrus palustris	100	66	25-90
Graminoids:			
Agrostis alaskana	54	4	0-3
Calamagrostis canadensis	77	34	0-90
Carex lyngbyaei	100	70	25-97
Mosses and lichens:			
Sphagnum spp.	54	34	0-80

Environmental characteristics—This is a major type found on root mats or mineral soils on uplifted marshes of the Copper River Delta. It is located on nontidal sites with semipermanent standing water ranging from at the soil surface to 12 inches below the surface. These are fens where precipitation and ground-water flow are both water sources; consequently nutrient availability, pH values, and biomass productivity are all higher than in bogs. Consistent vegetation zonation patterns are associated with different water depths. Vegetation zones of ponded basins typically change, moving from wet (standing water) to dry, from emergent vegetation, to herbaceous wet meadow, to shrub-dominated wetland, to forest. The forested portions usually are associated with levees.

Soils—The upper soil layer is a mat of roots and organic matter or a mixture of roots, organic matter, and silt ranging from 1 to 11 inches thick. The underlying mineral soils are typically silt and sand with little or no horizon development. The pH of the organic soil ranges from 5.3 to 6.1, and 5.1 to 6.6 in the mineral soil. Salinity is low.

Succession—This type is a remnant of the *Carex lyngbyaei* (Lyngby's sedge) saltmarsh that was uplifted by the 1964 earthquake, thereby removing it from tidal influence. The tidal marsh extended far inland from the foreshore levee. *Lathyrus palustris* (vetchling) was common in *Carex lyngbyaei* communities before the uplift, and increased after the uplift (Crow 1968). Other freshwater-tolerant species, such as *Calamagrostis canadensis* (bluejoint), are invading the sites.

The *Carex lyngbyaei-Lathyrus palustris* (Lyngby's sedge-vetchling) c.t. is an early stage of succession for tectonically uplifted *Carex lyngbyaei* (Lyngby's sedge) communities. The *Carex lyngbyaei-Lathyrus palustris* (Lyngby's sedge-vetchling) c.t. stage of succession may soon cease to occur on the Copper River Delta until the next tectonic uplift of a *Carex lyngbyaei*-dominated tidal marsh. Otherwise, succession appears to be progressing much as one would expect in a pond. Herbaceous species invade the emergent vegetation (*Carex lyngbyaei*) and eventually form thick mats of root and organic matter at or above water level. The vegetation on the root mats are in turn invaded by low shrubs. The organic mat will continue to thicken, and the sites eventually will develop into extensive peatlands, including bogs and fens.

***Carex lyngbyaei*/ Mixed-Herb Community Type**
Lyngby's Sedge/ Mixed Herb Community Type
CARLYN/Mixed Herb
Not Ranked

Other studies—No prior studies report a *Carex lyngbyaei*/mixed-herb (Lyngby's sedge/mixed-herb) c.t. Many investigations are cited in Viereck and others (1992) that include *Carex lyngbyaei* as the main dominant.

Vegetation—*Carex lyngbyaei* (Lyngby's sedge) dominates the community; species richness is high, and the combined cover value of herbaceous species is greater than 30 percent in all plots. Height of the *Carex lyngbyaei* (Lyngby's sedge) layer ranges from 1 to 3 feet. Bryophyte cover ranges from 0 to 90 percent; *Sphagnum* (peat moss) cover is high in several plots.

The following tabulation lists the common species, and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 11; species richness = 67):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Cicuta douglasii	36	1	0-3
Potentilla palustris	36	18	0-60
Graminoids:			
Agrostis alaskana	36	18	0-30
Calamagrostis canadensis	45	9	0-20
Carex lyngbyaei	100	71	30-97
Carex sitchensis	36	18	0-40
Deschampsia beringensis	36	16	0-10
Mosses and lichens:			
Sphagnum capillifolium	9	10	0-10
Sphagnum squarrosum	9	70	0-70
Sphagnum spp.	27	60	0-90

Environmental characteristics—*The Carex lyngbyaei*/mixed-herb (Lyngby's sedge/mixed-herb) c.t. is a minor type found on root mats or mineral soils on uplifted marshes of the Copper River Delta. They are nontidal with semipermanent standing water ranging from at the soil surface to 6 inches below the surface. On peat deposits, site characteristics range from that of bogs to fens. Within bogs, the sites are nutrient poor, acidic, and the water table is at or close to the surface most of the year; whereas, within fens, precipitation and ground-water flow are both water sources. Consequently, nutrient availability, pH values, and biomass productivity are all higher than in bogs. Consistent vegetation zonation patterns are associated with different water depths. Vegetation zones of ponded basins typically change, moving from wet (standing water) to dry, from emergent vegetation, to herbaceous wet meadow, to shrub-dominated wetland, and to forest. The forested portions usually are associated with levees.

Soils—The upper soil layer is a mat of roots, peat, and organic matter ranging from 1 to 10 inches thick. The underlying mineral soils are typically silt and sand with little or no horizon development. The pH of the organic soil ranges from 4.3 to 6.8, and 4.2 to 7.1 in the mineral soil. Salinity is low.

Succession—This type is a remnant of t*he Carex lyngbyaei* (Lyngby's sedge) tidal marsh that was uplifted by the 1964 earthquake, thereby removing it from any tidal influence. The tidal marsh extended far inland from the foreshore levee. Freshwater-tolerant species, such as *Calamagrostis canadensis* (bluejoint), are invading the sites.

This community is an early stage of succession for tectonically uplifted *Carex lyngbyaei* (Lyngby's sedge) communities. The *Carex lyngbyaei*/mixed-herb (Lyngby's sedge/mixed-herb) c.t. stage of succession may soon cease to occur on the Copper River Delta until the next tectonic uplift of a *Carex lyngbyaei*-dominated tidal marsh. Otherwise, succession appears to be progressing much as one would expect in a pond. Herbaceous species invade the emergent vegetation *Carex lyngbyaei* and eventually form thick mats of root and organic matter at or above water level. The vegetation on the root mats are in turn invaded by low shrubs. The organic mat will continue to thicken, and the sites eventually will develop into extensive peatlands.

Figure 29—*Carex lyngbyaei/Ranunculus cymbalaria* c.t. on tidal marsh landscape adjacent to Eyak River.

***Carex lyngbyaei/ Ranunculus cymbalaria* Community Type**
Lyngby's Sedge/ Seaside Buttercup Community Type
CARLYN/RANCYM
G5; S5

Other studies—*Carex lyngbyaei* (Lyngby's sedge) types have been described from many coastal areas of Alaska and are cited in Viereck and others (1992); no studies, however, document a *Carex lyngbyaei/Ranunculus cymbalaria* (Lyngby's sedge/seaside buttercup) c.t. The *Carex lyngbyaei/Ranunculus cymbalaria* (Lyngby's sedge/seaside buttercup) c.t. is similar to a *Carex lyngbyaei/Potentilla egedii* type reported by Crow (1977) and a *Carex lyngbyaei-Poa eminens/Ranunculus cymbalaria* type reported by Rosenberg (1986). Batten and others (1978) also found *Ranunculus cymbalaria* (seaside buttercup) associated with *Carex lyngbyaei* in their Yakutat Foreland, Copper River Delta, and upper Cook Inlet study sites.

Vegetation—*Carex lyngbyaei* (Lyngby's sedge) dominates the community (fig. 29). The diagnostic understory species, *Puccinellia* (alkali grass) species, *Carex mackenziei*, *Plantago maritima* (plantain), *Triglochin maritimum* (seaside arrow-grass), or *Ranunculus cymbalaria* (seaside buttercup) have low cover values in most sites. *Potentilla egedii* (Pacific silverweed) is a common understory species. Height of the *Carex lyngbyaei* layer ranges from 1.5 to 3 feet. Nonvascular species cover is typically low or absent.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 20; species richness = 54):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Plantago maritima	15	2	0-3
Potentilla egedii	90	15	0-80
Ranunculus cymbalaria	40	6	0-40
Triglochin maritimum	25	2	0-3
Graminoids:			
Carex lyngbyaei	100	71	25-97
Carex mackenziei	10	16	0-30
Puccinellia pumila or *P. nutkaensis*	10	6	0-10

Environmental characteristics—The *Carex lyngbyaei/Ranunculus cymbalaria* (Lyngby's sedge/seaside buttercup) c.t. is a major type on the tidal marsh landscape. The tideflats are found adjacent to the foreshore levee and the sound side of barrier islands and spits. They are not found on the remainder of the Copper River Delta. In the estuary west of the Copper River, during spring, the tide water is saline to brackish; however, by midsummer it has changed to fresh. The estuary east of the Copper River appears to remain brackish or saline year-round.

Soils—The soils are classified as Typic Cryaquents or Typic Cryopsamments. They are silt or sand with dense roots at the surface; horizon development was not noted. Although the surface layer is always saturated, deeper layers are often drier and contain mottles. The pH ranges from 5.7 to 8.0.

Succession—Primary succession on the tidal marsh progresses through a series of stages leading from pioneer species establishing on the newly exposed tideflats, to a marsh with creeks, levees, and ponds. Presently, pioneer species such as *Puccinellia pumila* (alkali grass) and *Carex lyngbyaei* (Lyngby's sedge) are establishing on the tideflats. *Carex lyngbyaei* also will dominate the late-seral tidal communities.

***Carex pluriflora-Carex lyngbyaei* Community Type**
Several-Flowered Sedge-Lyngby's Sedge Community Type
CARPLU-CARLYN
G4; S4

Other studies—This type is described for the Yakutat Foreland in the Tongass National Forest by Shephard (1995). It also is reported from the Kenai lowland (Batten and others 1978, Rosenberg 1986) and upper Cook Inlet (Hanson 1951, Ritchie and others 1981).

Vegetation—*Carex pluriflora* (several-flowered sedge) dominates the sedge layer, sometimes with *Carex lyngbyaei* (Lyngby's sedge) codominating. Height of the sedge layer ranges from 1 to 2 feet. Common mosses include *Meesia triquetra*, *Sphagnum fuscum*, and *Sphagnum papillosum*.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 2):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Shrubs:			
Andromeda polifolia	50	3	0-3
Salix arctica	50	5	0-5
Graminoids:			
Carex lyngbyaei	50	10	0-10
Carex pluriflora	100	40	30-50
Carex sitchensis	50	20	0-20
Eriophorum angustifolium	50	10	0-10
Mosses and lichens:			
Meesia triquetra	50	40	0-40
Sphagnum fuscum	50	50	0-50
Sphagnum papillosum	50	50	0-50

Environmental characteristics—This is an incidental type found on uplifted marshes of the Copper River Delta. The sites are poorly drained. Surface topography ranges from level to hummocky because of raised root wads. Consistent vegetation zonation patterns are found within ponded basins of uplifted marshes. Near water tracts or streams, herbaceous types dominate such as *Carex sitchensis* (Sitka sedge). Moving to higher, and presumably drier sites, the vegetation changes to herbaceous-dwarf shrub, to shrub and dwarf tree communities. Where peatlands abut upland forests, the ecozone consists of mature, typically slow-growing, needleleaf trees growing on a thin peat layer overlaying mineral soil.

Soils—The soils are characterized by an organic mat less than 16 inches thick, overlaying silt or sand. The soil is likely saturated throughout much of the growing season; the water table depth, however, can drop in excess of 16 inches during dry spells.

Succession—This is an early- to mid-seral community that will develop into peatland communities. To develop, it requires saturated soils or depressions in level areas that once supported ponds but are now filling with organic material. The presence of *Carex lyngbyaei* (Lyngby's sedge) indicates the sites were once tidal and supported various *Carex lyngbyaei* communities.

***Carex rostrata* Community Type**
Beaked Sedge Community Type
CARROS G5; S5

Other studies—The *Carex rostrata* (beaked sedge) c.t. is previously reported for south-central Alaska by Ritchie and others (1981) and Rosenberg (1986).

Vegetation—*Carex rostrata* (beaked sedge) dominates the community, although *Potentilla palustris* (marsh fivefinger) may be a strong codominant. The sedge layer ranges in height from 2 to 3 feet. Bryophyte cover is absent on sites with standing water, and high on sites where the water level drops below the soil surface.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 2):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Equisetum variegatum	50	3	0-3
Potentilla palustris	50	20	0-20
Graminoids:			
Carex rostrata	100	80	80-80
Mosses and lichens:			
Calliergon spp.	50	80	0-80

Environmental characteristics—The *Carex rostrata* (Lyngby's sedge) c.t. is an incidental type found on the floodplain of the Copper River and was not observed on the remainder of the study area. It is a common community of interior Alaska and likely occurs on the Copper River because of the influence of cold air flowing down the Copper River. It is located on sites with permanent to semipermanent standing water (ponded basins). These sites are located in regions that appear to receive ground water (fens) or flood water. In ponded basins, consistent vegetation zonation patterns are associated with different water depths. Vegetation zones typically change, moving from wet (standing water) to dry, from emergent vegetation, to herbaceous wet meadow, to shrub-dominated wetland, to forest. The forested portions usually are associated with levees.

Soils—The soils are characterized by a thick mat of roots and organic matter over silt and sand. The pH is above 6.0, and soils are saturated throughout the growing season.

Succession—This is an early- to mid-seral community that colonizes new ponds on the floodplain of the Copper River. It eventually will develop into peatland communities. To develop, it requires saturated soils or depressions in level areas that once supported ponds but are now filling with organic material.

***Carex sitchensis* Community Type**
Sitka Sedge Community Type
CARSIT G5; S5

Other studies—This type has been previously reported from upper Cook Inlet in south-central Alaska by Ritchie and others (1981) and is similar to the *Carex sitchensis/Equisetum fluviatile* (Sitka sedge/swamp horsetail) c.t. reported by Shephard (1995) for the Yakutat Forelands. A *Carex sitchensis/Caltha palustris* c.t. is described from Middleton Island in Prince William Sound by Thomas (1957).

Vegetation—*Carex sitchensis* (Sitka sedge) dominates the community, although *Equisetum fluviatile* (swamp horsetail), *Potentilla palustris* (marsh fivefinger), and *Calamagrostis canadensis* (bluejoint) may be strong codominants in some sites. Height of the sedge layer ranges from 1 to 3 feet. Bryophytes are absent or sparse because of the presence of standing water.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 13; species richness = 36):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Equisetum fluviatile	69	7	0-30
Equisetum palustre	38	5	0-10
Menyanthes trifoliata	31	6	0-20
Potentilla palustris	54	14	0-60
Graminoids:			
Calamagrostis canadensis	38	13	0-30
Carex sitchensis	100	77	40-100
Mosses and lichens:			
Sphagnum spp.	23	1	0-3

Environmental characteristics—The *Carex sitchensis* (Sitka sedge) c.t. is a major type on the outwash plains and uplifted marshes of the Copper River Delta. It is located on sites with permanent to semipermanent standing water (ponds and lakes) in regions of the delta that appear to receive ground water (fens) or flood water. This suggests that *Carex sitchensis* may require higher nutrient inputs than those supplied in nutrient-poor waters (bogs). Water depth varies from 4 inches above the soil surface to 6 inches below, depending on flooding and precipitation.

Soils—On young sites, *Carex sitchensis* typically forms a floating or submerged mat of roots and organic matter 7 to 38 inches thick, overlying silt and sand. No organic mat was present in one plot; the plants were rooted directly in the mineral soils. Within late-seral peatland complexes, peat thickness ranges from 12 to 35+ inches. The sites with shallow peat occurred adjacent to streams or on water tracks draining the peatland. The pH of the peat ranges from 4.6 to 6.8 and is typically above 6.0. Mineral soil pH ranges from 6.0 to 7.9.

Succession—This community occurs on early- through late-seral sites. On the ponds of the uplifted marsh and young ponds of outwash plains, it is an early- to mid-seral community. It colonizes open water or invades primary successional communities such as the *Equisetum fluviatile* (swamp horsetail) c.t. This community eventually will develop into peatland communities.

On older peatlands, it is a late-seral community. It occupies the higher pH and (assumably) nutrient-rich zones associated with water tracks or adjacent to streams. It also occurs on deep peat deposits with a high water table but not those associated with water tracks. The presence of buried peat moss in the soil profiles suggests water levels fluctuate over time, as do the occurrence of peatland communities on any given site.

***Carex sitchensis/ Sphagnum* Community Type Sitka Sedge/ Peat Moss Community Type CARSIT/SPHAGN G5; S5**

Other studies—The *Carex sitchensis/Sphagnum* (Sitka sedge/peat moss) c.t. is similar to a *Carex sitchensis/Oxycoccus palustris* (Sitka sedge/bog cranberry) c.t. reported for the Yakutat Foreland on the Tongass National Forest (Rigg 1914, Shephard 1995). A related type is described from the Kenai lowland by Rosenberg (1986).

Vegetation—Sites are dominated by *Carex sitchensis* (Sitka sedge; fig. 30). *Eriophorum russeolum* (russett cottongrass), *Menyanthes trifoliata* (buckbean), and *Equisetum palustre* (marsh horsetail) are often strong codominants. Height of the sedge layer averages 2 feet. Bryophytes, predominantly *Sphagnum* (peat moss) species, blanket the ground.

Figure 30—The *Carex sitchensis/Sphagnum* c.t., with a scattering of dwarf *Picea sitchensis* (Sitka spruce), on a distal outwash of the Bering Glacier.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 3):

Species	**Constancy**	**Average**	**Range**
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Drosera rotundifolia	67	2	0-3
Equisetum palustre	67	10	0-10
Fauria crista-galli	67	6	0-10
Menyanthes trifoliata	100	27	10-40
Platanthera dilatata	67	2	0-3
Potentilla palustris	100	5	3-10
Graminoids:			
Carex sitchensis	100	47	30-60
Eriophorum russeolum	67	15	0-20
Mosses and lichens:			
Sphagnum lindbergii	33	40	0-40
Sphagnum magellanicum	33	30	0-30
Sphagnum pacificum	33	50	0-50
Sphagnum riparium	67	35	0-40
Sphagnum squarrosum	33	30	0-30

Environmental characteristics—This incidental type occupies old undisturbed sites of distal outwash plains, floodplains, and uplifted marshes. These are bogs, or ombrotrophic fens, typically dominated by *Sphagnum* (peat moss) species. Within bogs, the sites are nutrient poor, acidic, and the water table is at or close to the surface most of the year. Within fens, precipitation and ground-water flow are both water sources; consequently, nutrient availability, pH values, and biomass productivity are all higher than in bogs. The water table is at or close to the surface most of the growing season and sometimes ponded in shallow hummocks. Surface topography is level with minor hummock formation. Consistent vegetation zonation patterns are found within peatlands. Near water tracts or streams, herbaceous types such as *Carex sitchensis* (Sitka sedge) c.t. dominate. Moving to higher and presumably drier sites, the vegetation changes to herbaceous-dwarf shrub, to shrub and dwarf tree communities. Where peatlands abut upland forests, the ecozone consists of mature, typically slow-growing, needleleaf trees growing on a thin peat layer overlaying mineral soil.

Soils—The soils are characterized by a saturated organic layer greater than 16 inches deep, over silt or sand. The pH of the organic layer ranges from 4.2 to 5.4, and salinity values are low. One plot had an organic layer less than 1 inch thick over silt.

Succession—This is typically a late-seral type. To develop, it requires saturated soils, or depressions in level areas that once supported ponds but now are filled with organic material. It may, however, occupy relatively young sites that are developing into peatlands.

***Deschampsia beringensis* Community Type**
Bering Hairgrass Community Type
DESBER G5; S5

Other studies—*Deschampsia beringensis* (Bering hairgrass) types are found from the Aleutian Islands northeast along the southern Alaska coast (Viereck 1992). Batten and others (1978) describe this community type from Sawmill Bay in western Prince William Sound, and Seguin (1977) and Ritchie and others (1981) report it from the Cook Inlet region. A somewhat related type (*Hedysarum alpinum/Deschampsia beringensis*) is described by Crow (1968) for the Copper River Delta. Various other coastal *Deschampsia beringensis* (Bering hairgrass) types are noted by Viereck and others (1992).

Vegetation—*Deschampsia caespitosa* (tufted hairgrass) or *Deschampsia beringensis* (Bering hairgrass) dominate the community with *Eleocharis acicularis* and *Potentilla egedii* (Pacific silverweed). The height of the graminoid layer ranges up to 3 feet. Bryophyte cover is below 1 percent.

The following tabulation lists the common species and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 2):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Plantago maritima	50	10	0-10
Potentilla egedii	100	12	3-20
Graminoids:			
Carex lyngbyaei	100	3	3-3
Deschampsia beringensis or *D. caespitosa*	100	20	10-30
Eleocharis acicularis	50	20	0-20
Puccinellia nutkaensis	50	10	0-10

Environmental characteristics—The *Deschampsia beringensis* c.t. is a minor type found adjacent to the foreshore levee and the sound side of the barrier islands and spits. It is located on mudflats or silt slopes (< 10 percent) that appear to be above mean high tide but within the tidal surge zone. The sites are well drained although soil mottles indicated a fluctuating water table. Surface topography is level.

Soils—The mineral soils are typically silt with occasional areas of sand or buried organics; horizon development was not noted.

***Eleocharis palustris* Community Type**
Common Spike-Rush Community Type
ELEPAL G5; S5

Other studies—An *Eleocharis palustris* (common spike-rush) c.t. has been described for Port Valdez, Prince William Sound (Crow 1977), the Yakutat Foreland (Shephard 1995), and Stikine River flats for southeast Alaska. It is similar to an *Eleocharis palustris/ Myriophyllum spicatum* c.t. described by Crow (1968) for the Copper River Delta and a *Eleocharis palustris/Hippuris vulgaris* c.t. described by Heusser (1960) for southern coastal Alaska.

Vegetation—*Eleocharis palustris* (common spike-rush) dominates the community, although plant cover of all species may be depauperate in some sites. Species diversity is highly variable because of the large ecological amplitude of *Eleocharis palustris*, which ranges from tidal marshes to outwash plains. Height of the tallest herbaceous layer ranges from 0.5 to 3 feet.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 9; species richness = 12):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Sparganium angustifolium	22	7	0-10
Triglochin maritimum	22	1	0-2
Triglochin palustre	22	1	0-1
Graminoids:			
Carex lyngbyaei	33	2	0-5
Eleocharis palustris	100	48	10-70

Environmental characteristics—This is a minor, yet widespread, community on the Copper River Delta. It occurs as small patches on the tidal marsh landscape and in ponds on the uplifted marsh and outwash plain landscapes. Within the tidal marshes, it occurs within the daily tide zone, and soil salinity ranges from that of fresh water to salt water. It is permanently inundated in outwash and uplifted marsh ponds; the water depth above soil surface ranges from 16 to 24 inches, depending on flooding and precipitation. Consistent vegetation zonation patterns are associated with different water depths. Vegetation zones of ponded basins typically change, moving from wet (standing water) to dry, from emergent vegetation, to herbaceous wet meadow, to shrub-dominated wetland, to forest. The forested portions usually are associated with levees.

Soils—The soils were classified as Typic Cryaquents on all plots sampled. On tidal marshes, *Eleocharis palustris* (common spike-rush) roots in mineral soil (silt or sand), with no horizon development. The pH is above 7.0. In ponds of uplifted marshes or outwash plains, this type either roots in mineral soil or forms a thin (< 4 inches) root mat above the mineral layer. The soils are typically silt and sand with no horizon development, and pH ranges from 6 to 7.

Succession—This is an early-seral community on all landscapes. Primary succession on the tidal marsh progresses through a series of stages leading from pioneer species establishing on the newly exposed tideflats, to a marsh with creeks, levees, and ponds. Presently, pioneer species such as *Eleocharis palustris* (common spike-rush), *Puccinellia pumila* (alkali grass), and *Carex lyngbyaei* (Lyngby's sedge) are establishing on the tideflats. *Carex lyngbyaei* also will dominate the late-seral tidal communities.

On outwash and uplifted marsh landscapes, it will develop into peatland communities. To develop, it requires saturated soils, or depressions in level areas that once supported ponds but are now filling with organic material.

***Elymus arenarius* Community Type**
Beach rye Community Type
ELYARE G5; S5

Other studies—This type has been previously described for Prince William Sound (Batten and others 1978, DeVelice and others 1994) and the Yakutat Foreland (Shephard 1995). Various *Elymus arenarius* (beach rye) c.t.s are cited in Viereck and others (1992) that include *Elymus arenarius* as the dominant species for coastal dune habitats of south-central (Hanson 1951, Quimby 1972, Rosenberg 1986) and southeast Alaska (Stephens and Billings 1967). Further analytical work may be necessary to compare these latter *Elymus arenarius* c.t.'s. to the Copper River Delta.

Vegetation—The herbaceous overstory is dominated by *Elymus arenarius* (beach rye; fig. 31). The sites are commonly monotypic with low species richness. Total cover of species other than beach rye, including bryophytes, is also sparse. Height of beach rye varies from 2 to 4.5 feet.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 6; species richness = 12):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Achillea borealis	33	1	0-1
Equisetum arvense	33	3	0-5
Honckenya peploides	67	2	0-3
Lathyrus maritimus	50	4	0-10
Graminoids:			
Elymus arenarius	100	43	20-90
Poa macrantha	33	1	0-1

Environmental characteristics—This is a major type on barrier islands, spits, and coastal dunes, and is a minor component of the linear dune landscape. It is the primary colonizer of beachfront dunes, and occupies (along with *Honckenya peploides* [seabeach sandwort]) the closest location on the beach front to the surf. The distribution pattern of the sites is typically discontinuous, colonizing entire small dunes. The

Figure 31—A gradient of communities leading from the *Elymus arenarius* c.t. on the lower beach to shrub and tree communities on the beach ridge.

dunes are composed of shifting sand and gravel deposits that are influenced by the wave action of the ocean (Thilenius 1990). Sites are well drained on level to steep slopes. The surface topography is undulating and uneven because of shifting sands. Storm tides likely inundate these sites, thereby suggesting that salt inputs may be sporadically high. Precipitation continually leaches the salts from the system.

On linear dunes, this type is the primary colonizer of exposed soil on blowouts. The sites are well drained and salinity is low.

Consistent vegetation zones occur on barrier islands, spits, and coastal dunes. The zones, moving from dunes of increasing stability, elevation, and distance from the ocean, typically change from *Elymus arenarius* (beach rye) types, to various herbaceous types, to forested types.

Soils—The soils are classified as Typic Cryopsamments or Typic Cryaquents. They are characterized by deep, well-drained silt and sand, with little litter layer and no horizon development. Mottles and gleying are not present. The pH ranges from 7.0 to 8.4.

Succession—This community is early successional. Newly formed dunes on barrier islands, spits, and coastal dunes are initially colonized by *Elymus arenarius* (beach rye). As the dunes become removed from the oceans influence, because of uplift or dune building, other herbaceous species invade the sites, followed by *Picea sitchensis* (Sitka spruce) communities and, eventually, *Tsuga heterophylla* (western hemlock) communities. Similarly, succession on linear dunes moves from herbaceous communities (such as the beach rye c.t.) establishing on recently disturbed surfaces, to shrub or cottonwood types. The cottonwood types, however, are likely not stable and, consequently, are not considered late successional.

Elymus arenarius/ Achillea borealis **Community Type**
Beach Rye/Yarrow Community Type
ELYARE/ACHBOR
G5; S5

Other studies—This specific type has not been previously described in the literature; many studies, however, are cited in Viereck and others (1992) that include *Elymus arenarius* (beach rye) as the dominant species for coastal dune habitats of south-central (Batten and others 1978, DeVelice and others 1994, Hanson 1951, Quimby 1972, Rosenberg 1986) and southeast Alaska (Shephard 1995, Stephens and Billings 1967). Shephard (1995) also describes a closely related *Fragaria chiloensis-Achillea borealis beach* (strawberry-yarrow) c.t. for the Yakutat Foreland.

Vegetation—The herbaceous overstory is dominated by *Elymus arenarius*. *Achillea borealis* and *Lathyrus maritimus* (beach pea) dominate the understory; species richness and community structure are higher than in the *Elymus arenarius* c.t. Lichen and moss cover is moderate. Height of the beach rye layer ranges from 2 to 3 feet.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 4):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Achillea borealis	100	28	10-50
Arabis hirsuta	50	1	0-1
Fragaria chiloensis	75	1	0-1
Lathyrus maritimus	50	35	0-50
Stellaria calycantha	50	2	0-3
Graminoids:			
Elymus arenarius	100	50	40-60
Luzula multiflora	50	1	0-1
Poa macrantha	75	4	0-10
Mosses and lichens:			
Rhytidiadelphus squarrosus	50	16	0-30

Environmental characteristics—The *Elymus arenarius/Achillea borealis* c.t. is a major type on barrier islands, spits, and coastal dunes and is an incidental component of the linear dunes. It usually occupies sites on dunes above the *Elymus arenarius* c.t. The distribution pattern of the sites is typically continuous along the upper and mid dunes. Shifting sand is still common. The surface topography is undulating and uneven. Salt inputs from ocean spray and extreme storm tides are sporadic, and precipitation rapidly leaches the salts from the system. Only one plot had high salinity. Consistent vegetation zones occur on barrier islands, spits, and coastal dunes. The zones, moving from dunes of increasing stability, elevation, and distance from the ocean, typically change from *Elymus arenarius* (beach rye) types, to various herbaceous types, to forested types.

Soils—The soils are classified as Typic Cryopsamments. They are characterized by a thin (0 to 2 inches) humic layer, over deep, well-drained silt and sand, with no horizon development. Mottles and gleying were not encountered. The pH ranges from 6.5 to 6.9 in the organic layer, and 6.6 to 8.0 in the mineral soil.

Succession—This community is early to mid successional. Newly formed dunes on barrier islands, spits, and coastal dunes are initially colonized by the *Elymus arenarius* c.t. As the dunes become removed from the oceans influence, because of uplift or dune building, other herbaceous species invade the sites and form the *Elymus arenarius/Achillea borealis* c.t. This is followed by other herbaceous communities, then *Picea sitchensis* (Sitka spruce) communities and, eventually, *Tsuga heterophylla* (western hemlock) communities.

Eriophorum angustifolium **Community Type**
Tall Cottongrass Community Type
ERIANG
Not Ranked

Other studies—*Eriophorum angustifolium* (tall cottongrass) types are uncommon in the vegetation literature for the state (Viereck and others 1992). Various authors describe subarctic lowland sedge moss-bog meadows that occur on peat soils on landtypes including various peat filled depressions in south-central and interior Alaska, and raised bogs, slope bogs, and early stages of flat bogs in southeastern Alaska. The *Eriophorum angustifolium* c.t. may be a variant of the *Eriophorum angustifolium-Carex pauciflora* and *Eriophorum angustifolium-Carex pluriflora* (tall cottongrass-several-flowered sedge) c.t.'s reported for the Chugach National Forest (DeVelice and others 1994). An *Eriophorum angustifolium/Carex livida* c.t. is described for the Kenai lowlands by Rosenberg (1986).

Vegetation—Sites are dominated by *Eriophorum angustifolium*. *Andromeda polifolia* (bog rosemary) and *Carex pluriflora* (several-flowered sedge) are often strong codominants. Height of *Eriophorum angustifolium* averages 1 foot. Bryophytes, predominantly *Sphagnum* (peat moss) species, blanket the ground.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 4):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Trees:			
Picea sitchensis	50	1	0-1
Shrubs:			
Andromeda polifolia	75	10	0-10
Empetrum nigrum	75	5	0-10
Oxycoccus microcarpus	75	2	0-3
Forbs:			
Drosera rotundifolia	75	2	0-3
Graminoids:			
Carex pluriflora	50	15	0-20
Carex sitchensis	75	4	0-10
Eriophorum angustifolium	100	67	50-98
Mosses and lichens:			
Sphagnum fuscum	75	37	0-50
Sphagnum papillosum	50	50	0-80

Environmental characteristics—This incidental type occupies old undisturbed sites of distal outwash plains and floodplains. These are bogs, or ombrotrophic fens, typically dominated by *Sphagnum* species. The sites are nutrient poor and acidic. The water table is at or close to the surface most of the growing season, and ponds sometimes form in shallow hummocks. Surface topography is level with minor hummock formation.

Soils—The soils are classified as Hydric Sphagnofibrists. These histic soils are characterized by a saturated organic layer greater than 16 inches deep, over silt or sand. The pH of the organic layer ranges up to 4.8, and salinity values are low.

Succession—This is a late-seral type. To develop, it requires saturated soils, or depressions, in level areas that once supported ponds but now are filled with organic material.

***Puccinellia nutkaensis* Community Type**
Dwarf Alkaligrass Community Type
PUCNUT G5; S5

Other studies—*Puccinellia pumila* (dwarf alkaligrass) and *Puccinellia nutkaenis* (Pacific alkaligrass) communities are grouped together because of their similarity in taxonomy and habitat. A *Puccinellia pumila* type is previously reported from the Yakutat Foreland and includes both *Puccinellia pumila* and *Puccinellia nutkaenis* (Shephard 1995). A *Puccinellia nutkaenis* c.t. is described from southeast Alaska (Neiland 1971), Glacier Bay (Streveler and others 1973), Prince William Sound including sites on the Copper River Delta (Batten and others 1978), and upper Cook Inlet in south-central Alaska (Vince and Snow 1984). Related *Puccinellia nutkaenis* types are identified throughout this region (Crow 1977, Crow and Koppen 1977, McCormick and Pinchon 1978).

Vegetation—*Puccinellia pumila* or *Puccinellia nutkaenis* dominate the community (fig. 32). Total cover for all species is low, rarely exceeding 50 percent, and species richness is low. Canopy height of *Puccinellia* ranges from 1 to 6 inches. Bryophytes were not encountered.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 6; species richness = 4):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Graminoids:			
Carex lyngbyaei	33	1	0-1
Puccinellia pumila or *P. nutkaensis*	100	35	20-60

Environmental characteristics—The *Puccinellia nutkaensis* c.t. is a major type on tidal marsh landscape adjacent to the foreshore levee and the sound side of the barrier islands and spits. It is not found on the remainder of the Copper River Delta. In the estuary west of the Copper River, the tide water is saline to brackish during spring; by midsummer, however, it has changed to fresh. The estuary east of the Copper River appears to remain brackish or saline year-round. The sites are tidally inundated daily.

Soils—The mineral soils are typically silt with occasional areas of sand or buried organics; horizon development was not noted. Although the surface layer is always saturated, deeper layers (> 5 inches) are often drier and contained mottles. The pH ranges up to 8.0.

Figure 32—The *Puccinellia nutkaensis* c.t. invading tidal mudflats adjacent to Eyak River.

Succession—Primary succession on the tidal marsh progresses through a series of stages leading from pioneer species establishing on the newly exposed tideflats, to a marsh with creeks, levees, and ponds. Presently, pioneer species such as *Puccinellia pumila*, *Puccinellia nutkaenis*, and *Carex lyngbyaei* (Lyngby's sedge) are establishing on the tideflats. *Carex lyngbyaei* will dominate the late-seral tidal communities.

Undersampled Graminoid Community Types

***Calamagrostis canadensis/Lathyrus palustris* (bluejoint/vetchling) c.t.—**Reconnaissance information indicates this is an incidental type (no sites sampled) on the uplifted marsh landscape. It occurs on saturated root mats and is dominated by *Calamagrostis canadensis* (bluejoint) and *Lathyrus palustris* (vetchling); species composition is variable. Not ranked.

***Carex chordorrhiza* (creeping sedge) c.t.—**This is an incidental type (one site sampled) on the Copper River Delta. It occurs on root mats or mineral soils of the uplifted marsh landscape. It is dominated by *Carex chordorrhiza* (creeping sedge). The soils are poorly drained. Not ranked.

***Carex glareosa* c.t.—**This is an incidental to minor type (one site sampled) that occurs on tidal marshes, predominantly marshes between the Bering Glacier and Copper River. It may form extensive areas dominated by *Carex glareosa*, and species richness is relatively high compared to other tidal marsh communities. The sites are commonly flooded by tides, and water salinity is high during the growing season. The pH is above 7.0. Not ranked.

Figure 33—*Eriophorum russeolum* c.t. on a developing peatland of the uplifted marsh landscape.

***Carex limosa* (livid sedge) c.t.—**This is an incidental type (one site sampled) that occurs on mature peatlands of the uplifted marsh landscape and between uplifted beach ridges. It is dominated by *Carex limosa* (livid sedge); species composition is variable. The soils are organic, and the water table is at or near the surface. This is a late-successional type. Not ranked.

***Carex saxatilis* (russet sedge) c.t.—**The *Carex saxatilis* (russet sedge) c.t. is an incidental type (two sites sampled) found on uplifted marshes and outwash plains of the Copper River Delta. *Carex saxatilis* dominates the community, although other emergent species often have high cover values. The water table fluctuates, ranging in depth from above the soil surface to greater than 16 inches below. Not ranked.

***Eriophorum russeolum* (russett cottongrass) c.t.—**This is an incidental type (one site sampled) that occurs on root mats and poorly drained soils of the uplifted marsh landscape (fig. 33). It is dominated by *Eriophorum russeolum* (russett cottongrass). Not ranked.

***Glyceria pauciflora* (weak mannagrass) c.t.—**This is an incidental yet widespread type (two sites sampled) that occurs on the uplifted marsh and distal outwash landscapes. It is dominated by *Glyceria pauciflora* (weak mannagrass). The sites are poorly drained typically with standing water. The soils are silt or sand with no organic mat development, and the pH is above 6.7. Not ranked.

***Hierochloe odorata* (vanilla grass) c.t.—**This is an incidental type (one site sampled) that occurs on poorly drained mineral soils of the uplifted marsh and (distal) outwash landscapes. It is dominated by *Hierochloe odorata* (vanilla grass). Not ranked.

Figure 34—*Epilobium angustifolium* c.t. on a levee of the uplifted marsh landscape (photo courtesy of Dean Davidson, USDA-FS, Anchorage, AK).

***Juncus alpinus* (northern rush) c.t.—**This is an incidental, yet widespread, type (one site sampled) that occurs as small patches on tidal marshes. It is dominated by *Juncus alpinus* (northern rush); species composition is variable. The sites are commonly flooded by tides, and the pH is above 7.0. Not ranked.

***Juncus arcticus* (arctic rush) c.t.—**This is an incidental, yet widespread, type (one site sampled) that occurs as small patches on tidal marshes. It is dominated by *Juncus arcticus* (arctic rush). The sites are commonly flooded by tides, and the pH is above 7.0. Not ranked.

***Poa macrantha* (seashore bluegrass) c.t.—**This is a rare community within Alaska. On the Copper River Delta, it is an incidental type (one site sampled) restricted to young slacks or beach dunes. It is dominated by *Poa macrantha* (seashore bluegrass); associate species, such as *Deschampsia beringensis* (Bering hairgrass) and *Eleocharis palustris* (common spike-rush), are common. The sites are commonly flooded by tides, salinity is high, and the pH is above 7.0. The soils have a thin organic cover over sand and silt, and the water table likely fluctuates with the tide. It is an early successional type. G?; S1.

Forb Community Type Descriptions

***Epilobium angustifolium* Community Type**
Fireweed Community Type
EPIANG G5; S2

Other studies—The *Epilobium angustifolium* (fireweed) c.t. (fig. 34) has not been previously described in the literature (Viereck and others 1992).

Vegetation—Sites are dominated by *Epilobium angustifolium* and *Athyrium filix-femina* (lady-fern). *Calamagrostis canadensis* (bluejoint) and *Angelica lucida* (sea coast angelica) are common associates. Because of the large ecological amplitude of fireweed, composition and cover of other herbaceous species are highly variable. Height of fireweed ranges from 4 to 5 feet. Bryophyte cover ranges from 0 to 80 percent.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 3):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Achillea borealis	67	6	0-10
Angelica lucida	67	25	0-30
Epilobium angustifolium	100	67	40-80
Equisetum arvense	67	20	0-30
Galium trifidum	100	1	1-3
Stellaria crassifolia	67	11	0-20
Trientalis europaea	67	7	0-10
Graminoids:			
Calamagrostis canadensis	67	22	0-40
Ferns:			
Athyrium filix-femina	67	25	0-30
Mosses and lichens:			
Rhytidiadelphus squarrosus	67	50	0-80

Environmental characteristics—The *Epilobium angustifolium* c.t. is a major type on the barrier island, dune, and spit landscape, and a minor component of the outwash plain and uplifted marsh landscapes. The distribution pattern of the sites ranges from large and continuous, primarily on dunes, to patchy and discontinuous on outwash and uplifted marshes. On barrier islands, coastal dunes, and spits, this type usually occupies the upper and mid dune sites above the *Elymus arenarius/Achillea borealis* (beach rye/yarrow) c.t. and below the forested types. The surface topography is undulating and uneven, and shifting sand may still be common. Salt inputs from ocean spray is likely sporadic, and precipitation rapidly leaches the salts from the system. On uplifted marshes, this type occupies moist slough levees, and on outwash plains, it occupies abandoned channels and new alluvial deposits.

Soils—On dunes, the soils are classified as Typic Cryopsamments. They are characterized by a thin (0 to 2 inches) humus layer, over deep, well-drained silt and sand, with minor horizon development. Mottles and gleying were not encountered. The pH of the mineral soil ranges from 5.6 to 6.5.

Succession—This community is mid successional. Newly formed dunes on barrier islands, spits, and coastal dunes are initially colonized by the *Elymus arenarius* (beach rye) c.t. As the dunes become removed from the oceans influence, because of uplift or dune building, other herbaceous species invade the sites and form the *Elymus arenarius/Achillea borealis* c.t. This is followed by other herbaceous communities such as the *Epilobium angustifolium* c.t., then *Picea sitchensis* (Sitka spruce) communities and, eventually, *Tsuga heterophylla* (western hemlock) communities.

Figure 35—*Equisetum fluviatile* c.t. on the uplifted marsh landscape near Alaganik Sough.

***Equisetum fluviatile* Community Type**
Swamp Horsetail Community Type
EQUFLU G5; S5

Other studies—The *Equisetum fluviatile* (swamp horsetail) c.t. (fig. 35) is similar to an *Equisetum fluviatile* type reported for the Yakutat Foreland (Shephard 1995) and *Equisetum fluviatile* and *Equisetum fluviatile-Menyanthes trifoliata* community types from the upper Cook Inlet (Ritchie and others 1981). Related types have been described from other parts of Alaska (Viereck and others 1992).

Vegetation—*Equisetum fluviatile* dominates the community. *Potentilla palustris* (marsh fivefinger) and *Menyanthes trifoliata* (buckbean) may be found as codominants. *Equisetum fluviatile* often ranges up to 3 feet in height.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 16; species richness = 37):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Equisetum fluviatile	100	56	20-90
Lysimachia thyrsiflora	25	9	0-20
Menyanthes trifoliata	38	2	0-3
Potentilla palustris	31	6	1-10

Environmental characteristics—The *Equisetum fluviatile* c.t. is one of the most widespread types on the Copper River Delta. It is a major type on the uplifted marshes, including recently uplifted slacks and outwash plains. *Equisetum fluviatile* is an emergent species, growing on sites with permanent to semipermanent standing water (ponds and lakes). Water depths range from 1 to 18 inches depending on flooding

and precipitation. Within the ponded basins, consistent vegetation zonation patterns are associated with different water depths. Vegetation zones typically change, moving from wet (standing water) to dry, from emergent vegetation, to herbaceous wet meadow, to shrub-dominated wetland, to forest. The forested portions usually are associated with levees.

Soils—*Equisetum fluviatile* typically forms a root mat 2 to 55 inches thick, although in shallow water it roots in mineral soil. The root mat often floats over as much as 18 inches of water. The mineral soils are typically silt and sand with no horizon development. The pH of the root mat ranges from 4.9 to 6.2, and 5.3 to 6.9 in the mineral soil.

Succession—This is a primary colonizer of open water in ponds, channels, or slow streams. On the waters edge, the root mat will thicken and other species will invade, such as *Potentilla palustris* and *Menyanthes trifoliata*. The organic mats eventually develop into peatlands.

***Equisetum variegatum* Community Type**
Northern Horsetail Community Type
EQUVAR G4; S4

Other studies—The *Equisetum variegatum* (northern horsetail) c.t. is the same as an *Equisetum arvense-Equisetum variegatum* (meadow horsetail-northern horsetail) type reported for Hartney Bay near Cordova (Batten and others 1978), and similar to an *Equisetum variegatum* type from the Yakutat Foreland (Shephard 1995) and Susitna River drainage (Helm and others 1984). *Equisetum variegatum-Cicuta douglasii* (northern horsetail-water hemlock) and *Equisetum arvense-Equisetum variegatum/ Philonotis fontana* community types also have been described from the Glacier Bay National Park area (Bosworth 1985, Cooper 1939).

Vegetation—*Equisetum variegatum* dominate the sites. *Equisetum arvense* (meadow horsetail) is often a strong codominant species. The height of northern horsetail ranges from 0.5 to 1.5 feet. Composition and cover of other herbaceous species are highly variable. Bryophyte cover ranges from 20 to 90 percent.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 7; species richness = 45):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Shrubs:			
Alnus crispa var. *sinuata*	57	1	0-1
Salix sitchensis	57	1	0-1
Forbs:			
Equisetum arvense	71	9	0-30
Equisetum variegatum	100	60	40-90
Parnassia palustris	71	1	0-1
Platanthera dilatata	57	1	0-1
Spiranthes romanzoffiana	71	1	0-1
Graminoids:			
Carex lyngbyaei	57	2	0-3

Environmental characteristics—The *Equisetum variegatum* c.t. is an incidental, yet widely distributed, community of the Copper River Delta. It occurs on slacks of the barrier island, dune, and spit landscape, newly exposed sand of linear dunes, and exposed channels and newly deposited alluvium of floodplains and outwash plains. The surface topography ranges from level to undulating. On slacks, storm tides likely inundate these sites, thereby suggesting that salt inputs may be sporadically high. Precipitation likely continually leaches the salts from the system. On linear dunes, floodplains, and outwash, this type is a primary colonizer of exposed soil.

Soils—On slacks, the soils are classified as Typic Cryaquents or Typic Aquic Cryopsamments. Soils are characterized by an organic mat, ranging up to 2 inches thick, over sand or silt. The pH of the organic mat ranges from 7.4 to 8, and the pH of the mineral soil ranges from 7.1 to 7.5. Depth to water table ranges from 5 to 24 inches. The soils of this community on linear dunes, floodplains, and outwash plains are similar to those of slacks but are typically more acidic. Mottles and occasional gleying are present.

Succession—This is an early-seral community. On slacks, the sites are initially invaded by primary colonizers such as the *Equisetum variegatum* c.t. Willow and sweetgale soon follow. As the slack matures, species composition may change dramatically, eventually developing into a tidal marsh. Adjacent dunes also may migrate and cover the sites. It is also a pioneer community on exposed soil of floodplains, outwash, and linear dunes. It is seral to various *Alnus* (alder) and *Salix* (willow) communities.

***Fragaria chiloensis* Community Type**
Beach Strawberry Community Type
FRACHI G?; S3

Other studies—The *Fragaria chiloensis* (beach strawberry) c.t. (fig. 36) is similar to a *Fragaria chiloensis-Achillea borealis* (beach strawberry-yarrow) type described by Shephard (1995) for the Yakutat Foreland. It appears to be unreported for the rest of the state.

Vegetation—Sites are dominated by *Fragaria chiloensis*. In some sites, *Achillea borealis* (yarrow) and *Elymus arenarius* (beach rye) are strong codominants. The average canopy height is less than 1 foot. Bryophyte cover ranges from 0 to 80 percent.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 3):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Achillea borealis	100	34	3-90
Fragaria chiloensis	100	60	30-90
Rhinanthus minor	100	1	1-1
Graminoids:			
Elymus arenarius	100	10	1-20
Festuca rubra	67	6	0-10
Mosses and lichens:			
Rhytidiadelphus squarrosus	67	65	0-80

Figure 36—*Fragaria chiloensis* c.t. found on dune deposits of Okalee Spit.

Environmental characteristics—The *Fragaria chiloensis* c.t. is a major type of the barrier islands, coastal dunes, and spits. Its distribution pattern is typically patchy and discontinuous, occupying dunes above the *Elymus arenarius/Achillea borealis* (beach rye/yarrow) c.t. and below the *Epilobium angustifolium* (fireweed) or forested communities. The surface topography ranges from flat to undulating and uneven because of shifting sands. Salt inputs from ocean spray and extreme storm tides are sporadic, and precipitation rapidly leaches the salts from the system.

Soils—The soils are classified as Typic Cryopsamments. They are characterized by a thin (0 to 1 inch) litter layer, over deep, well-drained silt and sand, with no horizon development. Mottles and gleying were not encountered. The pH ranges from 6.3 to 6.5 in the mineral soil.

Succession—This community is early to mid successional. Newly formed dunes on barrier islands, spits, and coastal dunes are initially colonized by the *Elymus arenarius* c.t. As the dunes become removed from the ocean's influence, because of uplift or dune building, other herbaceous species invade the sites and form the *Elymus arenarius/ Achillea borealis* c.t. This is followed by other herbaceous communities, including the *Fragaria chiloensis* c.t., then *Picea sitchensis* (Sitka spruce) communities and, eventually, *Tsuga heterophylla* (western hemlock) communities.

Figure 37—*Hippuris vulgaris* c.t. invading open water of the uplifted marsh landscape (photo courtesy of Sandy Frost, USDA-FS, Cordova, AK).

***Hippuris vulgaris* Community Type**
Common Marestail Community Type
HIPVUL G5; S5

Other studies—This type is similar to a *Hippuris vulgaris* (common marestail) c.t. (fig. 37) described for upper Cook Inlet by Ritchie and others (1981). Other *Hippuris vulgaris* types have been identified; species associates differ, however, by the region of the state that the type was reported from (Viereck and others 1992).

Vegetation—*Hippuris vulgaris* dominates the community, and various aquatic species are typically present. The height of common marestail ranges from 6 to 12 inches.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 7; species richness = 17):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Hippuris vulgaris	100	50	10-85
Potamogeton perfoliatus richardsonii	29	43	0-60
Ranunculus trichophyllus	29	13	0-20
Sparganium angustifolium	29	16	0-30
Utricularia vulgaris	43	31	0-90
Graminoids:			
Glyceria pauciflora	29	15	0-20

Environmental characteristics—This is a major type of the uplifted marshes and distal portions of outwash plains. Common marestail is an emergent species, growing on sites with permanent to semipermanent standing water. It typically is found in ponds and occasionally occurs on the edges of slow-moving streams. Water depths range from 4 to 18 inches, depending on flooding and precipitation. Within ponded basins, recognizable and consistent vegetation zonation patterns are associated with different water depths. Vegetation zones typically change, moving from wet (standing water) to dry, from emergent vegetation, to herbaceous wet meadow, to shrub-dominated wetland, and to forest. The forested portions usually are associated with levees.

Soils—The soils are characterized by a root mat, or roots mixed with mineral soil, up to 16 inches thick, over mineral soil. The mineral soils are typically silt and sand with no horizon development.

Succession—This is a primary colonizer of open water in ponds or slow streams. On the waters edge, the root mat will thicken and other species will invade, such as *Potentilla palustris* (marsh fivefinger) and *Menyanthes trifoliata* (buckbean). The organic mats eventually develop into peatlands.

***Lathyrus maritimus* Community Type**
Beach Pea Community Type
LATMAR G?; S3

Other studies—The *Lathyrus maritimus* (beach pea) c.t. has not been previously described in the literature; it is, however, similar to other coastal beach communities such as an *Elymus arenarius-Lathyrus maritimus* (Hanson 1951) and *Elymus arenarius/Senecio pseudoArnica-Lathyrus maritimus* c.t. (Bank 1951, Hultén 1960, Rausch and Rausch 1968).

Vegetation—*Lathyrus maritimus* dominates the community, and *Elymus arenarius* (beach rye) is often a major codominant. Canopy height of *Lathyrus maritimus* ranges from 6 to 12 inches.

The following tabulation lists the common species and average percentage of canopy cover within this type (number of sites sampled = 2):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Achillea borealis	50	3	0-3
Honckenya peploides	100	1	1-1
Lathyrus maritimus	100	55	50-60
Rhinanthus minor	100	1	1-1
Graminoids:			
Elymus arenarius	100	20	10-30
Poa macrantha	100	1	1-1

Environmental characteristics—This is a minor type of the barrier islands, coastal dunes, and spits. Its distribution pattern is typically patchy and discontinuous, occupying dunes above the *Elymus arenarius* c.t. and below the *Epilobium angustifolium* (fireweed) or forested communities. The surface topography ranges from flat to undulating and uneven because of shifting sands. Salt inputs from ocean spray and extreme storm tides are sporadic, and precipitation rapidly leaches the salts from the system.

Soils—The soils are classified as Typic Cryopsamments. They are characterized by deep, well-drained silt and sand, with no horizon development. Mottles and gleying were not encountered. The pH ranges from 5.5 to 8.0.

Succession—This community is early to mid successional. Newly formed dunes on barrier islands, spits, and coastal dunes are initially colonized by the *Elymus arenarius* c.t. As the dunes become removed from the oceans influence, because of uplift or dune building, other herbaceous species invade the sites and form the *Elymus arenarius/Achillea borealis* (beach rye/yarrow) c.t. or *Lathyrus maritimus* c.t. These may be followed by other herbaceous communities, then *Picea sitchensis* (Sitka spruce) communities, and eventually *Tsuga heterophylla* (western hemlock) communities.

Figure 38—*Lupinus nootkatensis* c.t. on the barrier island, coastal dune and spit landscape of Softuck Bar.

Lupinus nootkatensis **Community Type**
Nootka Lupine Community Type
LUPNOO G?; S3

Other studies—This community (fig. 38) is similar to a *Lupinus nootkatensis-Lathyrus maritimus-Achillea borealis* type described by Hanson (1951) for Kodiak Island. A related *Lupinus nootkatensis/Salix setchelliana* (nootka lupine/setchell willow) c.t. is reported from the Yakutat Foreland by Shephard (1995).

Vegetation—Sites are dominated by *Lupinus nootkatensis* (nootka lupine), and *Deschampsia beringensis* (Bering hairgrass) and *Achillea borealis* (yarrow) are common associates. Canopy coverage of *Lupinus nootkatensis* may differ dramatically between years. Canopy height ranges from 1 to 4 feet tall. Bryophyte cover ranges from 10 to 30 percent.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 4):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Achillea borealis	75	20	1-40
Angelica genuflexa	50	2	0-3
Angelica lucida	50	12	0-20
Epilobium adenocaulon	50	1	0-1
Epilobium angustifolium	50	1	0-1
Fragaria chiloensis	50	17	0-30
Lathyrus maritimus	50	1	0-1
Lupinus nootkatensis	100	77	60-97
Potentilla egedii	50	3	0-3
Rumex longifolius	50	1	0-1
Stellaria crassifolia	75	1	0-1
Graminoids:			
Deschampsia beringensis or *D. caespitosa*	50	20	0-40
Elymus arenarius	75	5	0-10
Festuca rubra	75	15	0-40
Mosses and lichens:			
Rhytidiadelphus squarrosus	50	40	0-70

Environmental characteristics—This is a minor type of the barrier islands, coastal dunes, and spits. Its distribution pattern is typically patchy and discontinuous, occupying dunes above the *Elymus arenarius* (beach rye) c.t., and below the *Epilobium angustifolium* (fireweed) or forested communities. The surface topography ranges from flat to undulating and uneven because of shifting sands. Salt inputs from ocean spray and extreme storm tides are sporadic, and precipitation rapidly leaches the salts from the system.

Soils—The soils are classified as Typic Cryopsamments or Sandy Humic Cryaquents. They are characterized by an organic layer 0 to 2 inches thick, over deep, well-drained (one site with a water table within 16 inches) silt and sand, with little or no horizon development. Mottles and gleying were not encountered. The pH of the organic layer ranges from 5.9 to 6.0, and from 6 to 7 in the mineral soil.

Succession—This community is early to mid successional. Newly formed dunes on barrier islands, spits, and coastal dunes are initially colonized by the *Elymus arenarius* c.t. As the dunes become removed from the oceans influence, because of uplift or dune building, other herbaceous species invade the sites and form types such as the *Elymus arenarius/Achillea borealis* (beach rye/yarrow) c.t. or *Lupinus nootkatensis* c.t. This is followed by other herbaceous communities, then *Picea sitchensis* (Sitka spruce) communities and, eventually, *Tsuga heterophylla* (western hemlock) communities.

***Menyanthes trifoliata* Community Type**
Buckbean Community Type
MENTRI G5; S5

Other studies—This type is reported by Dachnowski-Stokes (1941), Griggs (1936), Palmer (1942), Ritchie and others (1981), and Rosenberg (1986) for southern Alaska. Related types include a *Menyanthes trifoliata-Potentilla palustris* (buckbean/marsh cinquefoil) c.t. described for the Yakutat Forelands (Shephard 1995), and *Equisetum fluviatile-Menyanthes trifoliata* c.t. for the Cook Inlet area (Ritchie and others 1981, Rosenberg 1986).

Figure 39—*Menyanthes trifoliata* c.t. on the uplifted marsh landscape.

Vegetation—*Menyanthes trifoliata* (buckbean) dominates the community, although *Equisetum fluviatile* (horsetail) and *Potentilla palustris* (marsh fivefinger) are often strong codominants (fig. 39). On young sites, species richness is low, bryophytes are rare, and monotypic stands of buckbean occur. On older sites, species richness and bryophyte cover increases. Canopy height of buckbean ranges up to 1 foot.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 8; species richness = 31):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Equisetum fluviatile	63	14	0-20
Menyanthes trifoliata	100	55	20-80
Potentilla palustris	50	7	0-20

Environmental characteristics—The *Menyanthes trifoliata* c.t. is one of the most widespread types on the Copper River Delta. It is a major type of ponds, channels, or slow streams on the uplifted marshes, and distal portions of outwash plains. Buckbean is an emergent species, growing on sites with permanent to semipermanent standing water (ponds and lakes). Water depths range from 4 to 20 inches depending on flooding and precipitation. Within ponded basins, consistent vegetation zonation patterns are associated with different water depths. Vegetation zones change, moving from wet (standing water) to dry, from emergent vegetation, to herbaceous wet meadow, to shrub-dominated wetland, and to forest. The forested portions usually are associated with levees.

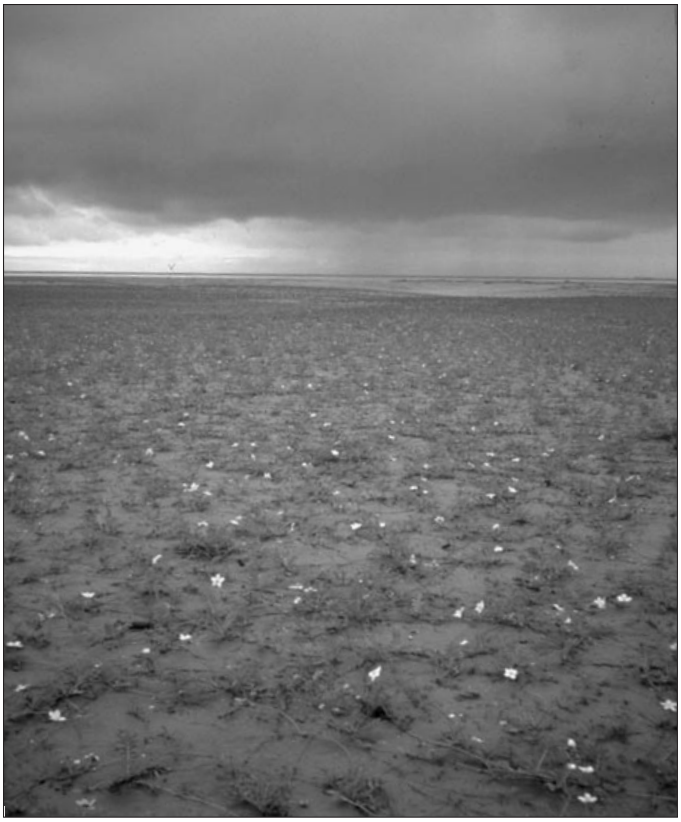

Figure 40—*Potentilla egedii* c.t. on the tidal marsh landscape near Government Slough.

Soils—Buckbean typically forms a root mat 10 to 30 inches thick, that is either anchored in mineral soil or floating. The mineral soils are typically silt and sand with no horizon development. The pH of the root mat ranges from 5.8 to 6.5, and 5.9 to 6.9 in the mineral soil.

Succession—This is a primary colonizer of open water or invades primary colonizers such as *Equisetum fluviatile*. On the waters edge, the root mat will thicken and other species will invade, such as *Potentilla palustris* or *Myrica gale* (sweetgale). The organic mats eventually develop into peatlands.

Potentilla egedii **Community Type**
Pacific Silverweed Community Type
POTEGE
Not Ranked

Other studies—A *Potentilla egedii* (Pacific silverweed) c.t. (fig. 40) has not been described by previous investigators. *Potentilla egedii*, however, is associated with various related coastal halophytic types. *Carex ramenskii/Potentilla egedii*, *Carex lyngbyaei-Poa eminens/Potentilla egedii*, *Triglochin maritimum/Potentilla egedii*, and *Carex ramenskii/Triglochin maritimum-Potentilla egedii* community types are described for the upper Cook Inlet region (Hanson 1951, Ritchie and others 1981, Rosenberg 1986, Vince and Snow 1984), and a *Carex lyngbyaei/Potentilla egedii* type is identified for Port Valdez (Crow 1977).

Vegetation—*Potentilla egedii* (Pacific silverweed) dominates the community. In tidal marshes, total cover for all species is low, rarely exceeding 50 percent, and species richness is low. On uplifted marshes, species richness and cover increase. The height of *Potentilla egedii* rarely exceeds 1 foot.

The following tabulation lists the species that occur in more than 50 percent of the sites (50 percent constancy) and gives the percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 4):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Potentilla egedii	100	30	20-40
Ranunculus cymbalaria	75	2	0-3
Graminoids:			
Juncus arcticus	50	1	0-1
Puccinellia pumila	75	2	0-3

Environmental characteristics—The *Potentilla egedii* c.t. is a minor type on tidal marshes adjacent to the foreshore levee and the sound side of the barrier islands and spits. It is not found on the remainder of the Copper River Delta except as rare remnant populations on levees of the uplifted marsh. In the estuary west of the Copper River during spring, the tide water is saline to brackish; however, by midsummer it has changed to fresh. The estuary east of the Copper River appears to remain brackish or saline year-round.

Soils—The soils are characterized by silt or sand with no horizon development. Although the surface layer is always saturated, deeper layers are often drier and contain mottles.

Succession—Primary succession on the tidal marsh progresses through a series of stages leading from pioneer species establishing on the newly exposed tideflats, to a marsh with creeks, levees, and ponds. Presently, pioneer species such as *Potentilla egedii*, and *Carex lyngbyaei* (Lyngby's sedge) are establishing on the tideflats. *Carex lyngbyaei* also will dominate the late-seral tidal communities.

***Potentilla palustris* Community Type**
Marsh Fivefinger Community Type
POTPAL G3; S3

Other studies—This type has not been previously reported in the literature. A related type, however, is *Menyanthes trifoliata-Potentilla palustris* c.t. described for south-central Alaska (Tande 1983), the Yakutat Foreland (Shephard 1995), interior Alaska (Drury 1956, Racine and Walters 1991), and western Alaska (Griggs 1936).

Vegetation—*Potentilla palustris* (marsh fivefinger) dominates the community, although *Equisetum fluviatile* (swamp horsetail) is often a strong codominant; species richness within the sites is typically low; some sites are monotypic. Canopy height of *Potentilla palustris* ranges from 6 to 24 inches.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 3):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Equisetum fluviatile	33	20	0-20
Equisetum pratense	33	10	0-10
Menyanthes trifoliata	33	3	0-3
Potentilla palustris	100	63	50-80
Sparganium angustifolium	33	10	0-10
Utricularia vulgaris	33	90	0-90
Graminoids:			
Calamagrostis canadensis	33	3	0-3
Carex pluriflora	33	10	0-10

Environmental characteristics—The *Potentilla palustris* c.t. is one of the most widespread types on the Copper River Delta. It is a major type of ponds, channels, or slow streams on the uplifted marshes and distal portions of outwash plains. *Potentilla palustris* is an emergent species, growing on sites with permanent to semipermanent standing water (ponds and lakes). Water depths range from 0 to 15 inches depending on flooding and precipitation. Within ponded basins, consistent vegetation zonation patterns are associated with different water depths. Vegetation zones change, moving from wet (standing water) to dry, from emergent vegetation, to herbaceous wet meadow, to shrub-dominated wetland, to forest. The forested portions usually are associated with levees.

Soils—The soils are classified as Hydric Borofibrists. *Potentilla palustris* typically forms a root mat 1 to 12 inches thick that is either anchored in mineral soil or floating. The mineral soils are typically silt and sand with no horizon development. The pH of the root mat ranges up to 6.3.

Succession—This is a primary colonizer of open water or invades primary colonizers such as *Equisetum fluviatile*. On the waters edge, the root mat will thicken and other species will invade, such as *Myrica gale* (sweetgale). The organic mats eventually develop into peatlands.

Sparganium Species Community Type Bur-Reed Community Type SPARGA G5; S5

Other studies—Various *Sparganium hyperboreum* community types are reported from across the state and are reviewed by Viereck and others (1992). No *Sparganium* (bur-reed) types dominated by species other than *Sparganium hyperboreum*, *Sparganium minimum* (small bur-reed), or *Sparganium angustifolium* (floating bur-reed) have been reported.

Vegetation—Three *Sparganium* (bur-reed) species, *Sparganium angustifolium* (floating bur-reed), *Sparganium hyperboreum*, or *Sparganium minimum* (small bur-reed), may dominate the community. The three species are grouped into one community type because of similarities in habitat.

The following tabulation lists the common species and gives their percentage of constancy, average percentage of canopy cover for sites in which they occur, and range of cover values (number of sites sampled = 7; species richness = 15):

Species	Constancy	Average	Range
	- - - - - - - - - -	*Percent*	- - - - - - - - - -
Forbs:			
Equisetum fluviatile	14	20	0-20
Hippuris vulgaris	29	30	0-50
Myriophyllum spicatum	29	4	0-5
Potamogeton perfoliatus richardsonii	43	6	0-10
Ranunculus trichophyllus	14	20	0-20
Sparganium angustifolium	43	62	0-95
Sparganium hyperboreum	14	60	0-60
Sparganium minimum	43	50	0-60
Utricularia vulgaris	29	51	0-99
Graminoids:			
Glyceria pauciflora	14	10	0-10

Environmental characteristics—The *Sparganium* c.t. is a widely distributed, although minor, type on the Copper River Delta. It occurs in ponds of the uplifted marshes and distal portions of outwash plains. *Sparganium* (bur-reed) species are aquatics known to grow in clear water ponds. The ponds typically have permanent standing water, although water depth varies seasonally and yearly, ranging from 4 to 36 inches. Within ponded basins, consistent vegetation zonation patterns are associated with different water depths. Vegetation zones of ponded basins typically change, moving from wet (standing water) to dry, from emergent vegetation (*Sparganium*), to herbaceous wet meadow, to shrub-dominated wetland, to forest. The forested portions usually are associated with levees.

Soils—Soils are silt or sand with no horizon development. The pH approaches neutral.

Succession—This is a primary colonizer of open water. Root mat-forming species, such as *Equisetum fluviatile* (swamp horsetail), *Potentilla palustris* (marsh fivefinger), or *Menyanthes trifoliata* (buckbean) invade in time. The root mats eventually develop into peatlands.

Undersampled Forb Community Types

***Athyrium filix-femina* (lady-fern) c.t.—**This is a minor type (one site sampled) on the uplifted marsh; it forms discontinuous stringers running on top of moist to wet levees or on levee banks sloping into channels. Although few studies describe fern communities, they are found in the Aleutian Islands and the south-central and southeastern parts of the state (Viereck and others 1992). DeVelice and others (1994) report an *Athyrium filix-femina* (lady-fern) type as an “undersampled herbaceous community” for the Chugach National Forest. An *Athyrium filix-femina* c.t. is not otherwise reported in the literature; however, *Athyrium filix-femina* is recognized as a principle dominant species of many fern types (Viereck and others 1992). The dense overstory is dominated by *Athyrium filix-femina*, although *Equisetum arvense* (meadow horsetail) and *Calamagrostis canadensis* (bluejoint) may be strong codominants on some sites. Height of *Athyrium filix-femina* ranges up to 4 feet. The drier sites may develop into forested communities, whereas the wetter sites may in time support peatlands. Not ranked.

***Epilobium adenocaulon* (northern willow-herb) c.t.—**This is an incidental type (one site sampled) that occurs on dunes of barrier islands, spits, and beaches. It is dominated by *Epilobium adenocaulon* (northern willow-herb). The sites are well drained, and the soils are silt or sand. Not ranked.

***Epilobium latifolium* (river beauty) c.t.—**This is an incidental, yet widespread, type (one site sampled) that occurs on new alluvial deposits along all the rivers of the Copper River Delta. It is dominated by *Epilobium latifolium* (river beauty), and the sites are often flooded but well drained during low riverflows. The soils are silt or sand with no horizon development. Not ranked.

***Equisetum arvense* (meadow horsetail) c.t.—**It is an incidental type (three sites sampled) that occurs on linear dunes and slacks of barrier islands, spits, and beaches. It is dominated by *Equisetum arvense* (meadow horsetail), and other species such as *Epilobium latifolium* (river beauty) and *Potentilla egedii* (Pacific silverweed) may codominate. The sites are well drained, and the soils are silt or sand with no horizon development. On linear dunes, it occurred on steep (up to 45 percent) blowouts. Not ranked.

***Equisetum palustre* (marsh horsetail) c.t.—**This is an incidental type (one site sampled) that occurs on uplifted marshes and the distal portions of outwash plains. It is dominated by *Equisetum palustre* (marsh horsetail), and bryophyte cover is high. The sites are poorly drained with water to the surface. The soils are silt or sand with minor organic mat development. Not ranked.

***Fauria crista-galli* (deer cabbage) c.t.—**This is an incidental type (two sites sampled) that occurs on peatlands of the distal portions of outwash plains. It is dominated by *Fauria crista-galli* (deer cabbage), and other peatland species typically have high cover values. The sites are poorly drained typically with water near the surface, the soils are peat, and the pH is below 4.8. Not ranked.

***Hedysarum alpinum* (alpine sweet-vetch) c.t.—**This is an incidental type (one site sampled) found on uplifted marshes at the mouth of the Copper River. It is located on moist levees, the edge of ponds, and on level beach overwash at, or above high tide mark. Crow (1968) describes a similar type (*Hedysarum alpinum/Deschampsia beringensis*) as common on levees of the uplifted marsh. Sites occupied by this type before the 1964 uplift outside of the mouth of the Copper River have been invaded by various alder, willow, and herbaceous communities. *Hedysarum alpinum* (alpine sweet-vetch), in combination with *Carex lyngbyaei* (Lyngby's sedge), dominate the community. Other common species include A*lnus crispa* subsp. *sinuata* (Sitka alder) and *Salix arctica* (arctic willow). The canopy cover of *Carex lyngbyaei* (Lyngby's sedge) is variable, partially because of intense grazing by waterfowl (primarily Canada geese (*Branta canadensis*)) on some sites. Not ranked.

***Hippuris tetraphylla* (four-leaf marestail) c.t.—**This is an incidental type (two sites sampled) that occurs on mudflats of the tidal marsh landscape. It is often a monoculture of *Hippuris tetraphylla* (four-leaf marestail), with cover values of less than 30 percent. The sites are tidally flooded on a daily basis. The soils are silt with no organic mat development, with a pH ranging from 5.5 to 7.8. Not ranked.

***Honckenya peploides* (seabeach sandwort) c.t.—**The *Honckenya peploides* (seabeach sandwort) c.t. is an incidental type (one site sampled) on barrier islands, coastal dunes, and spits. The overstory is dominated by seabeach sandwort, and other vascular and nonvascular species are uncommon. This type occupies the closest location on the beach front to the surf. Its distribution pattern is typically discontinuous along dune bases facing the beach. Sites are well-drained silt and sand on level to steep slopes. Not ranked.

***Iris setosa* (wild iris) c.t.—**Reconnaissance information indicates this is an incidental type (no sites sampled) that occurs on the uplifted marsh landscape. Its distribution pattern differs from stringers on levees, to broader expanses on the wider levees. The sites are moist to wet, without standing water. Not ranked.

***Lysimachia thyrsiflora* (tufted loosestrife) c.t.—**Reconnaissance information indicates the tufted loosestrife c.t. is an incidental type (no sites sampled) that occurs on pond edges of the uplifted marsh landscape. It is dominated by *Lysimachia thyrsiflora* (tufted loosestrife), and the sites are poorly drained often in standing water, with thick root mats over silt or sand. Not ranked.

***Nuphar polysepalum* (lily-pad) c.t.—**This is a minor type (one site sampled) found on uplifted marshes and outwash plains, growing in ponds with permanent standing water. It is widely distributed throughout Alaska and has been reported for south-central Alaska by Cooper (1942), Dachnowski-Stokes (1941), Hogan and Tande (1983), Ritchie and others (1981), and Tande (1983). It is reported from the Yakutat Foreland and Glacier Bay area by Shephard (1995) and Streveler and others (1973).

Nuphar polysepalum (lily-pad) dominates the community, and cover is low. Water depth varies depending on flooding and precipitation but ranges up to 5 feet deep. The soils are typically silt and sand with no horizon development. Not ranked.

***Ranunculus cymbalaria* (seaside buttercup) c.t.—**Reconnaissance information indicates this is an incidental type (no sites sampled) that occurs on the tidal marsh landscape. It is a monoculture of *Ranunculus cymbalaria* (seaside buttercup), with cover values of less than 40 percent. The sites may be tidally flooded on a daily basis. The soils are silt with no organic mat development. Not ranked.

***Triglochin maritimum* (seaside arrow-grass) c.t.—**This is an incidental type (no sites sampled) that occurs on mudflats of the tidal marsh landscape. Reconnaissance notes indicate it is a monoculture of *Triglochin maritimum* (seaside arrow-grass), with cover values greater than 30 percent. The sites may be tidally flooded on a daily basis. The soils are silt with no organic mat development. This type is common in similar coastal Alaska habitats and, in time, may become more common on the mudflats of the Copper River Delta. Not ranked.

***Triglochin palustre* (marsh arrow-grass) c.t.—**This is an incidental type (no sites sampled) that occurs on the uplifted marsh, and mudflats of the tidal marsh landscape. Reconnaissance notes indicate it is often a monoculture of *Triglochin palustre* (marsh arrow-grass). The soils are silt with no organic mat development. Not ranked.

Aquatic Community Type Descriptions

***Callitriche hermaphroditica* c.t.**
Community Type
Northern Water Starwort Community Type
CALHER
Not Ranked

Other studies—Few aquatic plant communities have been identified and described for the state. Although a *Callitriche hermaphroditica* (northern water starwort) c.t. has not been previously described, a *Subularia aquatica-Callitriche anceps* type is reported from the Aleutian Islands (Shacklette and others 1969).

Vegetation and environmental characteristics—*Callitriche hermaphroditica* dominates this aquatic community (number of sites sampled = 4), and *Callitriche verna* (spring water starwort) and *Potamogeton perfoliatus* (Richardson's pondweed) are common associates. Its range across the Copper River Delta is unclear, but it has been recorded in clear water ponds of the uplifted marshes. The ponds have permanent standing water, and water depth varies seasonally and yearly, depending on flooding and precipitation. *Callitriche hermaphroditica* is a primary colonizer of open water. Root mat-forming species, such as *Equisetum fluviatile* (swamp horsetail) or *Menyanthes trifoliata* (buckbean), may invade in time. Some ponds, however, may be stable for extensive periods and support aquatic communities. The persistence of any given aquatic community at a site is unknown.

***Chara* Species Community Type**
Chara Species Community Type
CHARA
Not Ranked

Other studies—No freshwater algal communities have been identified for Alaska.

Vegetation and environmental characteristics—*Chara* (chara) species dominate or, codominate with other algae, this aquatic community (number of sites sampled = 2). Other common associates include *Myriophyllum spicatum* (spiked water-milfoil), *Potamogeton perfoliatus* (Richardson's pondweed), and *Ranunculus trichophyllus* (white water crowfoot). This is a widely distributed, although incidental, type on the Copper River Delta. It occurs in clear water ponds of the uplifted marshes and distal portions of outwash plains. Before the 1964 uplift, it commonly occurred in tidal ponds (Crow 1968). Present-day ponds have permanent standing water, and water depth varies seasonally and yearly, depending on flooding and precipitation. The *Chara* species c.t. is a primary colonizer of open water. Root mat-forming species, such as *Equisetum fluviatile* (swamp horsetail) or *Potentilla palustris* (marsh fivefinger), may invade in time. Some ponds, however, may be stable for extensive periods and support aquatic communities. The persistence of any given aquatic community at a site is unknown.

***Myriophyllum spicatum* Community Type**
Spiked Water-Milfoil Community Type
MYRSPI G5; S5

Other studies—Few aquatic plant communities have been identified and described for the state. Several *Myriophyllum spicatum* (spiked water-milfoil) community types, however, have been identified, including a *Myriophyllum spicatum-Potamogeton perfoliatus* (spiked water-milfoil-Richardson's pondweed) (Batten and others 1978) and a *Myriophyllum spicatum-Potamogeton* spp. c.t. (Ritchie and others 1981) for south-central Alaska.

Vegetation and environmental characteristics—These aquatic sites are dominated by *Myriophyllum spicatum* or *Myriophyllum alterniflorum* (water-milfoil) (number of sites sampled = 4). *Chara* (chara), *Potamogeton perfoliatus* (Richardson's pondweed), and *Potamogeton filiformis* (slender-leaved pondweed) are common components. This is a widely distributed, although minor, type on the Copper River Delta. It occurs in clear water ponds of the uplifted marshes and distal portions of outwash plains, and the distribution pattern is patchy and discontinuous. Before the 1964 uplift, it commonly occurred in tidal ponds. Present-day ponds have permanent standing water, and water

depth varies seasonally and yearly, depending on flooding and precipitation. The substrate is mineral soil, and organic debris over the mineral soil ranges from 0 to 6 inches thick. *Myriophyllum spicatum* is a primary colonizer of open water. Root mat-forming species, such as *Equisetum fluviatile* (swamp horsetail) and *Menyanthes trifoliata* (buckbean), may invade in time. Some ponds, however, may be stable for extensive periods and support aquatic communities. The persistence of any given aquatic community at a site is unknown.

***Potamogeton filiformis* Community Type Slender-Leaved Pondweed Community Type POTFIL G?; S3**

Other studies—Various *Potamogeton* (pondweed) plant communities have been identified and described for the state (Viereck and others 1992). The *Potamogeton filiformis* (slender-leaved pondweed) c.t. is similar to a *Potamogeton filiformis-Ruppia spiralis* type previously described from Glacier Bay National Park by Cooper (1939).

Vegetation and environmental characteristics—These aquatic sites are dominated by *Potamogeton filiformis* (slender-leaved pondweed) (number of sites sampled = 10; species richness = 9). *Chara* (chara), *Potamogeton perfoliatus* (Richardson's pondweed), and *Ranunculus trichophyllus* (white water crowfoot) are common associates. Its range on the Copper River Delta is unclear, but it has been recorded in clear water ponds of the uplifted marshes. The distribution pattern within ponds is patchy and discontinuous. Before the 1964 uplift, it commonly occurred in tidal ponds. Present-day ponds have permanent standing water, and water depth varies seasonally and yearly, depending on flooding and precipitation. The substrate is mineral soil, and organic debris over the mineral soil ranges from 0 to 6 inches thick. *Potamogeton filiformis* is a primary colonizer of open water. Root mat-forming species, such as *Equisetum fluviatile* (swamp horsetail) and *Menyanthes trifoliata* (buckbean), may invade in time. Some ponds, however, may be stable for extensive periods and support aquatic communities. The persistence of any given aquatic community at a site is unknown.

***Potamogeton perfoliatus* Community Type Richardson's Pondweed Community Type POTPER G5; S5**

Other studies—Various *Potamogeton perfoliatus* (Richardson's pondweed) plant communities have been identified and described for the state (Viereck and others 1992). A *Potamogeton perfoliatus* c.t. is previously described from south-central Alaska by Ritchie and others (1981).

Vegetation and environmental characteristics—These aquatic sites are dominated by *Potamogeton perfoliatus*, and *Callitriche hermaphroditica* (northern water starwort) and *Ranunculus trichophyllus* (white water crowfoot) are common associates (number of sites sampled = 28; species richness = 7). Its range is unclear for the Copper River Delta and has been recorded in clear water ponds on uplifted marshes and distal portions of outwash. The distribution pattern within ponds ranges from patchy and discontinuous to broad (several acres) and continuous. The ponds have permanent standing water, and water depth varies seasonally and yearly, depending on flooding and precipitation. *Potamogeton perfoliatus* is a primary colonizer of open water. Root mat-forming species, such as *Equisetum fluviatile* (swamp horsetail) and *Arctophila fulva* (pendant grass), may invade in time. Some ponds, however, may be stable for extensive periods and support aquatic communities. The persistence of any given aquatic community at a site is unknown.

***Ranunculus trichophyllus* Community Type**
White Water Crowfoot Community Type
RANTRI G5; S5

Other studies—Various *Ranunculus trichophyllus* (white water crowfoot) community types have been reported from across the state (Viereck and others 1992). A *Ranunculus trichophyllus-Potamogeton natans* type is described from Upper Cook Inlet (Seguin 1977), and a *Ranunculus trichophyllus* type is described from Glacier Bay (Streveler and others 1973).

Vegetation and environmental characteristics—*Ranunculus trichophyllus* dominates this type, and *Callitriche verna* (spring water starwort) and *Potamogeton perfoliatus* (Richardson's pondweed) are common associates (number of sites sampled = 7; species richness = 7). Its range is unclear for the Copper River Delta but has been recorded in clear water ponds on uplifted marshes. The distribution pattern within ponds ranges from patchy and discontinuous to broad (several acres) and continuous. The ponds have permanent standing water, and water depth varies seasonally and yearly, depending on flooding and precipitation. *Ranunculus trichophyllus* is a primary colonizer of open water. Root mat-forming species, such as *Equisetum fluviatile* (swamp horsetail) or *Arctophila fulva* (pendant grass), may invade in time. Some ponds, however, may be stable for extensive periods and support aquatic communities. The persistence of any given aquatic community at a site is unknown.

Undersampled Aquatic Community Types

Callitriche heterophylla* (different-leaved water starwort) c.t.—Callitriche heterophylla* (different-leaved water starwort) dominates the community (no plots sampled). Its range is unclear for the Copper River Delta but has been recorded in clear water ponds on uplifted marshes and distal portions of outwash. The ponds have permanent standing water, and water depth varies seasonally and yearly, depending on flooding and precipitation. Not ranked.

Callitriche verna* (spring water starwort) c.t.—Callitriche verna* (spring water starwort) dominates the community (no plots sampled). Its range is unclear for the Copper River Delta. The ponds have permanent standing water, and water depth varies seasonally and yearly, depending on flooding and precipitation. Not ranked.

Potamogeton gramineus* (grass-leaved pondweed) c.t.—Potamogeton gramineus* (grass-leaved pondweed) dominates the community (no plots sampled). Its range is unclear for the Copper River Delta but has been recorded in clear water ponds on uplifted marshes. The ponds have permanent standing water, and water depth varies seasonally and yearly, depending on flooding and precipitation. Not ranked.

***Potamogeton natans* (floating-leaved pondweed) c.t.—**Although various *Potamogeton* (pondweed) communities have been identified, the *Potamogeton natans* (floating-leaved pondweed) c.t. has not been previously described for the state (Viereck and others 1992) (no plots sampled). These aquatic sites are dominated by *Potamogeton natans* (floating-leaved pondweed). Its range is unclear for the Copper River Delta but is recorded in clear water ponds on distal portions of outwash plains, and on the uplifted marsh landscape. The distribution pattern within ponds is patchy and discontinuous. The ponds have permanent standing water, and water depth varies seasonally and yearly, depending on flooding and precipitation. Not ranked.

Potamogeton pectinatus* (fennel-leaved pondweed) c.t.—Potamogeton pectinatus* (fennel-leaved pondweed) dominates the community (no plots sampled). Its range is unclear for the Copper River Delta. The ponds have permanent standing water, and water depth varies seasonally and yearly, depending on flooding and precipitation. Not ranked.

Subularia aquatica* (awlwort) c.t.—Subularia aquatica* (awlwort) dominates the community (no plots sampled). Its range is unclear for the Copper River Delta but has been recorded in clear water ponds on uplifted marshes. The ponds have permanent standing water, and water depth varies seasonally and yearly, depending on flooding and precipitation. Not ranked.

***Utricularia vulgaris* (common bladderwort) c.t.—**The *Utricularia vulgaris* (common bladderwort) type has not been previously described in the literature although *Utricularia* (bladderwort) species have been commonly associated with many shallow water community types (no plots sampled). *Utricularia vulgaris* dominates this type. Its range is unclear for the Copper River Delta but is recorded in clear water ponds on uplifted marshes. The distribution pattern within ponds is patchy and discontinuous. The ponds have permanent standing water, and water depth varies seasonally and yearly, depending on flooding and precipitation. Not ranked.

Zannichellia palustris* (horned pondweed) c.t.—Zannichellia palustris* (horned pondweed) dominates the community (number of sites sampled = 1). Its range is unclear for the Copper River Delta but has been recorded in clear water ponds on uplifted marshes and brackish water of tidal flats. G?; S2.

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References

Arno, S.F.; Simmerman, D.G.; Keane, R.E. 1985. Forest succession on four habitat types in western Montana. Gen. Tech. Rep. INT-177. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 74 p.

Bank, T.P. 1951. Botanical and ethnobotanical studies in the Aleutian Islands. In: Aleutian vegetation and Aleut culture. Michigan Academy of Science, Arts and Letters. 37: 13-30.

Batten, A.R.; Murphy, S.; Murray, D.F. 1978. Definition of Alaskan coastal wetlands by floristic criteria. EPA804965-01. Corvallis, OR: Envrionmental Protection Aency, Environmental Research Lab. 490 p.

Bloom, A.L. 1983. Sea level and coastal changes. In: Wright, H.E., Jr., ed. Late-Quaternary environments of the United States: the Holocene. Minneapolis, MN: University of Minnesota Press. 2: 42-51.

Boggs, K.; Weaver, T. 1994. Changes in vegetation and nutrient pools during riparian succession. Wetlands. 14(2): 98-109.

Boothroyd, J.C.; Ashley, G.M. 1975. Processes, bar morphology and sedimentary structures on braided outwash fans, northeastern Gulf of Alaska. Spec. Publ. 23. Tulsa, OK: Social Economic Paleontologists and Mineralogist: 193-222.

Borchers, S.L.; Wattenbarger, J.; Ament, R. 1989. Forest plant associations of Montague Island, Chugach National Forest. Anchorage, AK: Chugach National Forest. 5 p. Unpublished report. On file with: U.S. Department of Agriculture, Forest Service, Alaska Region, Chugach National Forest, 3301 “C” Street, Suite 300, Anchorage, AK 99503-3998.

Borland International. 1993. Paradox: relational database version 4.0. Scotts Valley, CA: Borland International.

Bosworth, K.S. 1985. Vegetation dynamics and habitat use by sandhill cranes on the Dude Creek flats, Gustavus, AK: 123 p. Unpublished report. On file with: University of Vermont, Burlington, VT 05405.

Bourgeron, P.S.; Engelking, L.D. 1994. A preliminary vegetation classification of the Western United States. [Place of publication unknown]: The Nature Conservancy, Western Heritage Task Force.

Brown, D. 1954. Methods of surveying and measuring vegetation. Bull. 42. Bucks, England: Commonwealth Agricultural Bureau.

Campbell, B.H. 1990. Factors affecting the nesting success of dusky Canada geese, *Branta canadensis occidentalis*, on the Copper River Delta, Alaska. Canadian Field Naturalist. 104: 567-574.

Carter, R.W.G. 1988. Coastal environments. San Diego, CA: Academic Press Limited. 617 p.

Clark, M.H.; Kautz, D.R. 1993. Soil and vegetation inventory of the Gulkana River, main stem area, Alaska. Palmer, AK: Natural Resources Conservation Service. 300 p. Unpublished report. On file with: U.S. Natural Resources Conservation Service, Alaska State Office, 949 E 36th Ave., Palmer, AK 99645.

Coleman, J.M. 1968. Deltaic evolution. In: Fairbridge, R.W., ed. Encyclopedia of geomorphology. New York: Reinhold Book Corp.: 255-260.

Cooper, S.V.; Neiman, K.E.; Roberts, D.W. 1991. Forest habitat types of northern Idaho: a second approximation. Gen. Tech. Rep. INT-236. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 143 p.

Cooper, W.S. 1939. A fourth expedition to Glacier Bay, Alaska. Ecology. 20(2): 130-155.

Cooper, W.S. 1942. Vegetation of the Prince William Sound region, Alaska; with a brief excursion into post-Pleistocene climatic history. Ecological Monographs. 12(1): 1-22.

Cornely, J.E.; Campbell, B.H.; Jarvis, R.L. 1985. Productivity, mortality and population status of dusky Canada geese. Transactions of the North American Wildlife Natural Resource Conference. 50: 540-548.

Crow, J.H. 1968. Plant ecology of the Copper River Delta, Alaska. Pullman, WA: Washington State University. 120 p. Ph.D. thesis.

Crow, J.H. 1971. Earthquake-initiated changes in the nesting habitat of the dusky Canada goose. In: National Research Council, Committee on the Alaska Earthquake. The great Alaska earthquake of 1964: biology. Washington, DC: National Academy of Sciences: 130-136.

Crow, J.H. 1977. Salt marshes of Port Valdez, Alaska, and vicinity: a baseline study; final report; New Brunswick, NJ: Rutgers University, Newark College of Arts and Sciences. 113 p.

Crow, J.H. 1979. Distribution and ecological characteristics of *Zannichellia palustris* L. along the Alaska Pacific coast. Torreya. 106(4): 346-349.

Crow, J.H.; Koppen, J.D. 1977. The salt marshes of China Poot Bay, Alaska. Volume 10: Environmental studies of Kachemak Bay and lower Cook Inlet. Anchorage, AK: Alaska Department of Fish and Game. 29 p.

Dachnowski-Stokes, A.P. 1941. Peat resources in Alaska. Tech. Bull. 769. Washington, DC: U.S. Department of Agriculture. 84 p.

Daubenmire, R.D. 1952. Forest vegetation of northern Idaho and adjacent Washington, and its bearing on concepts of vegetation classification. Ecological Monographs. 22: 301-330.

Daubenmire, R.D. 1959. A canopy-coverage method of vegetation analysis. Northwest Science. 33: 43-66.

Daubenmire, R.D. 1968. Plant communities. New York: Harper and Row. 300 p.

Davidson, D.; Klinge, K. 1992. Copper River Delta integrated inventory. Anchorage, AK: Chugach National Forest. Unpublished report. On file with: U.S. Department of Agriculture, Forest Service, Alaska Region, Chugach National Forest, 3301 “C” Street, Suite 300, Anchorage, AK 99503-3998.

DeLapp, J.A. 1991. Rare vascular plant species of the U.S. Forest Service Alaska Region. Anchorage, AK: Alaska Natural Heritage Program. 221 p. Unpublished report. On file with: Alaska Natural Heritage Program, 707 A St., University of Alaska Anchorage, Anchorage, AK 99501.

DeMeo, T.; Martin, J.; West, R.A. 1992. Forest plant association management guide: Ketchikan Area, Tongass National Forest. Gen. Tech. Rep. R10-MB-210. Juneau, AK: U.S. Department of Agriculture, Forest Service, Alaska Region. 405 p.

del Moral, R.; Watson, A.F. 1978. Vegetation of the Stikine flats, southeast Alaska. Northwest Science. 52(2): 137-150.

Dolan, R.; Hayden, B.; Lins, H. 1980. Barrier islands. American Scientist. 68: 16-25.

DeVelice, R.; Hubbard, C. 1993. Vegetation reconnaissance level sampling procedure, version 93A. Anchorage, AK: Chugach National Forest. 15 p. Unpublished report. On file with: U.S. Department of Agriculture, Forest Service, Alaska Region, Chugach National Forest, 3301 “C” Street, Suite 300, Anchorage, AK 99503-3998.

DeVelice, R.; Hubbard, C.; Potkin, M.; Boucher, T. 1994. Preliminary classification of vegetation types of Prince William Sound. Anchorage, AK: Chugach National Forest. 40 p. Unpublished report. On file with: U.S. Department of Agriculture, Forest Service, Alaska Region, Chugach National Forest, 3301 “C” Street, Suite 300, Anchorage, AK 99503-3998.

Drury, W.H., Jr. 1956. Bog flats and physiographic processes in the upper Kuskokwim River region, Alaska. Cambridge, MA: Harvard University, Contributions of the Gray Herbarium 178. 130 p.

ECOMAP. 1993. National hierarchical framework of ecological units. Washington, DC: U.S. Department of Agriculture, Forest Service. 21 p.

Fastie, C.L. 1995. Causes and ecosystem consequences of multiple pathways of primary succession at Glacier Bay, Alaska. Ecology. 76(6): 1899-1916.

Forman, R.T.; Godron, M. 1986. Landscape ecology. New York: Wiley and Sons.

Fox, J.L. 1983. Constraints on winter habitat selection by the mountain goat (*Oreamnos americanus*) in Alaska. Seattle, WA: University of Washington. 147 p. Ph.D. thesis.

Friedkin, J. 1972. A laboratory study of the meandering of alluvial rivers. In: Schumm, S., ed. River morphology. Stroudsburg, PA: Dowden, Hutchinson, and Ross: 237-281.

Gallant, A.; Binnian, E.; Omernik, J.; Shasby, M. 1995. Ecoregions of Alaska. Geological Survey Professional Paper 1567. Denver, CO: U.S. Geological Survey, Information Services. 73 p.

Gleason, H.A. 1917. The structure and development of the plant association. Bulletin of the Torrey Botanical Club. 44: 463-481.

Gleason, H.A. 1927. Further views on the succession concept. Ecology. 8: 299-326.

Godfrey, P.J. 1976. Barrier beaches of the east coast. Oceanus. 19: 27-40.

Griggs, R.F. 1936. Vegetation of the Katmai District. Ecology. 17(3): 380-417.

Hagen, R.; Meyer, M. 1978. Remote sensing applications to habitat analysis of the Bering River-Controller Bay Trumpeter Swan Management Area and Martin River Valley, Alaska. Remote Sensing Lab Report 77-78. Minneapolis, MN: University of Minnesota, Institute of Agriculture, Forestry, and Home Economics. 65 p.

Hampton, M.A.; Carlson, P.R.; Lee, H.J.; Feely, R.A. 1987. Geomorphology, sediment, and sedimentary processes. In: Hood, D.W.; Zimmerman, S.T., eds. The Gulf of Alaska: physical environment and biological resources. Washington, DC: U.S. Department of Commerce; U.S. Department of the Interior: 93-114.

Hansen, P.L.; Pfister, R.D.; Boggs, K. [and others]. 1995. Classification and management of Montana's riparian and wetland sites. Missoula, MT: Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, 646 p.

Hanson, H.C. 1951. Characteristics of some grassland, marsh, and other plant communities in western Alaska. Ecological Monographs. 21(4): 317-378.

Helm, D.; Collins, W.; McKendrick, J. 1984. Floodplain succession in south-central Alaska. In: LaBau, V.J.; Kerr, C.L., eds. Inventorying forest and other vegetation of the high latitude and high altitude regions: Proceedings of the Society of American Foresters regional technical conference; 1984 July 23-26; Fairbanks, AK. Bethesda, MD: Society of American Foresters: 114-118.

Heusser, C.J. 1960. Late-Pleistocene environments of North Pacific North America. American Geographic Society Spec. Publ. 35. New York: American Geographical Society. 308 p.

Hill, M.D. 1979. TWINSPAN: a Fortran program for arranging multivariant data in an ordered two-way table by classification of the individuals and attributes. Ithaca, NY: Cornell University, Ecology and Systematics Department.

Hill, M.D.; Gauch, H.G., Jr. 1980. Detrended correspondence analysis: an improved ordination technique. Vegetatio. 42: 47-58.

Hoffman, G.R.; Alexander, R.R. 1976. Forest vegetation of the Bighorn Mountains, Wyoming: a habitat type classification. Res. Pap. RM-170. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 38 p.

Hogan, M.; Tande, G.F. 1983. Vegetation types and bird use of Anchorage wetlands. Special Studies. Anchorage, AK: U.S. Department of the Interior, Fish and Wildlife Service, Region 7. 134 p.

Howard, A.D.; Morton, J.B.; Gal-el-Hak, M.; Pierce, D. 1977. Simulation model of erosion and deposition on a barchan dune. CR-2838 [Place of publication unknown]: National Aeronautics and Space Administration.

Hultén, E. 1960. Flora of the Aleutian Islands and westernmost Alaska Peninsula with notes on the flora of Commander Islands. 2d ed., rev. Weinheim, Germany: J. Cramer. 376 p.

Hultén, E. 1968. Flora of Alaska and neighboring territories. Stanford, CA: Stanford University Press. 1008 p.

Isleib, M.E.P.; Kessel, B. 1973. Birds of the north Gulf Coast-Prince William Sound region, Alaska. Biol. Pap. 14. Fairbanks, AK: University of Alaska. 149 p.

Jakobsen, B. 1954. The tidal area in south-western Jutland and the process of the salt marsh formation. Geografisk Tidsscrift. 53: 49-61.

Jefferies, R.L.; Sinclair, A.R.E. 1992. Foraging by geese, isostatic uplift and asymmetry in the development of salt-marsh plant communities. Journal of Ecology. 80: 395-406.

Jensen, M.; Manning, M.; Tripp, J. 1992. ECODATA. Missoula, MT: Northern Region, U.S. Department of Agriculture, Forest Service.

King, C.A.M. 1972. Beaches and coasts. New York: St. Martin's Press.

Klinger, L.F.; Elias, S.A.; Behan-Pelletier, V.M.; Williams, N.E. 1990. The bog climax hypothesis: fossil arthropod and stratigraphic evidence in peat sections from southeast Alaska, USA. Holarctic Ecology. 13: 72-80.

Larsen, J.A. 1980. The boreal ecosystem. New York: Academic Press. 550 p.

Laury, R.L. 1971. Stream bank failure and rotational slumping: preservation and significance in the geologic record. Geological Society America Bulletin. 82: 1251-1266.

Leopold, L.; Wolman, M.; Miller, J. 1964. Fluvial processes in geomorphology. San Francisco, CA: Freeman and Company. 522 p.

Letzsch, W.S.; Frey, R.W. 1980. Deposition and erosion in a Holocene salt marsh, Sapeb Island, Georgia. Journal of Sedimentary Petrology. 50: 529-542.

Lindsey, A.; Petty, R.; Sterling, D.; VanAsdall, W. 1961. Vegetation and environment along the Wabash and Tippecanoe Rivers. Ecological Monographs. 31: 105-156.

Ludwig, J.A.; Reynolds, J.F. 1988. Statistical ecology. New York: John Wiley and Sons, Inc. 337 p.

Martin, J.R.; Trull, S.J.; Brady, W.W. [and others]. 1995. Forest plant association management guide: Chatham Area, Tongass National Forest. Tech. Rep. R10-TP-5. Juneau, AK: U.S. Department of Agriculture, Forest Service, Alaska Region. 280 p.

McAllister, D.C. 1990. Plant community development in a minerotrophic peatland, Teton County, Montana. Missoula, MT: University of Montana. 257 p. Ph.D. thesis.

McCormick, J.; Pinchon, W. 1978. Wetlands of Potter Marsh, Point Campbell to Potter. WAPORA, Proj. 681. Washington, DC: WAPORA, Inc. 79 p.

Mueller-Dombois, D.; Ellenberg, H. 1974. Aims and methods of vegetation ecology. New York: John Wiley and Sons. 547 p.

Murray, R.C. 1980. The pattern and process of vegetation and soil develpment in two dune slacks at Magilligan Point, Co. Londonderry, Ireland: New University, Ulster. 75 p. B.S. thesis.

Neiland, B.J. 1971. The forest-bog complex of southeast Alaska. Vegetatio Acta Geobotanica 22. 64 p.

Olson, J.S. 1958. Lake Michigan dune development. 1-2-3. Journal of Geology. 56: 254-263, 345-351, 413-483.

Padgett, W.G.; Youngblood, A.P.; Winward, A.H. 1989. Riparian community type classification of Utah and southeastern Idaho. Ecology 89-01. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 191 p.

Palmer, L.J. 1942. Major vegetative types of southeastern Alaska. Anchorage, AK: Alaska Natural Heritage Program. 16 p. Unpublished report. On file with: Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A St., Anchorage, AK 99501.

Pawuk, W.H.; Kissinger, E. 1989. Preliminary forest plant associations of the Stikine Area, Tongass National Forest. Tech. Rep. R10-TP-72. U.S. Department of Agriculture, Forest Service, Alaska Region. 126 p.

Pemadasa, M.A.; Greig-Smith, P.; Lovell, P.H. 1974. A quantitative description of the distribution of annuals in the dune system at Aberffraw, Anglesey. Journal of Ecology. 62: 379-402.

Pestrong, R. 1965. The development of drainage patterns on tidal marshes. Geol. Publ. 10-12. Stanford, CA: Stanford University. 38 p.

Pethick, J.S. 1981. Model of marsh accretion rates. Journal of Sedimentary Petrology. 51: 571-579.

Pewé, T.L.; Hopkins, D.M.; Giddings, J.L. 1965. The Quaternary geology and archaeology of Alaska. In: Wright, H.E., Jr.; Frey, D.G., eds. The Quaternary of the United States. Princeton, NJ: Princeton University Press: 355-376.

Pfister, R.D.; Arno, S.F. 1980. Classifying forest habitat types based on potential climax vegetation. Forest Science. 26(1): 52-70.

Pfister, R.D.; Kovalchik, B.L.; Arno, S.F.; Presby, R.C. 1977. Forest habitat types of Montana. Gen. Tech. Rep. INT-34. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 175 p.

Plafker, G.; Lajoie, K.R.; Rubin, M. 1990. Determining the recurrence intervals of great subduction zone earthquakes in southern Alaska by radiocarbon dating. In: Taylor, R.E.; Long, A.; Kra, R., eds. Radiocarbon after four decades. Tucson, AZ: University of Arizona Press: 1-14.

Platts, W.S. 1979. Including the fishery system in land planning. Gen. Tech. Rep. INT-60. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 37 p.

Podani, J. 1993. SYN-TAX-pc: computing programs for multivariate data analysis in ecology and systematics. Version 5.0. Budapest, Hungary: Scientia Publishing. 104 p.

Porter, S.C. 1986. Pattern and forcing of Northern Hemisphere glacier variations during the last millennium. Quaternary Research. 26: 27-48.

Potyondy, J.; Meyer, J.; Mace, A., Jr. 1975. An analysis of 1964 earthquake effects upon the vegetation and hydrology of the Copper River Delta, Alaska. Rep. 75-6. Minneapolis, MN: University of Minnesota, Institute of Agriculture, Forestry and Home Economics, Remote Sensing Lab. 91 p.

Quimby, R.L. 1972. Waterbird habitat and use of Chickaloon Flats. Fairbanks, AK: University of Alaska. 86 p. M.S. thesis.

Racine, C.H.; Walters, J.C. 1991. Ground-water discharge wetlands in the Tanana flats, interior Alaska. CRREL Rep. 91-14. Hanover, NH: U.S. Army Corps of Engineers. 10 p.

Rausch, R.L.; Rausch, V.R. 1968. On the biology and systematic position of *Microtus abbreviatus* Miller, a vole endemic to the St. Matthew Islands, Bering Sea. Sonderdruck aus Zeitschrift für Saugetierkunde. 9(4): 65-99.

Reimnitz, E. 1966. Late Quaternary history and sedimentation of the Copper River Delta and vicinity. San Diego, CA: California University. 160 p. Ph.D. thesis.

Reiners, W.A.; Worley, I.A.; Lawrence, D.B. 1971. Plant diversity in a chronosequence at Glacier Bay, Alaska. Ecology. 52(1): 55-69.

Rigg, G.B. 1914. Notes on the flora of some Alaskan sphagnum bogs. Plant World. 17(6): 167-182.

Ritchie, R.; Curatolo, J.; Batten, A. 1981. Knik Arm wetland study; final report; Fairbanks, AK: Alaska Biological Research. 195 p.

Ritchie, W. 1972. The evolution of coastal sand dunes. Scottish Geographic Magazine. 88: 19-35.

Ritter, D.F. 1986. Process geomorphology. Dubuque, IA: Wm. C. Brown Publishers. 577 p.

Rosenberg, D.H. 1986. Wetland types and bird use of Kenai lowlands. Special Studies. Anchorage, AK: U.S. Department of the Interior, U.S. Fish and Wildlife Service, Region 7. 189 p.

Scheierl, R.; Meyer, M. 1977. Habitat analysis of the Copper River Delta Game Management Area (east side), Alaska. Rep. 77-8. Minneapolis, MN: University of Minnesota, Institute of Agriculture, Forestry, and Home Economics, Remote Sensing Lab. 73 p.

Scott, A.J.; Fisher, W.L. 1969. Delta systems and deltaic deposition. In: Fisher, W. [and others], eds. Delta systems in the exploration for oil and gas. Austin, TX: University of Texas, Bureau of Economic Geology.

Scott, R.W. 1974. Successional patterns on moraines and outwash of the Frederika Glacier, Alaska. In: Bushnell, V.C; Marcus, M.G., eds. Icefield ranges research project scientific results. New York: American Geographical Society: 319-329. Vol. 4.

Searby, H.W. 1969. Coastal weather and marine data summary for Gulf of Alaska, Cape Spencer westward to Kodiak Island. ESSA Tech. Memo. EDSTM 8. Silver Spring, MD: U.S. Department of Commerce.

Seguin, R.J. 1977. Portage Flats wildlife inventory and analysis 1977. In: Mangan, L.S., ed. Boulder, CO: Western Interstate Commission for Higher Education: 1-64.

Shacklette, H.T.; Durrell, L.W.; Erdman, J.A. [and others]. 1969. Vegetation of Amchitka Island, Aleutian Islands, Alaska. Geological Survey Paper 648. Washington, DC: U.S. Geological Survey. 66 p.

Shephard, M.E. 1995. Plant community ecology and classification of the Yakutat Foreland, Alaska. Tech. Rep. R10-TP-56. Juneau, AK: U.S. Department of Agriculture, Forest Service, Alaska Region. 206 p.

Sims, R.A.; Cowell, D.W.; Wickware, G.M. 1982. Classification of fens near southern James Bay, Ontario, using vegetation physiognomy. Canadian Journal of Botany. 60: 2608-2623.

Smith, B. 1990. Ecoaid. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Region.

Smith, D.G. 1976. Effect of vegetation on lateral migration of anastomosed channels of a glacier meltwater river. Geological Society America Bulletin. 87: 857-860.

Sprugel, D.G. 1990. Disturbance, equilibrium, and environmental variability: what is ‘natural’ vegetation in a changing environment? Biological Conservation. 58: 1-18.

Stanley, D.J.; Krinitzsky, E.L.; Compton, J.R. 1966. Mississippi River bank failure, Fort Jackson, Louisiana. Geological Society America Bulletin. 77: 850-866.

Steel, R.G.D.; Torrie, J.H. 1960. Principles and procedures of statistics. New York: McGraw-Hill Book Company, Inc. 481 p.

Steers, J.A. 1977. Physiography. In: Chapman, V.J., ed. Wet coastal ecosystems. Amsterdam, NY: Elsevier: 31-60.

Stephens, F.R.; Billings, R.F. 1967. Plant communities of a tide-influenced meadow on Chichigof Island, Alaska. Northwest Science. 41(4): 178-183.

Stephenson, T.R. 1995. Nutritional ecology of moose and vegetation succession on the Copper River Delta, Alaska. Moscow, ID: University of Idaho. 59 p. Ph.D. thesis.

Stevens, P.; Walker, T. 1970. The chronosequence concept and soil formation. Quarterly Review of Biology. 45: 333-350.

Stone, C.S. 1993. Vegetation of coastal marshes near Juneau, Alaska. Northwest Science. 67(4): 215-231.

Streveler, G.P.; Paige, B.P. 1971. The natural history of Glacier Bay National Monument, Alaska: a survey of past research and suggestions for the future. [Place of publication unknown]: U.S. National Park Service, Glacier Bay National Park. 89 p.

Swanson, F.J.; Kratz, T.K.; Caine, N.; Woodmansee, R.G. 1988. Landform effects on ecosystem patterns and processes. BioScience. 38 (2): 92-98.

Tande, G.F. 1983. Vegetation. In: Rothe, T.C.; Lanigan, S.H.; Martin, P.M.; Tande, G.F. Natural resource inventory of Elmendorf Air Force Base, Alaska: Part I. Special studies. Anchorage, AK: U.S. Department of the Interior, Fish and Wildlife Service: 14-85.

Tarr, R.S.; Martin, L. 1914. Alaskan glacier studies of the National Geographic Society in Yakutat Bay, Prince William Sound and lower Copper River regions. Washington, DC: The National Geographic Society. 498 p.

Thilenius, J.F. 1990. Woody plant succession on earthquake-uplifted coastal wetlands of the Copper River Delta, Alaska. Forest Ecology and Management. 33/34: 439-462.

Thomas, J.H. 1957. The vascular flora of Middleton Island, Alaska. Contributions from the Dudley Museum. 5(2): 39-56.

Thorne, C.R. 1982. Processes and mechanisms of river bank erosion. In: Hey, R.; Bathurst, J.; Thorne, C., eds. Gravel-bed rivers. New York: John Wiley and Sons: 227-272.

Trainer, C.E. 1959. The 1959 western Canada goose (*Branta canadensis occidentalis*) study on the Copper River Delta, Alaska. In: U.S. Bureau of Sport Fish, Wildlife, Mines. Annual Waterfowl Report: Alaska: 1-9.

U.S. Department of Agriculture, Soil Conservation Service. 1983. Range site technical guidelines for Montana. Bozeman, MT. U.S. Department of Agriculture, Soil Conservation Service. ca. 750 p.

Van der Valk, A.G.; Davis, C.B. 1978. The role of seed banks in the vegetation dynamics of prairie glacial marshes. Ecology. 59: 322-335.

Viereck, L.A. 1966. Plant succession and soil development on gravel outwash of the Muldrow Glacier, Alaska. Ecological Monographs. 36(3): 181-199.

Viereck, L.A.; Dyrness, C.T.; Batten, A.R.; Wenzlick, K.J. 1992. The Alaska vegetation classification. Gen. Tech. Rep. PNW-GTR-286. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 278 p.

Vince, S.W.; Snow, A.A. 1984. Plant zonation in an Alaskan salt marsh: I. Distribution, abundance, and environmental factors. Journal of Ecology. 72: 651-667.

Vitt, D.H.; Marsh, J.E.; Bovey, R.B. 1988. Mosses, lichens and ferns of northwest North America. Seattle, WA: University of Washington Press. 296 p.

Walker, A.S. 1982. Deserts of China. American Scientist. 70: 366-376.

Whittaker, R. 1975. Communities and ecosystems. New York: Macmillan. 387 p.

Worley, I.A. 1977. Plant community analysis. In: Streveler, G.P.; Worley, I.A., eds. Dixon Harbor biological survey; final report on the summer phase of 1975 field work; Juneau, AK: U.S. National Park Service; 126-239. (Part 6).

Youngblood, A.P.; Padgett, W.G.; Winward, A.H. 1985. Riparian community type classification of eastern Idaho-western Wyoming. Ecol. Rep. 85-01. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 78 p.

Appendix

Table 10—Placement of community types from the Copper River Delta, Alaska, into "The Alaska Vegetation Classification" (Viereck and others 1992)

Level I[a]	Level II	Level III	Level IV	Level V
Forest	Needleleaf forest	Closed needleleaf (canopy 60-100 percent)	Sitka spruce	*Picea sitchensis/Rubus spectabilis* *Picea sitchensis/Alnus crispa* *Picea sitchensis/Echinopanax horridum* *Picea sitchensis/Vaccinium/Lysichiton americanum* *Picea sitchensis/Vaccinium-Echinopanax horridum* *Picea sitchensis/Vaccinium* *Picea sitchensis*/bryophyte
			Western hemlock	*Tsuga heterophylla/Vaccinium/Lysichiton americanum* *Tsuga heterophylla/Vaccinium-Echinopanax horridum* *Tsuga heterophylla/Vaccinium* *Tsuga heterophylla/Echinopanax horridum*
		Open needleleaf forest (canopy 25-60 percent)	Sitka spruce	*Picea sitchensis/Rubus spectabilis* *Picea sitchensis/Alnus crispa* *Picea sitchensis/Echinopanax horridum* *Picea sitchensis/Vaccinium/Lysichiton americanum* *Picea sitchensis/Vaccinium-Echinopanax horridum* *Picea sitchensis/Vaccinium* *Picea sitchensis*/bryophyte
			Western hemlock	*Tsuga heterophylla/Vaccinium/Lysichiton americanum* *Tsuga heterophylla/Vaccinium-Echinopanax horridum* *Tsuga heterophylla/Vaccinium* *Tsuga heterophylla/Echinopanax horridum*
	Broadleaf forest	Closed broadleaf forest (canopy 60-100 percent)	Black cottonwood	*Populus trichocarpa/Alnus crispa* *Populus trichocarpa*/young *Populus trichocarpa/Aruncus sylvester*
		Open broadleaf forest (canopy 25-60 percent)	Black cottonwood	*Populus trichocarpa/Alnus crispa* *Populus trichocarpa*/young *Populus trichocarpa/Aruncus sylvester*
		Broadleaf woodland (canopy 10-25 percent)	Black cottonwood	*Populus trichocarpa/Alnus crispa* *Populus trichocarpa*/young *Populus trichocarpa/Aruncus sylvester*
	Mixed forest	Closed mixed forest (canopy 60-100 percent)	Cottonwood-spruce	*Populus trichocarpa-Picea sitchensis*
		Open mixed forest (canopy 25-60 percent)	Cottonwood-spruce	*Populus trichocarpa-Picea sitchensis*

Table 10—Placement of community types from the Copper River Delta, Alaska, into "The Alaska Vegetation Classification" (Viereck and others 1992) (continued)

Level I[a]	Level II	Level III	Level IV	Level V
Scrub	Dwarf tree	Open dwarf tree scrub (canopy 25-60 percent)	Sitka spruce-bog	*Picea sitchensis/Sphagnum*
		Dwarf tree scrub woodland (canopy 10-25 percent)	Sitka spruce-bog	*Picea sitchensis/Sphagnum*
	Tall scrub (> 4.5 feet)	Closed tall scrub (canopy 60-100 percent)	Willow	*Salix hookeriana* *Salix sitchensis* *Salix barclayi/Lupinus nootkatensis* *Salix barclayi/Carex pluriflora* *Salix barclayi/Carex sitchensis* *Salix barclayi/Equisetum variegatum* *Salix barclayi*/mixed herb *Salix alaxensis*
			Alder	*Alnus crispa/Rubus spectabilis* *Alnus crispa/Equisetum arvense* *Alnus crispa/Calamagrostis canadensis* *Alnus crispa-Salix*
	Tall scrub	Open tall scrub (canopy 25-60 percent)	Willow	*Salix hookeriana* *Salix sitchensis* *Salix barclayi/Lupinus nootkatensis* *Salix barclayi/Carex pluriflora* *Salix barclayi/Carex sitchensis* *Salix barclayi/Equisetum variegatum* *Salix sitchensis*/mixed herb *Salix alaxensis*
			Alder	*Alnus crispa/Rubus spectabilis* *Alnus crispa/Equisetum arvense* *Alnus crispa/Calamagrostis canadensis* *Alnus crispa-Salix*
	Low scrub (8 inches to 4.5 feet tall)	Closed low scrub (canopy 60-100 percent)	Low willow	*Salix hookeriana* *Salix sitchensis* *Salix barclayi/Lupinus nootkatensis* *Salix barclayi/Carex pluriflora* *Salix barclayi/Carex sitchensis* *Salix barclayi/Equisetum variegatum* *Salix barclayi*/mixed herb *Salix alaxensis*
			Salmonberry	*Rubus spectabilis-Echinopanax horridum*
			Sweetgale-graminoid bog	*Myrica gale/Carex lyngbyaei* *Myrica gale/Carex sitchensis* *Myrica gale/Equisetum variagatum* *Myrica gale/Empetrum nigrum* *Myrica gale/Epilobium angustifolium* *Myrica gale/Carex livida* *Myrica gale/Carex pluriflora*

Table 10—Placement of community types from the Copper River Delta, Alaska, into "The Alaska Vegetation Classification" (Viereck and others 1992) (continued)

Level I[a]	Level II	Level III	Level IV	Level V
Scrub (cont.)	Open low scrub (canopy 25-60 percent)		Ericaceous shrub bog	*Vaccinium uliginosum/Empetrum nigrum*
			Willow	*Salix hookeriana* *Salix sitchensis* *Salix barclayi/Lupinus nootkatensis* *Salix barclayi/Equisetum variegatum* *Salix barclayi/*mixed herb *Salix alaxensis*
			Willow-graminoid shrub bog	*Salix barclayi/Carex pluriflora* *Salix barclayi/Carex sitchensis*
			Sweetgale-graminoid bog	*Myrica gale/Carex lyngbyaei* *Myrica gale/Carex sitchensis* *Myrica gale/Empetrum nigrum* *Myrica gale/Carex livida* *Myrica gale/Carex pluriflora*
	Dwarf scrub (< 8 inches)	Ericaceous dwarf scrub	Ericaceous bog	*Empetrum nigrum-Carex pluriflora*
		Willow dwarf scrub	Willow	*Salix arctica/Carex lyngbyaei* *Salix setchelliana*
Herbaceous	Graminoid herbaceous	Dry graminoid herbaceous	*Elymus*	*Elymus arenarius/Achillea borealis* *Elymus arenarius*
			Midgrass-herb	*Poa macrantha*
			Hair-grass	*Deschampsia beringensis*
		Mesic graminoid herbaceous	Bluejoint meadow	*Calamagrostis canadensis/Potentilla palustris* *Calamagrostis canadensis* *Calamagrostis canadensis/Lathyrus palustris*
			Vanilla-grass	*Hierochloe odorata*
		Wet graminoid herbaceous	Fresh sedge marsh	*Eleocharis palustris*
			Fresh grass marsh	*Arctophila fulva* *Glyceria pauciflora*
		Wet graminoid herbaceous	Subarctic lowland sedge wet meadow	*Carex lyngbyaei* *Carex lyngbyaei-Lathyrus palustris* *Carex rostrata* *Carex sitchensis* *Carex chordorrhiza* *Carex saxatilis*

Table 10—Placement of community types from the Copper River Delta, Alaska, into "The Alaska Vegetation Classification" (Viereck and others 1992) (continued)

Level I[a]	Level II	Level III	Level IV	Level V
Herbaceous (cont.)			Halophytic grass wet meadow	*Puccinellia nutkaensis*
			Halophytic sedge wet meadow	*Carex lyngbyaei/Ranunculus cymbalaria* *Carex glareosa* *Eleocharis palustris*
			Subarctic lowland sedge bog meadow	*Carex lyngbyaei* *Carex lyngbyaei-Lathyrus palustris* *Carex lyngbyaei*-mixed herb *Carex sitchensis/Sphagnum* *Carex pluriflora/Carex lyngbyaei* *Carex limosa* *Carex livida/Trichophorum caespitosum* *Eriophorum angustifolium* *Eriophorum russeolum* *Trichophorum caespitosum*
	Forb herbaceous	Dry forb herbaceous	Seral herbs	*Epiobium latifolium* *Equisetum variegatum* *Lathyrus maritimus*
		Mesic forb herbaceous	Mixed herbs	*Epilobium adenocaulon* *Fauria crista-galli* *Fragaria chiloensis* *Iris setosa* *Lupinus nootkatensis* *Athyrium filix-femina* *Hedysarum alpinum* *Equisetum arvense*
			Fireweed	*Epilobium angustifolium* *Epilobium latifolium* *Epilobium adenocaulon*
			Ferns	*Athyrium filix-femina*
		Wet forb herbaceous	Fresh herb marsh	*Equisetum fluviatile*
			Subarctic lowland herb wet meadow	*Equisetum variegatum* *Juncus arcticus* *Juncus alpinus* *Equisetum palustre*
			Subarctic lowland herb bog meadow	*Menyanthes trifoliata* *Potentilla palustris* *Lysimachia thyrsiflora*

Table 10—Placement of community types from the Copper River Delta, Alaska, into "The Alaska Vegetation Classification" (Viereck and others 1992) (continued)

Level I[a]	Level II	Level III	Level IV	Level V
Herbaceous (cont.)			Halophytic herb wet meadow	*Potentilla egedii* *Honckenya peploides* *Ranunculus cymbalaria* *Triglochin maritimum* *Triglochin palustre* *Hippuris tetraphylla*
	Aquatic herbaceous (floating and submerged)	Freshwater aquatic herbaceous	Pondlily	*Nuphar polysepalum*
			Common marestail	*Hippuris vulgaris*
			Aquatic buttercup	*Ranunculus trichophyllus*
			Bur-reed	*Sparganium* species
			Water milfoil	*Myriophyllum spicatum*
			Awlwort	*Subularia aquatica*
			Bladderwort	*Utricularia vulgaris*
			Fresh pondweed	*Potamogeton filiformis* *Potamogeton gramineus* *Potamogeton natans* *Potamogeton pectinatus* *Potamogeton perfoliatus*
			Water star-wort	*Callitriche hermaphroditica* *Callitriche heterophylla* *Callitriche verna*
			Fresh water algae	*Chara* species
		Brackish water aquatic herbaceous	Four-leaf marestail	*Hippuris tetraphylla*
			Brackish pondweed	*Myriophyllum spicatum* *Potamogeton filiformis* *Zannichellia palustris*

[a] Viereck and others (1992) "have constructed a hierarchical classification containing units at five levels of resolution (levels I through V). The broadest, most generalized level (level I) consists of three formations: forest, scrub, and herbaceous. At the finest level of resolution (level V), units are discrete plant communities, with levels II, III, and IV intermediate in resolution. We have not attempted to name levels II, III, and IV, although level IV in forest is comparable to Daubenmire's (1952) series."

Table 11—List of 6-letter species codes, scientific and common names, and total number of plots of occurrence of each species

Six letter code	Scientific name	Common name	Occurrence[a]
Trees:[b]			
PICSIT	*Picea sitchensis* (Bong.) Carr.	Sitka spruce	106
POPTRI	*Populus trichocarpa* Torr. & Gray	Black cottonwood	34
TSUHET	*Tsuga heterophylla* (Raf.) Sarg.	Western hemlock	43
TSUMER	*Tsuga mertensiana* (Bong.) Carr.	Mountain hemlock	3
Tall shrubs:			
ALNCRIS	*Alnus crispa* (Ait.) Pursh ssp. s*inuata* (Regel) Hult.	Sitka alder	126
CLAPYR	*Cladothamnus pyroliflorus* Bong.	Copperbush	1
ECHHOR	*Echinopanax horridum* (Sm.) Decne. & Planch.	Devil's club	63
LONINV	*Lonicera involucrata* (Richards.) Banks	—	1
MALFUS	*Malus fusca* (Raf.) Schneid.	Oregon crab apple	0
MENFER	*Menziesia ferruginea* Sm.	Rusty menziesia	18
MYRGAL	*Myrica gale* L.	Sweetgale	78
RIBBRA	*Ribes bracteosum* Dougl.	Stink current	6
RUBSPE	*Rubus spectabilis* Pursh	Salmonberry	63
SALALA	*Salix alaxensis* (Anderss.) Cov.	Feltleaf willow	40
SALBAR	*Salix barclayi* Anderss.	Barclay willow	94
SALCOM	*Salix commutata* Bebb	Undergreen willow	44
SALHOO	*Salix hookeriana* Barratt	Hooker willow	52
SALSIT	*Salix sitchensis* Sanson	Sitka willow	61
SAMRAC	*Sambucus racemosa* L.	Red elderberry	24
SORSIT	*Sorbus sitchensis* Roem.	Sitka mountain ash	2
VIBEDU	*Viburnum edule* (Michx.) Raf.	Highbush cranberry	26
Low and subshrubs:			
ANDPOL	*Andromeda polifolia* L.	Bog rosemary	11
ARCUVA	*Arctostaphylos uva-ursi* (L.) Spreng.	Kinnikinnick	1
EMPNIG	*Empetrum nigrum* L.	Crowberry	21
KALPOL	*Kalmia polifolia* Wang.	Bog kalmia	3
LEDPAL	*Ledum palustre* L.	Labrador tea	0
LOIPRO	*Loiseleuria procumbens* (L.) Desv.	Bog rosemary	1
OXYMIC	*Oxycoccus microcarpus* Turcz.	Bog cranberry	15
SALARC	*Salix arctica* Pall.	Arctic willow	15
SALOVA	*Salix ovalifolia* Trautv.	Ovalleaf willow	3
SALSET	*Salix setchelliana* Ball	Setchell willow	1
SALSTO	*Salix stolonifera* Cov.	Stoloniferous willow	1
VACALA	*Vaccinium alaskensis* How.	Alaska blueberry	50
VACOVA	*Vaccinium ovalifolium* Sm.	Tall blueberry	—
VACULI	*Vaccinium uliginosum* L.	Bog blueberry	19
VACVIT	*Vaccinium vitis-idaea* L.	Mountain cranberry	8

Table 11—List of 6-letter species codes, scientific and common names, and total number of plots of occurrence of each species (continued)

Six letter code	Scientific name	Common name	Occurrence[a]
Forbs:			
ACHBOR	*Achillea borealis* Bong.	Yarrow	42
ACTRUB	*Actaea rubra* (Ait.) Willd.	Baneberry	7
ANGGEN	*Angelica genuflexa* Nutt.	Bent-leaved angelica	23
ANGLUC	*Angelica lucida* L.	Sea coast angelica	17
APABOR	*Apargidium boreale* (Bong.) Torr. & Gray	—	1
AQUFOR*	*Aquilegia formosa* Fisch.	Western columbine	0
ARADRU	*Arabis drummondii* Gray	Rockcress	2
ARAHIR	*Arabis hirsuta* (L.) Scop.	Hairy rockcress	3
ARALYR	*Arabis lyrata* L.	Kamchatka rockcress	2
ARTTIL	*Artemisia tilesii* Ledeb.	Aleutian mugwort	14
ARUSYL	*Aruncus sylvester* Kostel.	Goatsbeard	12
ASTSUB	*Aster subspicatus* Nees	Douglas' aster	1
BOSROS	*Boschniakia rossica* (Cham. & Schlecht.) Fedtsch	Ground-cone	11
CALHER	*Callitriche hermaphroditica* L.	Northern water starwort	13
CALHET	*Callitriche heterophylla* Pursh	Different-leaved water starwort	0
CALVER	*Callitriche verna* L. emend. Lonnr.	Spring water-starwort	15
CALLEP	*Caltha leptosepala* DC.	Mountain marsh-marigold	0
CALPAL	*Caltha palustris* L.	Yellow marsh-marigold	35
CARPRA	*Cardamine pratensis* L. subsp. *angustifolia* (Hook.) O.E. Schulz	Cuckoo flower	2
CASUNA	*Castilleja unalascensis* (Cham. & Schlecht.) Malte	Yellow paintbrush	5
CERFON	*Cerastium fontanum* Baumg.	—	2
CHRARC	*Chrysanthemum arcticum* L.	Arctic daisy	7
CICDOU	*Cicuta douglasii* (DC)	Water hemlock	31
CICMAC	*Cicuta mackenzieana* Raup	—	19
CIRALP	*Circaea alpina* L.	Enchanter's nightshade	27
CLASIB	*Claytonia sibirica* L.	Siberian spring-beauty	1
CONCHI	*Conioselinum chinense* (L.) BSP.	Western hemlock-parsley	4
COPASP	*Coptis asplenifolia* Salisb.	Fern-leaf goldthread	2
COPTRI	*Coptis trifolia* (L.) Salisb.	Trifoliate goldthread	3
CORCAN	*Cornus canadensis* L.	Bunchberry	47
CORSUE	*Cornus suecia* L.	Lapland cornel	5
CORTRI	*Corallorhiza trifida* Chatelain	Early coral-root	3
DODJEF	*Dodecatheon jeffreyi* Van Houtte	Jeffrey shooting-star	1
DODPUL	*Dodecatheon pulchellum* (Raf.) Merr.	Pretty shooting-star	3
DROANG	*Drosera anglica* Huds.	Long-leaf sundew	1
DROROT	*Drosera rotundifolia* L.	Round-leaf sundew	21
EPIADE	*Epilobium adenocaulon* Haussk.	Northern willow-herb	24
EPIANG	*Epilobium angustifolium* L.	Fireweed	31
EPIBEH	*Epilobium behringianum* Haussk.	—	2
EPIGLA	*Epilobium glandulosum* Lehm.	Glandular willow-herb	11
EPIHOR	*Epilobium hornemannii* Rchb.	—	14
EPILAT	*Epilobium latifolium* L.	River beauty	10

Table 11—List of 6-letter species codes, scientific and common names, and total number of plots of occurrence of each species (continued)

Six letter code	Scientific name	Common name	Occurrence[a]
EPILEP	*Epilobium leptocarpum* Haussk.	—	3
EPIPAL	*Epilobium palustre* L.	Swamp willow-herb	31
EPISER	*Epilobium sertulatum* Haussk.	—	5
EQUARV	*Equisetum arvense* L.	Meadow horsetail	132
EQUFLU	*Equisetum fluviatile* L. ampl. Ehrh.	Swamp horsetail	73
EQUPAL	*Equisetum palustre* L.	Marsh horsetail	40
EQUPRA	*Equisetum pratense* Ehrh.	Meadow horsetail	16
EQUVAR	*Equisetum variegatum* Schleich.	Northern horsetail	44
ERIPER*	*Erigeron peregrinus* (Pursh) Greene	Subalpine daisy	1
EUPMOL	*Euphrasia mollis* (Ledeb.) Wettst.	Arctic eyebright	2
FAUCRI	*Fauria crista-galli* (Menzies) Makino	Deer cabbage	11
FRACHI	*Fragaria chiloensis* (L.) Duchesne	Beach strawberry	13
FRICAM	*Fritillaria camschatcensis* (L.) Ker-Gawl	Chocolate lily	6
GALAPA	*Galium aparine* L.	Catchweed bedstraw	1
GALBOR	*Galium boreale* L.	Northern bedstraw	4
GALTRI	*Galium trifidum* L.	Small bedstraw	49
GALTRIL	*Galium triflorum* Michx.	Sweet-scented bedstraw	35
GENAMA	*Gentiana amarella* L.	Gentian	1
GENDOU	*Gentiana douglasiana* Bong.	Swamp gentian	6
GEUCAL	*Geum calthifolium* Menzies	Caltha-leaf avens	3
GEUMAC	*Geum macrophyllum* Willd.	Large-leaf avens	11
GLELIT	*Glehnia littoralis* F. Schm.	Glehnia	1
HAMPAL*	*Hammarbya paludosa* (L.) Ktze.	—	0
HEDALP	*Hedysarum alpinum* L.	Alpine sweet-vetch	5
HERLAN	*Heracleum lanatum* Michx.	Cow parsnip	20
HEUGLA	*Heuchera glabra* Willd.	Alpine heuchera	2
HIPVUL	*Hippuris vulgaris* L.	Common marestail	21
HIPTET	*Hippurus tetraphylla* L.	Four-leaf marestail	2
HONPEP	*Honkenya peploides* (L.) Ehrh.	Seabeach sandwort	8
IRISET	*Iris setosa* Pall.	Wild iris	38
LATMAR	*Lathyrus maritimus* L.	Beach pea	10
LATPAL	*Lathyrus palustris* L.	Vetchling	34
LIGSCO	*Ligusticum scoticum* L.	Hulten sea-lovage	15
LIMAQU	*Limosella aquatica* L.	Mudwort	0
LISCOR	*Listera cordata* (L.) R. Br.	Heart-leaved twayblade	20
LUPNOO	*Lupinus nootkatensis* Donn	Nootka lupine	25
LYSAME	*Lysichiton americanum* Hult. & St. John	Yellow skunk-cabbage	17
LYSTHY	*Lysimachia thyrsiflora* L.	Tufted loosestrife	18
MAIDIL	*Maianthemum dilatatum* (How.) Nels. & Macbr.	Deerberry	2
MALMON	*Malaxis monophylla* (L.) Sw.	White adder's-tongue	1
MENTRI	*Menyanthes trifoliata* L.	Buckbean	38
MIMGUT	*Mimulus guttatus* DC.	—	3
MONFON*	*Montia fontana* L.	Water blinks	0
MONUNI	*Moneses uniflora* (L.) Gray	—	28
MYRALT	*Myriophyllum alterniflorum* DC.	Water-milfoil	0

Table 11—List of 6-letter species codes, scientific and common names, and total number of plots of occurrence of each species (continued)

Six letter code	Scientific name	Common name	Occurrence[a]
MYRSPI	*Myriophyllum spicatum* L.	Spiked water-milfoil	18
NUPPOL	*Nuphar polysepalum* Engelm.	Lily-pad	4
OSMDEP	*Osmorhiza depauperata* Phill.	—	1
PARPAL	*Parnassia palustris* L.	—	32
PEDLAB	*Pedicularis labradorica* Wirsing	Labrador lousewort	4
PEDPAR	*Pedicularis parviflora* J.E. Sm.	—	22
PEDSUD*	*Pedicularis sudetica* Willd.	—	0
PETSAG	*Petasites sagittatus* (Banks) Gray	—	2
PINVUL	*Pinguicula vulgaris* L.	—	4
PLAMAR	*Plantago maritima* L.	Plantain	6
PLAMAC	*Plantago macrocarpa* Cham. & Schlecht.	—	2
PLADIL	*Platanthera dilatata* (Pursh) Lindl.	White bog-orchid	39
PLAHYP	*Platanthera hyperborea* (L.) Lindl.	Northern bog-orchid	5
PLAOBT	*Platanthera obtusata* (Pursh) Lindl.	—	1
PLASAC	*Platanthera saccata* (Greene) Hult.	Slender bog-orchid	2
POLAVI	*Polygonum aviculare* L.	—	2
POLFOW*	*Polygonum fowleri* Robins.	—	0
POLVIV	*Polygonum viviparum* L.	Viviparum bistort	5
POTBER*	*Potamogeton berchtoldi* Fieb.	—	0
POTFIL	*Potamogeton filiformis* Pers.	Slender-leaved pondweed	27
POTFRI	*Potamogeton friesii* Rupr.	—	1
POTGRA	*Potamogeton gramineus* L.	Grass-leaved pondweed	0
POTNAT	*Potamogeton natans* L.	Floating-leaved pondweed	1
POTPEC	*Potamogeton pectinatus* L.	Fennel-leaved pondweed	2
POTPER	*Potamogeton perfoliatus* L. ssp. *richardsonii* (Bennett) Hult.	Richardson's pondweed	75
POTEGE	*Potentilla egedii* Wormsk.	Pacific silverweed	80
POTPAL	*Potentilla palustris* (L.) Scop.	Marsh fivefinger	98
PREALA	*Prenanthes alata* (Hook.) Dietr.	—	2
PRIEGA	*Primula egaliksensis* Wormsk.	—	3
PRISIB	*Primula sibirica* Jacq.	—	1
PYRASA	*Pyrola asarifolia* Michx.	Alpine pyrola	43
PYRMIN	*Pyrola minor* L.	—	2
PYRSEC	*Pyrola secunda* L.	—	20
RANBON	*Ranunculus bongardii* Greene	—	2
RANCON	*Ranunculus confervoides* (E. Fries) E. Fries	—	4
RANCYM	*Ranunculus cymbalaria* Pursh	Seaside buttercup	19
RANPAC	*Ranunculus pacificus* (Hult.) Benson	—	1
RANPAL	*Ranunculus pallasii* Schlecht.	—	0
RANREP	*Ranunculus reptans* L.	—	7
RANTRI	*Ranunculus trichophyllus* Chaix.	White water crowfoot	37
RHIMIN	*Rhinanthus minor* L.	—	26
RUBARC	*Rubus arcticus* L.	—	49
RUBPED	*Rubus pedatus* Sm.	—	52
RUMFEN	*Rumex fenestratus* Greene	—	14

Table 11—List of 6-letter species codes, scientific and common names, and total number of plots of occurrence of each species (continued)

Six letter code	Scientific name	Common name	Occurrence[a]
RUMLON	*Rumex longifolius* DC.	—	4
RUMOCC	*Rumex occidentalis*	—	1
RUPSPI*	*Ruppia spiralis* L.	Ditch grass	0
SANSTI	*Sanguisorba stipulata* Raf.	Burnet	31
SAXPUN	*Saxifraga punctata* L.	—	3
SENPSE	*Senecio pseudo-Arnica* Less.	—	1
SENTRI	*Senecio triangularis* Hook.	—	0
SOLLEP	*Solidago lepida* DC.	—	5
SOLMUL	*Solidago multiradiata* Ait.	—	2
SPAANG	*Sparganium angustifolium* Michx.	Floating bur-reed	9
SPAHYP	*Sparganium hyperboreum* Laest.	—	2
SPAMIN	*Sparganium minimum* (Hartm.) E. Fries	Small bur-reed	6
SPIROM	*Spiranthes romanzoffiana* Cham.	—	17
STEBOR	*Stellaria borealis*	—	1
STECAL	*Stellaria calycantha* (Ledeb.) Bong.	Chickweed	4
STECRA	*Stellaria crassifolia* Ehrh.	—	35
STECRI	*Stellaria crispa* Cham. & Schlecht.	—	5
STEHUM*	*Stellaria humifusa* Rottb.	—	0
STESIT	*Stellaria sitchana* Steud.	—	2
STRAMP	*Streptopus amplexifolius* (L.) DC.	—	58
SUBAQU	*Subularia aquatica* L.	Awlwort	6
SWEPER	*Swertia perennis* L.	—	1
TELGRA	*Tellima grandiflora* (Pursh) Dougl.	—	4
THASPA	*Thalictrum sparsiflorum* Turcz.	—	1
TIATRI	*Tiarella trifoliata* L.	—	45
TOFGLU	*Tofieldia glutinosa* (Michx.) Pers.	—	3
TRIEUR	*Trientalis europaea* L.	—	39
TRIMAR	*Triglochin maritimum* L.	Seaside arrow-grass	13
TRIPAL	*Triglochin palustre* L.	Marsh arrow-grass	8
UTRMIN*	*Utricularia minor* L.	—	0
UTRVUL	*Utricularia vulgaris* L.	Common bladderwort	15
VERVIR	*Veratrum viride Ait.*	—	3
VERAME	*Veronica americana* Schwein.	Speedwell	1
VERSER	*Veronica serpyllifolia* L.	—	2
VERSTE	*Veronica stelleri Pall.*	—	1
VIOEPI	*Viola epipsila* Ledeb.	Marsh violet	46
VIOGLA	*Viola glabella* Nutt.	—	10
VIOLAN	*Viola langsdorffii* Fisch.	—	3
VIOLA	*Viola* spp. L.	—	0
ZANPAL	*Zannichellia palustris* L.	Horned pondweed	1
ZOSMAR	*Zostera marina* L.	Eelgrass	0

Table 11—List of 6-letter species codes, scientific and common names, and total number of plots of occurrence of each species (continued)

Six letter code	Scientific name	Common name	Occurrence[a]
Graminoids:			
AGRVIO	*Agropyron violaceum* (Hornem.) Lange	Wheatgrass	1
AGRALA	*Agrostis alaskana* Hult.	—	49
AGRBOR	*Agrostis borealis* Hartm.	—	1
AGREXA	*Agrostis exarata* Trin.	—	7
AGRGIG	*Agrostis gigantea* Roth	—	9
AGRSCA	*Agrostis scabra* Willd.	—	6
ARCLAT	*Arctagrostis latifolia* (R. Br.) Griseb.	—	14
ARCFUL	*Arctophila fulva* (Trin.) Anderss.	Pendant grass	15
CALCAN	*Calamagrostis canadensis* (Michx. Beauv.)	Bluejoint	127
CALDES	*Calamagrostis deschampsioides* Trin.	—	2
CALINE	*Calamagrostis inexpansa* Gray	—	3
CALLAP	*Calamagrostis lapponica* (Wahlenb.) Hartm.	—	2
CALNEG	*Calamagrostis neglecta* (Ehrh.) Gaertn., Mey. & Schreb.	—	6
CARANT*	*Carex anthoxanthea* Presl	—	0
CARAQU	*Carex aquatilis* Wahlenb.	—	8
CARAUR	*Carex aurea* Nutt.	—	1
CARBIC	*Carex bicolor* All.	—	1
CARCAN	*Carex canescens* L.	—	18
CARCHO	*Carex chordorrhiza* Ehrh.	Creeping sedge	3
CARDEW	*Carex deweyana* Schwein.	—	1
CARDIS	*Carex disperma* Dew.	—	1
CARFLA	*Carex flava* L.	—	1
CARGAR	*Carex garberi* Fern.	—	4
CARGLA	*Carex glareosa* Wahlenb.	—	2
CARGME	*Carex gmelini* Hook. & Arn.	—	3
CARKEL	*Carex kelloggii* W. Boott	—	11
CARLAE	*Carex laeviculmis* Meinsh.	—	5
CARLIM	*Carex limosa* L.	Livid sedge	7
CARLIV	*Carex livida* (Wahlenb.) Willd.	Pale sedge	1
CARLYN	*Carex lyngbyaei* Hornem.	Lyngby's sedge	111
CARMACK	*Carex mackenziei* Krecz.	—	5
CARMACH*	*Carex macrochaeta* C.A. Mey.	—	1
CARMAR*	*Carex maritima* Gunn.	—	3
CARMICG	*Carex microglochin* Wahlenb.	—	1
CARPAU	*Carex pauciflora* Lightf.	—	7
CARPLU	*Carex pluriflora* Hult.	Several-flowered sedge	27
CARPRE	*Carex preslii* Steud.	—	1
CARRAM*	*Carex ramenskii* Kom.	—	0
CARROS	*Carex rostrata* Stokes	Beaked sedge	7
CARSAX	*Carex saxatilis* L.	Russet sedge	15
CARSIT	*Carex sitchensis* Prescott	Sitka sedge	66
CARSPE	*Carex spectabilis* Dew.	—	2
CINLAT	*Cinna latifolia* (Trev.) Griseb.	—	0
DESBER	*Deschampsia beringensis* Hult.	Bering hairgrass	51

Table 11—List of 6-letter species codes, scientific and common names, and total number of plots of occurrence of each species (continued)

Six letter code	Scientific name	Common name	Occurrence[a]
DESCAE	*Deschampsia caespitosa* (L.) Beauv.	Tufted hairgrass	31
ELEACI	*Eleocharis acicularis* (L.) Roem. & Schult.	—	7
ELEKAM	*Eleocharis kamtschatica* (C.A. Mey.) Kom.	—	8
ELEPAL	*Eleocharis palustris* (L.) Roem. & Schult.	Common spike-rush	33
ELEUNI	*Eleocharis uniglumis* (Link) Schult.	—	4
ELYARE	*Elymus arenarius* L.	Beach rye	25
ERIANG	*Eriophorum angustifolium* Honck.	Tall cottongrass	22
ERIRUS	*Eriophorum russeolum* E. Fries	Russett cottongrass	16
FESALT	*Festuca altaica* Trin.	Rough fescue	3
FESBRA	*Festuca brachyphylla* Schult.	—	0
FESRUB	*Festuca rubra* L.	—	53
GLYPAU	*Glyceria pauciflora* Presl	—	11
HIEODO	*Hierochloe odorata* (L.) Wahlenb.	Vanilla-grass	4
HORBRA	*Hordeum brachyantherum* Nevski	—	9
HORJUB*	*Hordeum jubatum* L.	Squirreltail grass	0
JUNALP	*Juncus alpinus* Vill.	Northern rush	12
JUNARC	*Juncus arcticus* Willd.	—	22
JUNBUF	*Juncus bufonius* L.	—	3
JUNCAS	*Juncus castaneus* Sm.	Chestnut rush	1
JUNENS*	*Juncus ensifolius* Wikstr.	—	0
JUNEFF	*Juncus effusus* L.	—	1
JUNFAL	*Juncus falcatus* E. Mey.	—	7
JUNFIL	*Juncus filiformis* L.	—	2
LUZMUL	*Luzula multiflora* (Retz.) Lej.	—	9
LUZPAR	*Luzula parviflora* (Ehrh.) Desv.	—	3
LUZWAH	*Luzula wahlenbergii* Rupr.	—	1
PHLALP	*Phleum alpinum* L.	—	0
POAALP	*Poa alpina* L.	—	2
POAEMI	*Poa eminens* Presl.	Large flower speargrass	4
POALAN	*Poa lanata* Scrbn. & Merr.	Wooly bluegrass	1
POAMACO	*Poa macrocalyx* Trautv. & Mey.	—	2
POAMACA	*Poa macrantha* Vasey.	Seashore bluegrass	9
POAPAL	*Poa palustris* L.	—	6
POAPRA	*Poa pratensis* L.	—	0
PODAEQ	*Podagrostis aequivalis* (Trin.) Scribn. & Merr.	—	0
PUCGRA	*Puccinellia grandis* Swallen	—	0
PUCNUT	*Puccinellia nutkaensis* (Presl.) Fern. & Weath.	Pacific alkaligrass	3
PUCPUM	*Puccinellia pumila* (Vasey) Hitchc.	Dwarf alkaligrass	12
SCIMIC	*Scirpus microcarpus* Presl.	—	1
TRICAE	*Trichophorum caespitosum* (L.) Hartm.	Tufted clubrush	3
TRICER	*Trisetum cernuum* Trin.	—	3
VAHATR	*Vahlodea atropurpurea* (Wahlenb.) E. Fries	—	1

Table 11—List of 6-letter species codes, scientific and common names, and total number of plots of occurrence of each species (continued)

Six letter code	Scientific name	Common name	Occurrence[a]
Ferns and allies:			
ATHFIL	*Athyrium filix-femina* (L.) Roth	Lady-fern	74
BLESPI	*Blechnum spicant* (L.) J. Sm.	—	3
CYSFRA	*Cystopteris fragilis* (L.) Bernh.	—	4
DRYDIL	*Dryopteris dilatata* (Hoffm.) Gray	—	50
GYMDRY	*Gymnocarpium dryopteris* (L.) Ehrh.	—	47
LYCANN	*Lycopodium annotinum* L.	—	25
LYCCLA	*Lycopodium clavatum* L.	—	3
LYCSEL	*Lycopodium selago*	—	2
POLBRA	*Polystichum braunii*	—	0
THEPHE	*Thelypteris phegopteris*	—	0
Mosses:[c]			
AMBPOL	*Amblystegium polygonum*	—	1
AMBRIP	*Amblystegium riparium*	—	6
AMBSER	*Amblystegium serpens*	—	1
ANTCUR	*Antitrichia curtipendula* (Hedw.) Brid.	—	4
AULPAL	*Aulocomnium palustre* (Hedw.) Schwaegr.	—	5
BARCON	*Barbula convoluta* Hedw.	—	1
BRAASP	*Brachythecium asperrimum* (C. Muell.)	—	3
BRACHY	*Brachythecium* spp.	—	4
BRAVEL	*Brachythecium velutinum*	—	1
BRYCAE	*Bryum caespiticium* Hedw.	—	1
BRYUM	*Bryum* spp.	—	0
BRYPAP	*Bryum papillata*	—	0
CALGIG	*Calliergon giganteum* (Schimp.) Kindb.	—	3
CALLIE	*Calliergon* spp.	—	2
CALLIEA	*Calliergonella* spp.	—	1
CAMNIS	*Campylium nispidulam*	—	1
CAMSTE	*Campylium stellatum* (Hedw.) C. Jens.	—	6
CINCLI	*Cinclidium* spp.	—	1
CINSTY	*Cinclidium stygium* Sw.	—	1
CLIDEN	*Climacium dendroides* (Hedw.) Web. & Mohr	—	2
CONCON	*Conocephalum conicum* (L.) Lindb.	—	2
DICMAJ	*Dicranum majus*	—	1
DICSCO	*Dicranum scoparium* Hedw.	—	12
DICRAN	*Dicranum* spp.	—	2
DICSUB	*Dicranella subulata*	—	1
DREADU	*Drepanocladus aduncus* (Hedw.) Warnst.	—	1
DREREV	*Drepanocladus revolvens* (Sw.) Warnst.	—	1
DREUNC	*Drepanocladus uncinatus* (Hedw.) Warnst.	—	1
FISSID	*Fissidens* spp.	—	1
HELBLA	*Helodium blandowii* (Web. & Mohr) Warnst.	—	10
HYLSPL	*Hylocomium splendens* (Hedw.) B.S.G.	—	54
HYPCAL	*Hypnum callichroum*	—	2

Table 11—List of 6-letter species codes, scientific and common names, and total number of plots of occurrence of each species (continued)

Six letter code	Scientific name	Common name	Occurrence[a]
HYPCUP	*Hypnum cupressiforme*	—	2
HYPLIN	*Hypnum lindbergii* Mit.	—	2
HYPNUM	*Hypnum* spp.	—	0
MEETRI	*Meesia triquetra*	—	12
MYUJUL	*Myurella julacea* (Schwaegr.) B.S.G.	—	2
ONCWAH	*Oncophorus wahlenbergii* Brid	—	1
ORTCON	*Orthotrichum consimile*	—	1
PHIFON	*Philonotis fontana* (Hedw.)	—	11
PLAINS	*Plagiomnium insigne*	—	2
PLARUG	*Plagiomnium rugicum*	—	3
PLESCH	*Pleurozium schreberi* (Brid.) Mitt.	—	8
POGALP	*Pogonatum alpinum* (Hedw.) Roehl.	—	1
POHLIA	*Pohlia* spp. Hedw.	—	3
POHNUT	*Pohlia nutans* (Hedw.) Lindb.	—	1
POLCOM	*Polytrichum commune* Hedw.	—	5
POLYTR	*Polytricaceae* spp. (as *Polytrichum* spp.) Hedw.	—	2
POLSTR	*Polytrichum strictum* Brid.	—	1
PTICRI	*Ptilium crista-castrensis* (Hedw.) De Not.	—	6
RACHET	*Rhacomitrium heterostichum* Hedw.	—	1
RACVAR	*Rhacomitrium varium*	—	1
RHIAND	*Rhizomnium andrewsianum* (Steere) Kop.	—	3
RHIGLA	*Rhizomnium glabrescens*	—	26
RHINUD	*Rhizomnium nudum*	—	6
RHIPER	*Rhizomnium perssonii*	—	1
RHIPSE	*Rhizomnium pseudopunctatum* Bruch & Schimp	—	1
RHIZOM	*Rhizomnium* spp. Hedw.	—	1
RHYLOR	*Rhytidiadelphus loreus* (Hedw.) Warnst.	—	43
RHYTRI	*Rhytidiadelphus triquetrus* (Hedw.) Warnst.	—	8
RHYSQU	*Rhytidiadelphus squarrosus* (Hedw.) Warnst.	—	33
SPHAGN	*Sphagnum* spp. L.	Peat moss species	68
SPHANG	*Sphagnum angustifolium*	—	1
SPHCAP	*Sphagnum capillifolium* (Weiss) Schrank	—	4
SPHFUS	*Sphagnum fuscum* (Schimp.) Klinggr.	—	11
SPHGIR	*Sphagnum girgensohnii* Russ.	—	8
SPHLIN	*Sphagnum lindbergii* Schimp.	—	2
SPHMAG	*Sphagnum magellanicum* Brid.	—	1
SPHPAC	*Sphagnum pacificum*	—	6
SPHPAP	*Sphagnum papillosum* Lindb.	—	5
SPHRIP	*Sphagnum riparium* Angstr.	—	3
SPHSQU	*Sphagnum squarrosum* Crome	—	15
SPHSUB	*Sphagnum subnitens* Russ. & Warnst. ex. Warnst.	—	2
SPHTER	*Sphagnum teres* (Schimp) Angstr. ex. Hartm.	—	1
SPHWAR	*Sphagnum warnstorfii* Russ.	—	1
ULOCRI	*Ulota crispa* (Hedw.) Brid.	—	1

Table 11—List of 6-letter species codes, scientific and common names, and total number of plots of occurrence of each species (continued)

Six letter code	Scientific name	Common name	Occurrence[a]
Lichens,			
ALECTO	*Alectoria* spp.	—	1
BRYBIC	*Bryoria bicolor* (Ehrh.) Brodo & D. Hawksw.	—	0
BRYORI	*Bryoria* spp.	—	0
CLABEL	*Cladonia bellidiflora* (Arch.) Schaerer	—	1
CLADON	*Cladonia* spp. (Hill) Hill	—	1
CLASCA	*Cladonia scabriuscula* (Del. in Duby) Nyl.	—	2
HYPOGY	*Hypogymnia* spp.	—	2
LOBARI	*Lobaria* spp.	—	5
LOBLIN	*Lobaria linita* (Arch.) Rabenh.	—	5
LOBORE	*Lobaria oregania* (Tuck) Mull. Arg.	—	1
PELMEM	*Peltigera membranacea* (Arch.) Nyl.	—	4
PELNEO	*Peltigera neopolydactyla* (Gyeln.) Gyeln.	—	2
PELSCA	*Peltigera scabrosa* Th. Fr.	—	2
PELTIG	*Peltigera* spp.	—	9
Liverwort:			
BARBIL	*Barbilophozia* spp.	—	1
Algae:			
CHARA	*Chara*	Chara	14

— = No common name.
* = Species identified by Batten and others (1978) but not recorded during this study.
[a] Total number of plots = 471.
[b] Common names and scientific names and authorities for vascular plants follow Hultén (1968).
[c] Common names and scientific names and authorities for nonvascular plants follow Vitt and others (1988).

Table 12—Constancy (Con) and average canopy coverage (Cov) (in percentage) of the plants in *Picea sitchensis* (Sitka spruce) community types

Community type	PICSIT/ ALNCIR (9 plots)		PICSIT/ Bryophyte (11 plots)		PICSIT/ ECHHOR (4 plots)		PICSIT/ RUBSPE (7 plots)		PICSIT/ Sphagnum (1 plot)		PICSIT/ VACOVA (7 plots)		PICSIT/ VACOVA/ ECHHOR (8 plots)		PICSIT/ VACOVA/ LYSAME (3 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Trees:																
Picea sitchensis	100	61	100	72	100	54	100	41	100	10	100	64	100	61	100	39
Picea sitchensis-understory	—	—	—	—	75	3	71	2	—	—	43	1	38	1	67	3
Populus trichocarpa	—	—	55	11	25	3	—	—	—	—	—	—	13	10	—	—
Tsuga heterophylla	33	1	36	1	50	12	29	24	—	—	71	6	88	15	33	10
Tsuga heterophylla-understory	—	—	—	—	25	4	43	3	—	—	29	5	63	5	—	—
Tall shrubs:																
Alnus crispa subsp. *sinuata*	100	55	82	5	75	4	29	3	—	—	43	1	25	11	100	2
Cladothamnus pyrolaeflorus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	3
Echinopanax horridum	33	2	27	2	100	50	100	20	—	—	86	3	100	12	67	2
Lonicera involucrata	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Menziesia ferruginea	—	—	—	—	25	1	43	1	—	—	57	5	50	16	—	—
Ribes spp.	—	—	—	—	50	13	14	5	—	—	—	—	—	—	—	—
Rubus spectabilis	33	14	9	1	50	13	100	41	—	—	71	7	63	5	67	2
Salix alaxensis	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Salix barclayi	44	15	27	2	—	—	—	—	—	—	—	—	—	—	—	—
Salix commutata	22	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Salix hookeriana	44	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Salix sitchensis	33	7	18	3	—	—	—	—	—	—	—	—	—	—	—	—
Salix spp.	—	—	—	—	—	—	—	—	—	—	14	1	—	—	—	—
Sambucus racemosa	11	1	9	7	25	8	29	2	—	—	—	—	—	—	—	—
Sorbus sitchensis	—	—	—	—	—	—	14	1	—	—	14	1	—	—	—	—
Vaccinium ovalifolium or-*V. alaskensis*	22	21	36	6	75	3	100	10	—	—	100	26	100	31	100	6
Viburnum edule	33	1	27	1	—	—	—	—	—	—	43	1	—	—	67	1
Low shrubs and subshrubs:																
Empetrum nigrum	—	—	—	—	—	—	—	—	100	10	—	—	—	—	—	—
Kalmia polifolia	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—
Oxycoccus microcarpus	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—
Vaccinium uliginosum	—	—	—	—	25	3	—	—	100	10	—	—	—	—	—	—
Vaccinium vitis-idaea	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—
Forbs:																
Achillea borealis	11	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Actaea rubra	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Angelica genuflexa	11	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Arabis lyrata	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Artemisia tilesii	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Boschniakia rossica	22	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 12—Constancy (Con) and average canopy coverage (Cov) (in percentage) of the plants in *Picea sitchensis* (Sitka spruce) community types (continued)

Community type	PICSIT/ ALNCIR (9 plots)		PICSIT/ Bryophyte (11 plots)		PICSIT/ ECHHOR (4 plots)		PICSIT/ RUBSPE (7 plots)		PICSIT/ Sphagnum (1 plot)		PICSIT/ VACOVA (7 plots)		PICSIT/ VACOVA/ ECHHOR (8 plots)		PICSIT/ VACOVA/ LYSAME (3 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Caltha palustris	11	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Castilleja unalascensis	11	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Circaea alpina	22	2	27	1	50	1	—	—	—	—	14	3	—	—	33	1
Coptis asplenifolia	—	—	—	—	—	—	14	2	—	—	—	—	13	6	—	—
Coptis trifolia	—	—	—	—	—	—	—	—	—	—	14	1	—	—	33	1
Corallorrhiza trifida	11	1	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Cornus canadensis	33	14	36	1	25	1	43	2	—	—	100	6	88	2	100	6
Epilobium angustifolium	22	2	18	1	—	—	—	—	—	—	14	1	—	—	—	—
Epilobium hornemannii	11	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Epilobium palustre	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Epilobium sertulatum	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Equisetum arvense	78	46	45	35	—	—	—	—	—	—	29	50	—	—	33	1
Equisetum palustre	—	—	18	1	—	—	—	—	100	10	—	—	—	—	33	1
Equisetum pratense	11	80	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Equisetum spp.	—	—	—	—	25	1	—	—	—	—	14	1	—	—	33	1
Equisetum variegatum	22	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fauria crista-galli	—	—	—	—	—	—	—	—	—	—	—	—	—	—	67	6
Fragaria chiloensis	11	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Galium trifidum	11	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Galium triflorum	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Geum macrophyllum	11	1	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Heracleum lanatum	22	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ligusticum scoticum	33	1	9	1	—	—	—	—	—	—	—	—	13	1	—	—
Listera cordata	—	—	27	1	—	—	29	1	—	—	29	2	25	1	33	1
Lupinus nootkatensis	—	—	18	2	—	—	—	—	—	—	—	—	—	—	—	—
Lysichiton americanum	33	4	—	—	—	—	—	—	—	—	43	1	—	—	100	37
Maianthemum dilatatum	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Mimulus guttatus	11	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Moneses uniflora	33	1	64	1	50	1	—	—	—	—	29	3	13	3	67	3
Pedicularis labradorica	—	—	—	—	—	—	—	—	100	10	—	—	—	—	—	—
Petasites sagittatus	11	3	—	—	—	—	—	—	—	—	—	—	13	3	—	—
Plantago macrocarpa	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	1
Platanthera dilatata	22	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Platanthera obtusata	11	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Potentilla egedii	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Potentilla palustris	22	1	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Pyrola asarifolia	56	8	27	1	25	1	—	—	—	—	—	—	13	3	33	1
Pyrola minor	—	—	—	—	25	1	—	—	—	—	—	—	—	—	—	—
Pyrola secunda	33	2	55	1	—	—	—	—	—	—	—	—	13	3	33	2
Ranunculus Bongardi	11	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ranunculus spp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	1

Table 12—Constancy (Con) and average canopy coverage (Cov) (in percentage) of the plants in *Picea sitchensis* (Sitka spruce) community types (continued)

Community type	PICSIT/ ALNCIR (9 plots)		PICSIT/ Bryophyte (11 plots)		PICSIT/ ECHHOR (4 plots)		PICSIT/ RUBSPE (7 plots)		PICSIT/ Sphagnum (1 plot)		PICSIT/ VACOVA (7 plots)		PICSIT/ VACOVA/ ECHHOR (8 plots)		PICSIT/ VACOVA/ LYSAME (3 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Rubus arcticus	56	2	27	1	—	—	—	—	—	—	—	—	—	—	—	—
Rubus pedatus	33	2	27	1	100	6	100	6	—	—	100	12	100	11	100	4
Sanguisorba stipulata	11	1	—	—	—	—	—	—	—	—	—	—	—	—	33	1
Stellaria crassifolia	22	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Stellaria crispa	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Streptopus amplexifolius	33	1	36	1	100	1	100	2	—	—	86	1	100	1	67	1
Tiarella trifoliata	11	3	—	—	100	9	100	3	—	—	86	5	100	4	100	2
Trientalis europaea	22	1	—	—	—	—	—	—	—	—	14	3	—	—	—	—
Veratrum viride	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—
Viola epipsila	11	3	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Viola glabella	—	—	—	—	—	—	—	—	—	—	14	1	—	—	33	1
Graminoids:																
Arctophila fulva	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Calamagrostis canadensis	33	2	—	—	—	—	—	—	—	—	29	2	—	—	—	—
Carex canescens	22	1	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Carex laeviculmis	11	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex macrochaeta	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Carex pluriflora	—	—	—	—	—	—	—	—	100	10	—	—	—	—	—	—
Carex sitchensis	—	—	—	—	—	—	—	—	100	60	—	—	—	—	—	—
Eriophorum spp.	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—
Luzula parviflora	—	—	—	—	—	—	—	—	—	—	14	1	—	—	—	—
Poa alpina	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Poa palustris	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Poa spp.	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Trisetum cernuum	11	1	—	—	—	—	—	—	—	—	—	—	—	—	33	1
Ferns and allies:																
Athyrium filix-femina	67	6	18	2	25	15	29	6	—	—	43	3	63	3	—	—
Blechnum spicant	—	—	—	—	—	—	—	—	—	—	—	—	13	1	33	15
Cystopteris fragilis	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Dryopteris dilatata	33	2	36	1	100	13	100	18	—	—	86	5	63	10	100	2
Gymnocarpium dryopteris	11	3	18	1	100	13	100	13	—	—	86	14	100	12	100	2
Lycopodium annotinum	22	1	36	1	25	1	29	2	—	—	43	2	75	1	—	—
Lycopodium clavatum	—	—	—	—	—	—	14	1	—	—	14	1	13	1	—	—
Lycopodium selago	—	—	—	—	25	1	—	—	—	—	—	—	—	—	—	—
Thelypteris phegopteris	—	—	—	—	25	1	—	—	—	—	14	1	25	1	33	1
Mosses:																
Antitrichia curtipendula	11	3	—	—	—	—	—	—	100	3	—	—	—	—	—	—
Calliergon giganteum	11	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 12—Constancy (Con) and average canopy coverage (Cov) (in percentage) of the plants in *Picea sitchensis* (Sitka spruce) community types (continued)

Community type	PICSIT/ ALNCIR (9 plots)		PICSIT/ Bryophyte (11 plots)		PICSIT/ ECHHOR (4 plots)		PICSIT/ RUBSPE (7 plots)		PICSIT/ Sphagnum (1 plot)		PICSIT/ VACOVA (7 plots)		PICSIT/ VACOVA/ ECHHOR (8 plots)		PICSIT/ VACOVA/ LYSAME (3 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Calliergon spp.	11	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dicranum majus	—	—	9	3	—	—	—	—	—	—	—	—	—	—	—	—
Dicranum scoparium	—	—	—	—	25	1	14	1	—	—	14	1	13	7	—	—
Dicranum spp.	11	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fissidens spp.	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Hylocomium splendens	44	18	91	26	75	17	86	14	—	—	86	30	38	18	67	15
Meesia triquetra	—	—	18	40	—	—	—	—	—	—	—	—	—	—	—	—
Pleurozium schreberi	—	—	9	10	—	—	—	—	100	10	—	—	—	—	—	—
Pogonatum alpinus	11	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Polytrichum commune	—	—	9	60	—	—	—	—	—	—	—	—	—	—	—	—
Polytrichum strictum	—	—	—	—	—	—	—	—	—	—	14	40	—	—	—	—
Ptilium crista-castrensis	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—
Rhizomnium glabrescens	11	10	9	1	75	22	86	22	—	—	29	13	13	20	67	28
Rhizomnium pseudopunctatum	11	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Rhytidiadelphus loreus	33	40	45	33	75	21	86	19	—	—	57	23	38	27	100	14
Rhytidiadelphus squarrosus	44	33	36	58	—	—	—	—	100	3	—	—	—	—	—	—
Rhytidiadelphus triquetrus	11	10	27	5	—	—	—	—	—	—	14	30	13	50	—	—
Sphagnum angustifolium	—	—	—	—	—	—	—	—	100	20	—	—	—	—	—	—
Sphagnum fuscum	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—
Sphagnum girgensohnii	11	1	18	6	—	—	—	—	—	—	14	8	13	4	—	—
Sphagnum pacificum	—	—	—	—	—	—	—	—	—	—	—	—	13	10	33	20
Sphagnum spp.	22	1	—	—	50	1	57	12	—	—	29	15	38	14	67	6
Sphagnum squarrosum	—	—	9	10	—	—	—	—	—	—	—	—	—	—	—	—
Sphagnum subnitens	11	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lichens:																
Alectoria spp.	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—
Bryoria spp.	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—
Lobaria linita	—	—	9	1	—	—	—	—	—	—	—	—	13	1	—	—
Lobaria spp.	—	—	—	—	—	—	—	—	—	—	14	1	—	—	—	—
Lobaria oregania	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Peltigera spp.	11	3	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Peltigera neopolydactyla	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—
Unknowns:																
Moss unknown	33	51	27	33	100	40	71	10	—	—	29	3	25	42	67	10
Species richness for types > 5 plots	57		48		—		22		—		31		27		—	

Table 13—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Populus trichocarpa* (black cottonwood) and *Tsuga heterophylla* (western hemlock) community types

	POPTRI/ ARUSYL (3 plots)		POPTRI/ ALNCRI (7 plots)		POPTRI-PICSIT (3 plots)		POPTRI/ Young (4 plots)		TSUHET/ VACOVA (4 plots)		TSUHET/ VACOVA ECHHOR (6 plots)		TSUHET/ VACOVA/ LYSAME (1 plot)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Trees:														
Picea sitchensis	—	—	—	—	100	20	75	11	100	9	100	22	100	7
Picea sitchensis-understory	—	—	—	—	—	—	—	—	50	1	17	3	100	8
Populus trichocarpa	100	43	100	29	100	43	100	25	—	—	—	—	—	—
Tsuga heterophylla	—	—	—	—	—	—	25	1	100	61	100	46	100	14
Tsuga heterophylla-understory	—	—	—	—	—	—	—	—	100	10	100	3	100	7
Tsuga mertensiana-understory	—	—	—	—	—	—	—	—	—	—	17	1	—	—
Tall shrubs:														
Alnus crispa subsp. *sinuata*	100	12	100	62	100	67	100	48	—	—	—	—	—	—
Echinopanax horridum	100	20	86	39	100	17	—	—	100	1	100	15	100	1
Menziesia ferruginea	—	—	—	—	—	—	—	—	25	1	67	1	100	1
Myrica gale	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Ribes spp.	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Ribes bracteosum	33	1	43	1	—	—	—	—	—	—	—	—	—	—
Rubus spectabilis	67	25	71	34	33	60	—	—	75	2	100	4	—	—
Salix alaxensis	67	10	29	6	—	—	25	10	—	—	—	—	—	—
Salix barclayi	—	—	14	20	33	10	75	5	—	—	—	—	—	—
Salix hookeriana	—	—	—	—	—	—	25	10	—	—	—	—	—	—
Salix sitchensis	—	—	—	—	67	2	100	23	—	—	—	—	—	—
Sambucus racemosa	33	5	71	15	67	7	—	—	—	—	—	—	—	—
Vaccinium ovalifolium or *V. alaskensis*	—	—	—	—	33	1	25	1	100	30	100	25	100	45
Viburnum edule	100	5	43	7	33	1	—	—	—	—	—	—	—	—
Forbs:														
Actaea rubra	—	—	43	2	33	1	—	—	—	—	—	—	—	—
Artemisia tilesii	67	6	14	30	—	—	—	—	—	—	—	—	—	—
Aruncus sylvester	100	52	43	5	33	1	—	—	—	—	—	—	—	—
Boschniakia rossica	33	1	29	1	—	—	25	1	—	—	—	—	—	—
Circaea alpina	—	—	14	60	100	8	—	—	—	—	—	—	—	—
Coptis trifolia	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Corallorrhiza trifida	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Cornus canadensis	—	—	—	—	33	1	—	—	100	2	100	1	100	6
Epilobium adenocaulon	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Epilobium angustifolium	—	—	—	—	33	1	50	12	—	—	—	—	—	—
Epilobiu behringianum	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Epilobium hornemannii	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Epilobium latifolium	—	—	29	2	—	—	—	—	—	—	—	—	—	—
Equisetum arvense	100	4	71	3	33	1	25	3	—	—	—	—	—	—
Galium trifidum	33	1	14	1	—	—	—	—	—	—	—	—	—	—
Galium triflorum	33	3	29	1	67	1	—	—	—	—	—	—	—	—
Galium boreale	—	—	14	1	—	—	—	—	—	—	—	—	—	—
Geum macrophyllum	—	—	14	1	—	—	—	—	—	—	—	—	—	—
Heracleum lanatum	33	10	43	8	—	—	—	—	—	—	—	—	—	—
Heuchera glabra	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Listera cordata	—	—	—	—	—	—	—	—	75	1	67	1	—	—
Lysichiton americanum	—	—	—	—	—	—	—	—	25	1	—	—	100	9

Table 13—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Populus trichocarpa* (black cottonwood) and *Tsuga heterophylla* (western hemlock) community types (continued)

	POPTRI/ ARUSYL (3 plots)		POPTRI/ ALNCRI (7 plots)		POPTRI-PICSIT (3 plots)		POPTRI/ Young (4 plots)		TSUHET/ VACOVA (4 plots)		TSUHET/ VACOVA ECHHOR (6 plots)		TSUHET/ VACOVA/ LYSAME (1 plot)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Moneses uniflora	—	—	—	—	—	—	50	1	75	1	50	1	—	—
Osmorhiza depauperata	—	—	14	1	—	—	—	—	—	—	—	—	—	—
Platanthera dilatata	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Pyrola asarifolia	—	—	29	2	67	2	75	4	—	—	—	—	—	—
Pyrola minor	—	—	—	—	33	10	—	—	—	—	—	—	—	—
Pyrola secunda	—	—	14	30	67	2	75	7	—	—	—	—	—	—
Rubus arcticus	—	—	14	1	—	—	75	12	—	—	—	—	—	—
Rubus pedatus	—	—	—	—	67	11	—	—	100	8	100	6	100	6
Solidago multiradiata	33	1	—	—	—	—	—	—	—	—	—	—	—	—
Stellaria calycantha	—	—	14	1	—	—	—	—	—	—	—	—	—	—
Stellaria crassifolia	—	—	—	—	67	1	75	11	—	—	—	—	—	—
Stellaria crispa	—	—	14	1	67	1	—	—	—	—	—	—	—	—
Streptopus amplexifolius	33	1	86	3	100	1	—	—	50	1	83	1	100	1
Tellima grandiflora	—	—	29	12	—	—	—	—	—	—	—	—	—	—
Tiarella trifoliata	—	—	—	—	67	2	—	—	75	1	100	1	—	—
Trientalis europaea	—	—	—	—	33	1	50	2	—	—	—	—	—	—
Utricularia vulgaris	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Veratrum viride	—	—	—	—	33	1	—	—	—	—	17	1	—	—
Viola epipsila	—	—	—	—	100	1	—	—	—	—	—	—	—	—
Viola glabella	—	—	—	—	—	—	—	—	—	—	33	1	—	—
Graminoids:														
Agrostis alaskana	—	—	—	—	—	—	75	2	—	—	—	—	—	—
Arctagrostis latifolia	33	1	43	2	—	—	—	—	—	—	—	—	—	—
Calamagrostis canadensis	67	15	29	6	33	3	75	20	—	—	—	—	—	—
Carex canescens	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Carex chordorrhiza	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Carex deweyana	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Carex disperma	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Carex limosa	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Carex lyngbyaei	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Carex microglochin	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Carex rostrata	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Carex spp.	—	—	—	—	—	—	—	—	25	1	—	—	100	1
Festuca rubra	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Luzula multiflora	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Poa palustris	—	—	14	1	—	—	25	3	—	—	—	—	—	—
Ferns and allies:														
Athyrium filix-femina	—	—	86	22	67	55	75	1	50	2	50	1	—	—
Blechnum spicant	—	—	—	—	—	—	—	—	25	1	—	—	—	—
Cystopteris fragilis	—	—	14	1	—	—	—	—	—	—	—	—	—	—
Dryopteris dilatata	—	—	14	3	100	5	—	—	75	7	100	9	100	1
Gymnocarpium dryopteris	—	—	—	—	—	—	—	—	100	5	100	10	100	2
Lycopodium annotinum	—	—	—	—	—	—	—	—	25	1	17	1	—	—
Polystichum Braunii	—	—	43	2	33	3	—	—	—	—	—	—	—	—
Thelypteris phegopteris	—	—	—	—	—	—	—	—	—	—	17	1	—	—

Table 13—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Populus trichocarpa* (black cottonwood) and *Tsuga heterophylla* (western hemlock) community types (continued)

	POPTRI/ ARUSYL (3 plots)		POPTRI/ ALNCRI (7 plots)		POPTRI-PICSIT (3 plots)		POPTRI/ Young (4 plots)		TSUHET/ VACOVA (4 plots)		TSUHET/ VACOVA ECHHOR (6 plots)		TSUHET/ VACOVA/ LYSAME (1 plot)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Mosses:														
Brachythecium asperrimum	33	1	—	—	—	—	—	—	—	—	—	—	—	—
Campylium stellatum	33	10	—	—	—	—	—	—	—	—	—	—	—	—
Dicranum scoparium	—	—	—	—	—	—	—	—	50	8	83	8	100	1
Hylocomium splendens	—	—	—	—	—	—	—	—	75	9	100	10	100	20
Philonotis fontana	33	10	—	—	—	—	—	—	—	—	—	—	—	—
Plagiomnium rugicum	33	10	—	—	—	—	—	—	—	—	—	—	—	—
Pohlia spp.	—	—	14	3	—	—	25	3	—	—	—	—	—	—
Rhizomnium andrewsianum	—	—	14	3	—	—	—	—	—	—	—	—	—	—
Rhizomnium glabrescens	—	—	—	—	—	—	—	—	75	27	100	9	100	1
Rhytidiadelphus loreus	—	—	—	—	—	—	—	—	75	20	100	16	100	15
Rhytidiadelphus squarrosus	—	—	14	3	—	—	—	—	—	—	—	—	—	—
Sphagnum spp.	—	—	—	—	—	—	25	10	100	49	100	29	100	20
Lichens:														
Cladonia bellidiflora	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Cladonia scabriuscula	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Lobaria spp.	—	—	—	—	—	—	—	—	—	—	50	1	100	1
Lobaria linita	—	—	—	—	33	3	—	—	—	—	—	—	—	—
Peltigera membranacea	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Unknowns:														
Moss unknown	67	10	57	5	67	22	75	87	75	1	50	1	100	1
Species richness for types > 5 plots	—		35		—		—		—		20		—	

Table 14—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Alnus crispa* (Sitka alder) and *Empetrum nigrums* (crowberry) community types

	ALNCRI/ CALCAN (5 plots)		ALNCRI/ EQUARV (13 plots)		ALNCRI/ RUBSPE (8 plots)		ALNCRI/ Salix (2 plots)		EMPNIG/ CARPLU (4 plots)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Trees:										
Picea sitchensis	20	20	15	7	—	—	50	1	50	3
Populus trichocarpa	—	—	8	5	13	5	50	1	—	—
Tsuga heterophylla	—	—	—	—	—	—	—	—	25	3
Tsuga mertensiana	—	—	—	—	—	—	—	—	25	1
Tall shrubs:										
Alnus crispa subsp. *sinuata*	100	74	100	80	100	79	100	75	—	—
Echinopanax horridum	—	—	—	—	13	3	—	—	—	—
Myrica gale	40	2	—	—	—	—	50	20	—	—
Ribes bracteosum	—	—	8	1	13	1	—	—	—	—
Rubus spectabilis	20	3	38	1	100	41	—	—	—	—
Salix alaxensis	—	—	46	5	38	4	—	—	—	—
Salix barclayi	60	21	46	14	25	2	100	20	—	—
Salix commutata	20	3	15	7	—	—	50	10	—	—
Salix hookeriana	20	10	8	1	—	—	—	—	—	—
Salix sitchensis	40	6	54	19	13	40	—	—	—	—
Sambucus racemosa	—	—	15	6	75	14	—	—	—	—
Viburnum edule	40	1	8	1	13	10	—	—	—	—
Low shrubs and subshrubs:										
Empetrum nigrum	—	—	—	—	—	—	—	—	100	40
Kalmia polifolia	—	—	—	—	—	—	—	—	50	10
Oxycoccus microcarpus	—	—	—	—	—	—	—	—	50	2
Salix arctica	—	—	—	—	—	—	50	10	—	—
Vaccinium oxycoccos	—	—	—	—	—	—	—	—	25	3
Vaccinium uliginosum	—	—	—	—	—	—	—	—	100	7
Vaccinium vitis-idaea	—	—	—	—	—	—	—	—	50	7
Forbs:										
Achillea borealis	—	—	8	3	—	—	50	3	—	—
Angelica genuflexa	—	—	8	1	—	—	—	—	—	—
Angelica lucida	20	1	8	10	13	1	—	—	—	—
Artemisia tilesii	—	—	15	1	25	6	—	—	—	—
Aruncus sylvester	—	—	—	—	25	21	—	—	—	—
Boschniakia rossica	20	1	—	—	25	3	—	—	—	—
Caltha palustris	20	5	8	1	13	1	—	—	—	—
Cicuta douglasii	20	1	—	—	—	—	—	—	—	—
Circaea alpina	20	50	23	18	38	14	—	—	—	—
Cornus canadensis	20	1	8	3	—	—	—	—	25	3
Cornus suecia	—	—	—	—	—	—	—	—	25	3
Drosera anglica	—	—	—	—	—	—	—	—	25	30
Drosera rotundifolia	—	—	—	—	—	—	—	—	75	8
Epilobium adenocaulon	—	—	15	1	25	1	50	1	—	—
Epilobium angustifolium	—	—	15	3	38	2	—	—	—	—
Epilobium behringianum	—	—	8	1	—	—	—	—	—	—
Epilobium glandulosum	—	—	15	1	25	1	—	—	—	—
Epilobium hornemannii	—	—	—	—	—	—	50	1	—	—
Epilobium latifolium	—	—	8	1	—	—	—	—	—	—

Table 14—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Alnus crispa* (Sitka alder) and *Empetrum nigrums* (crowberry) community types (continued)

	ALNCRI/ CALCAN (5 plots)		ALNCRI/ EQUARV (13 plots)		ALNCRI/ RUBSPE (8 plots)		ALNCRI/ Salix (2 plots)		EMPNIG/ CARPLU (4 plots)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Epilobium palustre	—	—	15	1	—	—	—	—	—	—
Epilobium spp.	20	3	—	—	—	—	—	—	—	—
Equisetum arvense	80	29	92	59	88	4	50	1	—	—
Equisetum fluviatile	20	1	8	1	—	—	50	1	—	—
Equisetum palustre	40	1	15	2	—	—	—	—	25	3
Equisetum pratense	20	3	—	—	—	—	50	90	—	—
Equisetum variegatum	—	—	38	25	13	10	50	1	—	—
Fauria crista-galli	—	—	—	—	—	—	—	—	25	60
Fritillaria camschatcensis	—	—	—	—	13	1	—	—	—	—
Galium boreale	—	—	8	2	—	—	—	—	—	—
Galium trifidum	40	1	—	—	25	1	—	—	—	—
Galium triflorum	20	1	15	1	—	—	—	—	—	—
Gentiana douglasiana	—	—	—	—	—	—	—	—	25	3
Geranium spp.	—	—	8	3	—	—	—	—	—	—
Geum calthifolium	20	1	8	10	—	—	—	—	—	—
Geum macrophyllum	—	—	8	1	25	2	—	—	—	—
Heracleum lanatum	—	—	23	7	50	6	—	—	—	—
Heuchera glabra	—	—	8	1	—	—	—	—	—	—
Iris setosa	—	—	8	1	—	—	50	20	—	—
Lathyrus palustris	—	—	—	—	—	—	50	1	—	—
Ligusticum scoticum	—	—	23	5	—	—	—	—	—	—
Listera cordata	—	—	—	—	25	15	—	—	—	—
Lupinus nootkatensis	—	—	8	1	—	—	—	—	—	—
Lysichiton americanum	40	2	—	—	13	30	—	—	—	—
Menyanthes trifoliata	—	—	—	—	—	—	—	—	25	3
Moneses uniflora	20	1	8	10	—	—	—	—	—	—
Pedicularis parviflora	—	—	—	—	—	—	—	—	25	3
Platanthera dilatata	—	—	—	—	—	—	50	1	25	1
Platanthera hyperborea	—	—	8	1	—	—	—	—	—	—
Potentilla egedii	—	—	—	—	—	—	50	30	—	—
Potentilla palustris	60	4	8	1	—	—	—	—	—	—
Primula egaliksensis	—	—	—	—	—	—	50	1	—	—
Pyrola asarifolia	40	16	46	12	—	—	—	—	—	—
Pyrola secunda	—	—	8	1	—	—	—	—	—	—
Rubus arcticus	80	3	—	—	25	11	50	20	25	10
Rubus pedatus	—	—	8	1	—	—	—	—	—	—
Rumex fenestratus	—	—	—	—	13	1	—	—	—	—
Sanguisorba stipulata	40	1	8	3	13	1	—	—	—	—
Saxifraga punctata	—	—	8	10	—	—	—	—	—	—
Solidago lepida	—	—	—	—	13	1	—	—	—	—
Solidago multiradiata	—	—	—	—	13	1	—	—	—	—
Stellaria calycantha	—	—	—	—	—	—	50	3	—	—
Stellaria crassifolia	20	1	8	1	13	1	—	—	—	—
Streptopus amplexifolius	—	—	—	—	25	7	—	—	—	—
Tellima grandiflora	—	—	—	—	13	1	—	—	—	—
Thalictrum sparsiflorum	20	1	—	—	—	—	—	—	—	—
Trichophorum caespitosum	—	—	—	—	—	—	—	—	50	12
Trientalis europaea	60	1	8	1	—	—	—	—	—	—
Veronica serpyllifolia	—	—	—	—	13	1	—	—	—	—

Table 14—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Alnus crispa* (Sitka alder) and *Empetrum nigrums* (crowberry) community types (continued)

	ALNCRI/ CALCAN (5 plots)		ALNCRI/ EQUARV (13 plots)		ALNCRI/ RUBSPE (8 plots)		ALNCRI/ Salix (2 plots)		EMPNIG/ CARPLU (4 plots)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Viola epipsila	60	1	23	1	13	1	—	—	—	—
Viola glabella	20	3	—	—	13	30	—	—	—	—
Viola spp.	20	1	—	—	13	1	—	—	—	—
Graminoids:										
Agrostis exarata	—	—	—	—	13	10	—	—	—	—
Agrostis gigantea	20	1	—	—	13	1	50	20	—	—
Agrostis scabra	—	—	8	1	—	—	—	—	—	—
Arctagrostis latifolia	—	—	23	20	38	4	—	—	—	—
Arctophila fulva	20	10	—	—	13	1	—	—	—	—
Calamagrostis canadensis	100	52	77	3	38	4	100	4	—	—
Carex livida	—	—	—	—	—	—	—	—	25	60
Carex lyngbyaei	20	1	8	1	—	—	50	3	—	—
Carex pauciflora	—	—	—	—	—	—	—	—	25	20
Carex pluriflora	—	—	—	—	—	—	—	—	50	10
Carex sitchensis	60	40	—	—	—	—	—	—	75	20
Carex spp.	—	—	15	1	—	—	—	—	—	—
Deschampsia caespitosa	—	—	—	—	13	3	—	—	—	—
Elymus arenarius	—	—	—	—	13	1	—	—	—	—
Eriophorum angustifolium	—	—	—	—	—	—	—	—	75	40
Festuca altaica	—	—	—	—	—	—	50	10	—	—
Festuca rubra	—	—	—	—	13	1	—	—	—	—
Luzula parviflora	20	1	—	—	—	—	—	—	—	—
Trisetum cernuum	—	—	8	3	—	—	—	—	—	—
Ferns and allies:										
Athyrium filix-femina	60	3	31	11	63	18	—	—	—	—
Cystopteris fragilis	20	1	—	—	—	—	—	—	—	—
Dryopteris dilatata	20	1	—	—	—	—	—	—	—	—
Gymnocarpium dryopteris	20	3	—	—	25	16	—	—	—	—
Lycopodium annotinum	20	1	—	—	—	—	—	—	—	—
Lycopodium selago	—	—	—	—	—	—	50	3	—	—
Polystichum Braunii	20	3	—	—	13	1	—	—	—	—
Mosses:										
Antitrichia curtipendula	—	—	15	6	—	—	—	—	—	—
Aulocomnium palustre	—	—	—	—	—	—	—	—	25	20
Brachythecium asperrimum	—	—	—	—	13	1	—	—	—	—
Brachythecium spp.	20	3	—	—	—	—	—	—	—	—
Bryum papillata	—	—	8	5	—	—	—	—	—	—
Climacium dendroides	—	—	8	20	—	—	—	—	—	—
Dicranella subulata	—	—	8	10	—	—	—	—	—	—
Helodium blandowii	—	—	8	10	—	—	—	—	—	—
Hylocomium splendens	—	—	8	5	—	—	—	—	25	20
Meesia triquetra	—	—	8	20	—	—	—	—	—	—
Myurella julacea	—	—	8	5	—	—	—	—	—	—
Oncophorus wahlenbergii	—	—	—	—	—	—	—	—	25	20
Orthotrichum consimile	—	—	8	10	—	—	—	—	—	—
Philonotis fontana	—	—	15	15	—	—	—	—	—	—

Table 14—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Alnus crispa* (Sitka alder) and *Empetrum nigrums* (crowberry) community types (continued)

	ALNCRI/ CALCAN (5 plots)		ALNCRI/ EQUARV (13 plots)		ALNCRI/ RUBSPE (8 plots)		ALNCRI/ Salix (2 plots)		EMPNIG/ CARPLU (4 plots)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Plagiomnium rugicum	—	—	—	—	13	10	—	—	—	—
Pleurozium schreberi	—	—	—	—	—	—	—	—	75	17
Polytricaceae spp.	—	—	8	1	—	—	—	—	—	—
Ptilium crista-castrensis	—	—	—	—	—	—	—	—	25	40
Rhizomnium nudum	—	—	8	5	—	—	50	40	—	—
Rhytidiadelphus loreus	—	—	15	2	13	3	—	—	—	—
Rhytidiadelphus squarrosus	—	—	15	11	—	—	—	—	—	—
Sphagnum fuscum	—	—	—	—	—	—	—	—	25	10
Sphagnum lindbergii	—	—	—	—	—	—	—	—	25	40
Sphagnum squarrosum	—	—	8	10	—	—	—	—	—	—
Sphagnum spp.	40	15	8	10	—	—	—	—	25	90
Ulota crispa	—	—	8	10	—	—	—	—	—	—
Lichens:										
Bryoria bicolor	—	—	—	—	—	—	—	—	25	3
Cladonia spp.	—	—	8	1	—	—	—	—	—	—
Hypogymnia spp.	—	—	15	6	—	—	—	—	—	—
Peltigera spp.	—	—	8	5	—	—	—	—	—	—
Liverwort:										
Barbilophozia spp.	—	—	8	20	—	—	—	—	—	—
Unknowns:										
Moss unknown	60	37	46	12	63	4	—	—	25	10
Species richness (> 5 plots)	47		57		50		—		—	

Table 15—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Myrica gale* (sweetgale) and other shrub-dominated community types

Community type	MYRGAL/ CARLYN (7 plots)		MYRGAL/ CARSIT (7 plots)		MYRGAL/ EMPNIG (3 plots)		MYRGAL/ EPIANG (4 plots)		MYRGAL/ EQUVAR (3 plots)		MYRGAL/ CARPLU (1 plot)		RUBSPE/ ECHHOR (1 plot)		VACULI/ EMPNIG (5 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Trees:																
Picea sitchensis	14	3	—	—	100	1	—	—	33	1	—	—	—	—	80	3
Tall shrubs:																
Alnus crispa subsp.-*sinuata*	57	4	—	—	—	—	—	—	67	1	—	—	—	—	—	—
Echinopanax horridum	—	—	—	—	—	—	—	—	—	—	—	—	100	60	—	—
Myrica gale	100	59	100	70	100	30	100	60	100	53	100	70	—	—	—	—
Rubus spectabilis	—	—	—	—	—	—	—	—	—	—	—	—	100	90	—	—
Salix barclayi	86	6	86	3	—	—	—	—	67	8	—	—	—	—	20	10
Salix commutata	71	2	43	4	—	—	—	—	67	13	—	—	—	—	—	—
Salix hookeriana	71	5	57	7	—	—	—	—	100	4	—	—	—	—	—	—
Salix sitchensis	57	3	14	1	—	—	—	—	33	1	—	—	—	—	—	—
Sambucus racemosa	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—
Low shrubs and subshrubs:																
Andromeda polifolia	14	1	—	—	100	10	—	—	—	—	—	—	—	—	40	1
Empetrum nigrum	—	—	—	—	100	27	—	—	—	—	—	—	—	—	80	43
Oxycoccus microcarpus	—	—	—	—	100	7	—	—	—	—	—	—	—	—	80	8
Salix arctica	14	40	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Vaccinium uliginosum	—	—	—	—	67	7	—	—	—	—	—	—	—	—	100	46
Vaccinium vitis-idaea	—	—	—	—	—	—	—	—	—	—	—	—	—	—	60	5
Forbs:																
Achillea borealis	43	2	—	—	—	—	100	9	—	—	—	—	—	—	—	—
Angelica genuflexa	—	—	—	—	—	—	50	10	—	—	—	—	—	—	—	—
Angelica lucida	—	—	—	—	—	—	50	12	—	—	—	—	—	—	—	—
Aruncus sylvester	—	—	—	—	—	—	—	—	—	—	—	—	100	50	—	—
Caltha palustris	29	10	14	3	—	—	—	—	—	—	—	—	—	—	—	—
Cardamine pratensis angustifolia	—	—	—	—	—	—	25	1	—	—	—	—	—	—	—	—
Chrysanthemum arcticum	14	1	—	—	—	—	—	—	33	1	—	—	—	—	—	—
Cicuta douglasii	43	5	14	3	—	—	—	—	—	—	—	—	—	—	—	—
Cicuta mackenzieana	29	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Circaea alpina	—	—	—	—	—	—	50	2	—	—	—	—	—	—	—	—
Cornus canadensis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	1
Cornus suecia	—	—	—	—	33	1	—	—	—	—	—	—	—	—	20	3
Dodecatheon pulchellum	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dodecatheon spp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	10
Drosera rotundifolia	14	1	—	—	67	1	—	—	—	—	—	—	—	—	60	2
Epilobium adenocaulon	14	1	—	—	—	—	25	1	—	—	—	—	—	—	—	—
Epilobium angustifolium	—	—	14	1	—	—	100	50	—	—	—	—	—	—	—	—

Table 15—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Myrica gale* (sweetgale) and other shrub-dominated community types (continued)

	MYRGAL/ CARLYN (7 plots)		MYRGAL/ CARSIT (7 plots)		MYRGAL/ EMPNIG (3 plots)		MYRGAL/ EPIANG (4 plots)		MYRGAL/ EQUVAR (3 plots)		MYRGAL/ CARPLU (1 plot)		RUBSPE/ ECHHOR (1 plot)		VACULI/ EMPNIG (5 plots)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Epilobium glandulosum	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Epilobium hornemannii	14	1	14	1	—	—	25	1	—	—	—	—	—	—	—	—
Epilobium palustre	29	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Epilobium sertulatum	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—
Epilobium spp.	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Equisetum arvense	86	7	14	50	—	—	50	65	100	8	—	—	—	—	—	—
Equisetum fluviatile	14	1	86	9	—	—	—	—	—	—	—	—	—	—	—	—
Equisetum palustre	—	—	43	2	—	—	—	—	—	—	—	—	—	—	—	—
Equisetum pratense	14	30	14	3	—	—	—	—	—	—	—	—	—	—	—	—
Equisetum variegatum	43	4	—	—	—	—	—	—	100	36	—	—	—	—	—	—
Fauria crista-galli	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
Fragaria chiloensis	—	—	—	—	—	—	25	1	—	—	—	—	—	—	—	—
Fritillaria camschatcensis	—	—	—	—	—	—	25	1	—	—	—	—	—	—	—	—
Galium trifidum	14	1	43	1	—	—	25	20	—	—	100	1	—	—	—	—
Galium triflorum	57	1	14	3	—	—	—	—	—	—	—	—	—	—	—	—
Gentiana douglasiana	—	—	—	—	33	1	—	—	—	—	—	—	—	—	20	3
Geum macrophyllum	—	—	—	—	—	—	25	1	—	—	—	—	—	—	—	—
Heracleum lanatum	—	—	—	—	—	—	25	1	—	—	—	—	—	—	—	—
Iris setosa	57	4	29	2	—	—	50	1	—	—	100	3	—	—	—	—
Lathyrus palustris	43	2	14	1	—	—	50	6	—	—	—	—	—	—	—	—
Ligusticum scoticum	14	3	—	—	—	—	—	—	33	1	—	—	—	—	—	—
Lupinus nootkatensis	14	1	—	—	—	—	25	1	33	10	—	—	—	—	—	—
Menyanthes trifoliata	—	—	57	25	—	—	—	—	—	—	—	—	—	—	20	10
Parnassia palustris	14	1	—	—	—	—	—	—	67	1	—	—	—	—	—	—
Pedicularis parviflora	14	1	—	—	33	1	—	—	—	—	—	—	—	—	40	2
Platanthera dilatata	14	1	14	1	67	1	—	—	67	1	—	—	—	—	20	1
Platanthera hyperborea	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Polygonum viviparum	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—
Potentilla egedii	57	9	14	1	—	—	50	1	100	5	—	—	—	—	—	—
Potentilla palustris	100	7	100	24	—	—	—	—	33	1	—	—	—	—	—	—
Pyrola asarifolia	29	17	—	—	—	—	—	—	67	2	—	—	—	—	—	—
Ranunculus bongardi	—	—	—	—	—	—	25	1	—	—	—	—	—	—	—	—
Rhinanthus minor	14	1	—	—	—	—	—	—	—	—	—	—	—	—	20	1
Rubus arcticus	—	—	14	1	33	1	50	2	—	—	100	3	—	—	20	1
Rumex longifolius	—	—	—	—	—	—	25	1	—	—	—	—	—	—	—	—
Sanguisorba stipulata	29	2	—	—	—	—	75	4	33	1	—	—	—	—	—	—
Solidago lepida	—	—	14	1	—	—	25	10	—	—	—	—	—	—	—	—
Spiranthes romanzoffiana	29	1	—	—	—	—	—	—	33	1	—	—	—	—	—	—
Stellaria crassifolia	—	—	14	1	—	—	25	1	—	—	—	—	—	—	—	—
Tiarella trifoliata	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 15—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Myrica gale* (sweetgale) and other shrub-dominated community types (continued)

Community type	MYRGAL/ CARLYN (7 plots)		MYRGAL/ CARSIT (7 plots)		MYRGAL/ EMPNIG (3 plots)		MYRGAL/ EPIANG (4 plots)		MYRGAL/ EQUVAR (3 plots)		MYRGAL/ CARPLU (1 plot)		RUBSPE/ ECHHOR (1 plot)		VACULI/ EMPNIG (5 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Tofieldia glutinosa	—	—	—	—	—	—	—	—	67	1	—	—	—	—	—	—
Trichophorum caespitosum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	1
Trientalis europaea	—	—	14	1	33	1	25	10	—	—	100	5	—	—	20	1
Viola epipsila	14	1	14	1	—	—	25	10	—	—	—	—	—	—	—	—
Viola langsdorffii	—	—	14	3	—	—	25	3	—	—	—	—	—	—	—	—
Graminoids:																
Agrostis alaskana	57	11	29	15	—	—	25	1	33	1	—	—	—	—	—	—
Agrostis exarata	—	—	—	—	—	—	25	10	—	—	—	—	—	—	—	—
Agrostis gigantea	—	—	—	—	—	—	25	1	—	—	—	—	—	—	—	—
Agrostis scabra	14	1	14	3	—	—	—	—	—	—	—	—	—	—	—	—
Calamagrostis canadensis	86	5	100	9	—	—	25	10	33	1	100	20	—	—	—	—
Calamagrostis deschampsioides	—	—	14	3	—	—	—	—	—	—	—	—	—	—	—	—
Carex aquatilis	—	—	—	—	—	—	—	—	33	20	—	—	—	—	—	—
Carex canescens	—	—	29	1	—	—	—	—	—	—	—	—	—	—	—	—
Carex glareosa	—	—	—	—	—	—	—	—	33	3	—	—	—	—	—	—
Carex lyngbyaei	100	50	29	7	—	—	—	—	67	2	—	—	—	—	—	—
Carex mackenziei	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex pauciflora	—	—	—	—	33	3	—	—	—	—	—	—	—	—	20	10
Carex pluriflora	—	—	14	10	100	14	—	—	—	—	100	50	—	—	60	17
Carex sitchensis	—	—	43	47	100	21	—	—	—	—	—	—	—	—	100	28
Carex spectabilis	—	—	14	20	—	—	—	—	—	—	—	—	—	—	—	—
Deschampsia beringensis	29	2	—	—	—	—	25	10	67	2	—	—	—	—	—	—
Deschampsia caespitosa	14	1	14	3	—	—	—	—	—	—	—	—	—	—	—	—
Eleocharis kamtschatica	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Eleocharis palustris	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Elymus arenarius	—	—	—	—	—	—	25	3	—	—	—	—	—	—	—	—
Eriophorum angustifolium	—	—	—	—	100	67	—	—	—	—	—	—	—	—	60	40
Eriophorum russeolum	14	1	14	3	—	—	—	—	—	—	—	—	—	—	20	1
Festuca brachyphylla	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—
Festuca rubra	57	1	—	—	—	—	50	20	100	2	—	—	—	—	—	—
Hierochloe odorata	—	—	14	1	—	—	—	—	—	—	100	1	—	—	—	—
Hordeum brachyantherum	—	—	—	—	—	—	50	2	—	—	—	—	—	—	—	—
Juncus alpinus	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Juncus arcticus	14	1	—	—	—	—	—	—	33	3	—	—	—	—	—	—
Juncus filiformis	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Poa palustris	—	—	—	—	—	—	25	1	—	—	—	—	—	—	—	—
Ferns and allies:																
Athyrium filix-femina	—	—	14	1	—	—	100	9	—	—	—	—	—	—	—	—
Dryopteris dilatata	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—

Table 15—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Myrica gale* (sweetgale) and other shrub-dominated community types (continued)

Community type	MYRGAL/ CARLYN (7 plots)		MYRGAL/ CARSIT (7 plots)		MYRGAL/ EMPNIG (3 plots)		MYRGAL/ EPIANG (4 plots)		MYRGAL/ EQUVAR (3 plots)		MYRGAL/ CARPLU (1 plot)		RUBSPE/ ECHHOR (1 plot)		VACULI/ EMPNIG (5 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Mosses:																
Amblystegium riparium	—	—	14	40	—	—	25	10	—	—	—	—	—	—	—	—
Aulocomnium palustre	—	—	—	—	—	—	25	10	—	—	—	—	—	—	—	—
Calliergon giganteum	—	—	—	—	—	—	—	—	33	20	—	—	—	—	—	—
Campylium stellatum	14	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Conocephalum conicum	—	—	—	—	—	—	—	—	33	50	—	—	—	—	—	—
Helodium blandowii	29	35	—	—	—	—	—	—	33	10	—	—	—	—	—	—
Hylocomium splendens	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	10
Meesia triquetra	14	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Philonotis fontana	14	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Polytrichum commune	14	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Rhytidiadelphus squarrosus	—	—	—	—	—	—	25	60	33	20	—	—	—	—	—	—
Sphagnum capillifolium	14	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sphagnum fuscum	—	—	—	—	67	40	—	—	—	—	—	—	—	—	40	35
Sphagnum girgensohnii	—	—	14	90	—	—	—	—	—	—	—	—	—	—	—	—
Sphagnum pacificum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	98
Sphagnum papillosum	—	—	—	—	33	50	—	—	—	—	—	—	—	—	20	40
Sphagnum spp.	—	—	57	30	67	75	—	—	33	1	100	30	—	—	40	50
Sphagnum squarrosum	14	40	14	60	—	—	—	—	33	30	—	—	—	—	—	—
Lichens:																
Peltigera membranacea	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Peltigera scabrosa	29	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unknowns:																
Moss unknown	86	28	43	2	—	—	25	20	33	20	—	—	—	—	40	75
Species richness for types > 5 plots	57		41		—		—		—		—		—		24	

Table 16—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Salix* (Willow) community types

	SALALA (2 plots)		SALARC/ CARLYN (4 plots)		SALBAR/ CARPLU (2 plots)		SALBAR/ CARSIT (8 plots)		SALBAR/ EQUVAR (3 plots)		SALBAR/ LUPNOO (5 plots)		SALBAR/ mixed herb (10 plots)		SALHOO (5 plots)		SALSIT (7 plots)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Trees:																		
Picea sitchensis	—	—	—	—	—	—	25	8	33	1	60	4	40	4	20	3	14	1
Populus trichocarpa	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—
Tall shrubs:																		
Alnus crispa subsp. *sinuata*	50	1	75	1	—	—	50	3	33	50	100	13	70	16	40	7	57	16
Echinopanax horridum	50	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Myrica gale	—	—	—	—	100	40	63	31	67	7	—	—	60	35	60	53	14	30
Ribes bracteosum	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—
Rubus spectabilis	50	10	—	—	—	—	—	—	—	—	—	—	—	—	20	20	29	1
Salix alaxensis	100	35	50	1	50	10	13	3	67	5	—	—	—	—	20	3	43	5
Salix barclayi	—	—	50	2	50	10	100	40	100	28	100	14	80	35	20	3	71	15
Salix commutata	—	—	25	3	100	10	50	21	67	10	40	40	50	34	20	10	14	3
Salix hookeriana	—	—	—	—	50	10	38	17	67	7	40	7	40	18	100	60	14	10
Salix sitchensis	50	10	—	—	100	10	25	22	33	10	100	19	30	20	60	14	100	47
Viburnum edule	50	4	—	—	—	—	—	—	—	—	—	—	10	3	20	1	—	—
Low shrubs and subshrubs:																		
Arctostaphylos uva-ursi	—	—	—	—	—	—	13	1	—	—	—	—	—	—	—	—	—	—
Empetrum nigrum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—
Salix arctica	—	—	100	28	50	1	—	—	—	—	—	—	—	—	—	—	—	—
Salix ovalifolia	—	—	25	1	—	—	13	1	—	—	—	—	—	—	—	—	—	—
Salix setchelliana	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Salix stolonifera	—	—	25	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Vaccinium uliginosum	—	—	—	—	—	—	13	3	—	—	—	—	—	—	20	3	—	—
Vaccinium vitis-idaea	—	—	—	—	—	—	13	30	—	—	—	—	—	—	20	3	—	—
Forbs:																		
Achillea borealis	—	—	25	3	—	—	—	—	—	—	60	4	30	8	—	—	—	—
Actaea rubra	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Angelica genuflexa	—	—	—	—	—	—	—	—	—	—	—	—	60	4	20	3	14	1
Angelica lucida	—	—	—	—	—	—	—	—	—	—	—	—	20	1	40	5	14	1
Artemisia tilesii	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	1
Aster subspicatus	—	—	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—
Caltha palustris	—	—	—	—	50	1	—	—	—	—	—	—	40	1	40	2	29	2
Castilleja unalascensis	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—
Cerastium fontanum	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Chrysanthemum arcticum	—	—	25	1	—	—	—	—	—	—	—	—	10	3	20	3	—	—

Table 16—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Salix* (Willow) community types (continued)

Community type	SALALA (2 plots)		SALARC/ CARLYN (4 plots)		SALBAR/ CARPLU (2 plots)		SALBAR/ CARSIT (8 plots)		SALBAR/ EQUVAR (3 plots)		SALBAR/ LUPNOO (5 plots)		SALBAR/ mixed herb (10 plots)		SALHOO (5 plots)		SALSIT (7 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Cicuta douglasii	—	—	—	—	50	3	—	—	—	—	—	—	—	—	20	1	14	20
Circaea alpina	—	—	—	—	—	—	—	—	—	—	—	—	20	1	20	1	—	—
Conioselinum chinense	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—
Cornus canadensis	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	14	3
Dodecatheon spp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	40	1	—	—
Drosera rotundifolia	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Epilobium adenocaulon	—	—	—	—	—	—	13	1	—	—	20	1	40	2	20	1	43	2
Epilobium angustifolium	—	—	—	—	—	—	13	1	—	—	—	—	10	1	20	1	14	10
Epilobium glandulosum	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Epilobium hornemannii	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—
Epilobium latifolium	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	14	1
Epilobium palustre	—	—	—	—	50	1	13	1	33	1	20	1	10	1	—	—	—	—
Epilobium spp.	—	—	—	—	50	1	—	—	—	—	—	—	10	1	—	—	—	—
Equisetum arvense	—	—	—	—	50	10	25	2	67	5	40	7	90	47	100	24	57	30
Equisetum fluviatile	—	—	25	1	—	—	25	3	—	—	—	—	30	24	—	—	14	1
Equisetum palustre	—	—	—	—	—	—	63	17	—	—	—	—	20	2	20	3	14	90
Equisetum pratense	—	—	—	—	—	—	13	1	—	—	—	—	10	90	—	—	14	90
Equisetum variegatum	—	—	50	1	50	1	—	—	100	43	20	1	10	1	20	1	14	3
Euphrasia mollis	—	—	25	1	50	1	—	—	—	—	—	—	—	—	—	—	—	—
Fauria crista-galli	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	30	—	—
Fragaria chiloensis	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—
Fritillaria camschatcensis	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Galium trifidum	—	—	—	—	—	—	—	—	—	—	20	1	40	1	20	3	57	3
Galium triflorum	—	—	25	1	50	1	—	—	—	—	—	—	10	10	20	1	—	—
Geranium spp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	3
Geum calthifolium	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	10	14	10
Geum macrophyllum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	29	1
Hedysarum alpinum	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Heracleum lanatum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	3
Iris setosa	—	—	100	7	—	—	—	—	—	—	—	—	50	2	40	2	—	—
Lathyrus palustris	—	—	—	—	—	—	—	—	—	—	—	—	30	24	20	1	—	—
Ligusticum scoticum	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Lupinus nootkatensis	—	—	—	—	50	1	—	—	—	—	100	40	—	—	—	—	29	1
Lysichiton americanum	—	—	—	—	—	—	13	3	—	—	—	—	—	—	20	10	—	—
Lysimachia thyrsiflora	—	—	25	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Maianthemum dilatatum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	10
Malaxis monophylla	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—
Menyanthes trifoliata	—	—	—	—	—	—	13	20	—	—	—	—	—	—	—	—	—	—

Table 16—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Salix* (Willow) community types (continued)

Community type	SALALA (2 plots)		SALARC/ CARLYN (4 plots)		SALBAR/ CARPLU (2 plots)		SALBAR/ CARSIT (8 plots)		SALBAR/ EQUVAR (3 plots)		SALBAR/ LUPNOO (5 plots)		SALBAR/ mixed herb (10 plots)		SALHOO (5 plots)		SALSIT (7 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Moneses uniflora	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	10
Parnassia palustris	—	—	100	2	50	1	—	—	—	—	20	1	—	—	20	1	14	1
Pedicularis parviflora	—	—	25	1	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Pedicularis spp.	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—
Pedicularis labradorica	—	—	25	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Pinguicula vulgaris	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Plantago macrocarpa	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Plantago maritima	—	—	25	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Platanthera dilatata	—	—	—	—	—	—	—	—	—	—	40	1	20	1	—	—	14	1
Platanthera hyperborea	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	1
Polygonum viviparum	—	—	50	1	—	—	—	—	—	—	—	—	—	—	20	1	—	—
Potentilla egedii	—	—	75	7	50	1	—	—	67	1	40	12	50	1	20	30	—	—
Potentilla palustris	—	—	75	1	100	1	50	18	—	—	—	—	70	8	60	10	29	11
Primula sibirica	—	—	25	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Pyrola asarifolia	—	—	—	—	50	1	38	5	—	—	—	—	50	8	20	30	29	20
Pyrola minor	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—
Pyrola secunda	—	—	—	—	—	—	—	—	33	1	—	—	10	1	—	—	—	—
Ranunculus cymbalaria	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—
Ranunculus pacificus	—	—	—	—	—	—	—	—	—	—	—	—	10	3	—	—	—	—
Ranunculus reptans	—	—	25	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ranunculus spp.	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—
Rhinanthus minor	—	—	75	2	—	—	—	—	33	1	—	—	20	1	—	—	—	—
Rubus arcticus	—	—	—	—	—	—	63	6	—	—	—	—	40	4	60	5	14	20
Rubus pedatus	—	—	—	—	—	—	13	1	—	—	—	—	10	3	—	—	—	—
Rumex fenestratus	—	—	—	—	—	—	—	—	—	—	20	1	20	1	—	—	14	1
Sanguisorba stipulata	—	—	—	—	50	1	—	—	—	—	—	—	50	1	60	2	57	20
Saxifraga punctata	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	10	29	6
Solidago lepida	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—
Spiranthes romanzoffiana	—	—	25	1	—	—	—	—	—	—	40	1	10	1	—	—	—	—
Stellaria crassifolia	—	—	—	—	50	30	—	—	—	—	—	—	20	2	20	1	14	1
Streptopus amplexifolius	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	3	14	1
Tiarella trifoliata	—	—	—	—	—	—	—	—	—	—	—	—	10	3	—	—	14	1
Trientalis europaea	—	—	—	—	—	—	63	1	—	—	—	—	30	1	40	1	29	2
Triglochin maritimum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—
Veronica americana	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—
Veronica stelleri	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	1
Viola epipsila	—	—	—	—	—	—	13	3	33	1	—	—	30	4	20	1	29	6
Viola glabella	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	29	36
Viola spp.	—	—	—	—	—	—	—	—	—	—	—	—	10	3	—	—	—	—

Table 16—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Salix* (Willow) community types (continued)

	SALALA (2 plots)		SALARC/ CARLYN (4 plots)		SALBAR/ CARPLU (2 plots)		SALBAR/ CARSIT (8 plots)		SALBAR/ EQUVAR (3 plots)		SALBAR/ LUPNOO (5 plots)		SALBAR/ mixed herb (10 plots)		SALHOO (5 plots)		SALSIT (7 plots)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Graminoids:																		
Agropyron spp.	50	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Agrostis alaskana	—	—	—	—	100	27	13	20	—	—	80	15	20	2	—	—	14	3
Agrostis exarata	—	—	—	—	—	—	—	—	—	—	40	1	—	—	—	—	14	1
Agrostis gigantea	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—
Agrostis scabra	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	1
Arctagrostis latifolia	—	—	—	—	—	—	—	—	—	—	20	3	—	—	—	—	14	1
Arctophila fulva	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	1
Calamagrostis canadensis	—	—	—	—	50	20	63	17	—	—	60	5	70	11	80	18	57	2
Calamagrostis deschampsioides	—	—	25	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Calamagrostis neglecta	—	—	50	2	—	—	—	—	—	—	—	—	—	—	—	—	—	-
Carex aquatilis	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Carex canescens	—	—	—	—	50	10	—	—	—	—	20	1	30	1	—	—	—	—
Carex gmelini	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—
Carex kelloggii	—	—	—	—	—	—	—	—	33	3	20	1	10	3	—	—	—	—
Carex limosa	—	—	25	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex lyngbyaei	—	—	100	35	100	15	—	—	67	7	—	—	20	6	40	10	14	9
Carex maritima	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—
Carex pluriflora	—	—	25	10	50	30	—	—	33	3	—	—	—	—	—	—	—	—
Carex rostrata	—	—	—	—	—	—	25	3	—	—	—	—	—	—	—	—	—	—
Carex saxatilis	—	—	—	—	—	—	—	—	—	—	—	—	30	24	—	—	—	—
Carex sitchensis	—	—	—	—	—	—	100	27	—	—	—	—	30	3	40	50	—	—
Deschampsia beringensis	—	—	25	10	—	—	—	—	33	3	60	2	40	1	—	—	14	Tr
Deschampsia caespitosa	—	—	25	1	—	—	—	—	—	—	20	20	10	1	40	1	14	3
Eriophorum angustifolium	—	—	—	—	—	—	—	—	33	1	—	—	10	1	—	—	—	—
Eriophorum russeolum	—	—	—	—	50	30	—	—	—	—	20	1	—	—	—	—	—	—
Festuca altaica	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Festuca rubra	50	1	25	1	—	—	—	—	—	—	60	2	30	1	20	1	—	—
Hordeum brachyantherum	—	—	—	—	—	—	—	—	—	—	20	1	—	—	20	1	14	1
Juncus alpinus	—	—	25	1	—	—	—	—	—	—	—	—	—	—	—	—	14	1
Juncus arcticus	—	—	—	—	—	—	—	—	—	—	40	6	10	1	—	—	14	3
Juncus falcatus	—	—	—	—	—	—	—	—	—	—	20	1	10	3	—	—	—	—
Luzula multiflora	—	—	—	—	—	—	—	—	—	—	40	1	20	1	—	—	—	—
Luzula parviflora	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	20
Luzula wahlenbergii	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Poa eminens	—	—	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—
Poa lanata	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	1
Poa palustris	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Puccinellia nutkaenis	—	—	—	—	—	—	—	—	—	—	20	10	—	—	—	—	—	—

Table 16—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Salix* (Willow) community types (continued)

Community type	SALALA (2 plots)		SALARC/ CARLYN (4 plots)		SALBAR/ CARPLU (2 plots)		SALBAR/ CARSIT (8 plots)		SALBAR/ EQUVAR (3 plots)		SALBAR/ LUPNOO (5 plots)		SALBAR/ mixed herb (10 plots)		SALHOO (5 plots)		SALSIT (7 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Ferns and allies:																		
Athyrium filix-femina	—	—	—	—	—	—	—	—	—	—	20	1	50	1	40	25	43	17
Lycopodium annotinum	—	—	—	—	—	—	13	1	—	—	—	—	—	—	20	3	—	—
Amblystegium riparium	—	—	—	—	—	—	—	—	—	—	—	—	10	20	—	—	—	—
Antitrichia curtipendula	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	10
Aulocomnium palustre	—	—	—	—	—	—	13	3	—	—	—	—	10	10	—	—	—	—
Barbula convoluta	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	10	—	—
Brachythecium asperrimum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	40
Brachythecium spp.	—	—	—	—	—	—	13	30	—	—	—	—	—	—	—	—	—	—
Brachythecium velutinum	—	—	—	—	—	—	—	—	—	—	—	—	10	20	—	—	—	—
Calliergonella spp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	30	—	—
Campylium stellatum	—	—	—	—	—	—	13	3	—	—	—	—	—	—	—	—	—	—
Climacium dendroides	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	3	14	20
Dicranum spp.	—	—	—	—	—	—	—	—	—	—	20	10	—	—	—	—	—	—
Drepanocladus uncinatus	—	—	—	—	—	—	—	—	—	—	20	10	—	—	—	—	—	—
Helodium blandowii	—	—	25	30	—	—	13	40	—	—	—	—	—	—	—	—	—	—
Hylocomium splendens	—	—	—	—	—	—	38	13	—	—	—	—	10	30	20	30	—	—
Hypnum callichroum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	10	—	—
Hypnum lindbergii	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	10	—	—
Hypnum spp.	—	—	—	—	—	—	—	—	33	5	—	—	—	—	—	—	—	—
Meesia triquetra	—	—	25	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Myurella julacea	—	—	—	—	—	—	—	—	—	—	—	—	10	10	—	—	—	—
Philonotis fontana	—	—	—	—	—	—	13	40	—	—	20	10	—	—	—	—	—	—
Plagiomnium insigne	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	40
Pleurozium schreberi	—	—	—	—	—	—	13	5	—	—	—	—	—	—	—	—	—	—
Pohlia nutans	—	—	—	—	—	—	—	—	—	—	20	30	—	—	—	—	—	—
Polytricaceae spp. (as *Polytri*)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	3	—	—
Ptilium crista-castrensis	—	—	—	—	—	—	25	10	—	—	—	—	—	—	—	—	—	—
Rhacomitrium varium	—	—	—	—	—	—	—	—	—	—	20	10	—	—	—	—	—	—
Rhizomnium andrewsianum	—	—	—	—	—	—	13	3	—	—	—	—	—	—	—	—	—	—
Rhizomnium nudum	—	—	—	—	—	—	—	—	—	—	—	—	10	20	20	3	—	—
Rhizomnium perssonii	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	10
Rhizomnium spp.	—	—	—	—	—	—	13	10	—	—	—	—	—	—	—	—	—	—
Rhytidiadelphus loreus	—	—	—	—	—	—	13	5	—	—	—	—	—	—	20	3	29	3
Rhytidiadelphus squarrosus	—	—	—	—	—	—	—	—	33	5	40	40	10	20	20	10	29	20
Rhytidiadelphus triquetrus	—	—	—	—	—	—	13	20	—	—	—	—	—	—	—	—	—	—
Sphagnum girgensohnii	—	—	—	—	—	—	—	—	33	40	—	—	—	—	—	—	—	—
Sphagnum riparium	—	—	—	—	—	—	13	50	—	—	—	—	—	—	—	—	—	—
Sphagnum spp.	—	—	—	—	50	3	38	24	—	—	—	—	20	5	20	1	14	10
Sphagnum squarrosum	—	—	—	—	—	—	—	—	—	—	—	—	10	1	20	10	14	10
Sphagnum subnitens	—	—	—	—	—	—	—	—	33	30	—	—	—	—	—	—	—	—
Sphagnum teres	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	10	—	—
Sphagnum warnstorfii	—	—	—	—	—	—	—	—	33	5	—	—	—	—	—	—	—	—

Table 16—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in *Salix* (Willow) community types (continued)

Community type	SALALA (2 plots)		SALARC/ CARLYN (4 plots)		SALBAR/ CARPLU (2 plots)		SALBAR/ CARSIT (8 plots)		SALBAR/ EQUVAR (3 plots)		SALBAR/ LUPNOO (5 plots)		SALBAR/ mixed herb (10 plots)		SALHOO (5 plots)		SALSIT (7 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Lichens:																		
Hogymnia spp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	10
Lobaria linita	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	1	14	3
Peltigera membranacea	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Peltigera neopolydactyla	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	3	—	—
Peltigera spp.	—	—	—	—	—	—	13	3	—	—	20	60	10	30	20	3	14	10
Unknowns:																		
Lichen unknown	—	—	—	—	50	1	13	1	—	—	—	—	—	—	—	—	—	—
Moss unknown	—	—	75	57	100	45	25	45	67	50	—	—	40	33	60	10	43	2
Species richness (> 5 plots)	—		—		—		32		—		47		73		57		62	

Table 17A—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in graminoid-dominated community types

Community type	ARCFUL (6 plots)		CALCAN (4 plots)		CALCAN-POTPAL (6 plots)		CARLYN (13 plots)		CARLYN-LATPAL (13 plot)		CARLYN/ mixed herb (11 plots)		CARLYN-RANCYM (20 plots)		CARPLU-CARLYN (2 plots)		CARROS (2 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Trees:																		
Picea sitchensis	—	—	—	—	—	—	—	—	—	—	18	1	—	—	50	1	—	—
Tall shrubs:																		
Alnus crispa subsp. *sinuata*	—	—	—	—	17	1	31	1	—	—	9	1	5	3	50	1	—	—
Myrica gale	—	—	—	—	17	10	23	3	15	11	18	4	20	4	—	—	—	—
Salix hookeriana	—	—	—	—	—	—	8	1	8	10	9	1	10	2	50	1	—	—
Salix commutata	—	—	—	—	—	—	—	—	—	—	—	—	20	3	—	—	—	—
Salix alaxensis	—	—	—	—	—	—	15	1	—	—	—	—	5	1	50	1	—	—
Salix sitchensis	—	—	—	—	—	—	8	3	—	—	—	—	—	—	—	—	—	—
Salix barclayi	—	—	—	—	33	6	8	3	—	—	9	1	15	1	—	—	—	—
Vaccinium ovalifolium or *V. alaskensis*	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—
Low shrubs and subshrubs:																		
Andromeda polifolia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	—	—
Empetrum nigrum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Salix arctica	—	—	—	—	—	—	15	15	—	—	9	5	5	3	50	5	—	—
Salix stolonifera	—	—	—	—	—	—	8	3	—	—	—	—	—	—	—	—	—	—
Vaccinium uliginosum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Forbs:																		
Achillea borealis	—	—	25	10	—	—	—	—	23	2	9	3	—	—	—	—	—	—
Angelica genuflexa	—	—	25	3	—	—	—	—	15	3	—	—	—	—	—	—	—	—
Angelica lucida	—	—	—	—	—	—	—	—	8	2	9	1	—	—	—	—	—	—
Caltha leptosepala	—	—	—	—	—	—	—	—	—	—	—	—	5	3	—	—	—	—
Caltha palustris	—	—	—	—	33	15	15	2	23	2	27	10	15	1	—	—	—	—
Cerastium fontanum	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—
Chrysanthemum arcticum	—	—	—	—	—	—	—	—	—	—	—	—	5	1	—	—	—	—
Cicuta douglasii	—	—	—	—	—	—	38	2	38	9	36	1	20	2	—	—	—	—
Cicuta mackenzieana	17	10	—	—	17	1	23	5	—	—	27	14	15	1	—	—	—	—
Claytonia sibirica	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—
Conioselinum chinense	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—
Drosera rotundifolia	—	—	—	—	—	—	8	1	—	—	—	—	—	—	50	1	—	—
Epilobium adenocaulon	—	—	—	—	17	1	—	—	8	1	9	1	—	—	—	—	—	—
Epilobium glandulosum	—	—	25	1	—	—	8	1	—	—	—	—	—	—	—	—	—	—
Epilobium hornemannii	—	—	—	—	17	1	—	—	8	1	9	1	—	—	—	—	—	—
Epilobium leptocarpum	—	—	—	—	17	1	8	1	8	1	—	—	—	—	—	—	—	—
Epilobium palustre	—	—	—	—	—	—	31	1	23	1	18	1	20	1	—	—	—	—
Epilobium sertulatum	—	—	—	—	—	—	—	—	—	—	9	1	5	1	—	—	—	—

Table 17A—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in graminoid-dominated community types (continued)

Community type	ARCFUL (6 plots)		CALCAN (4 plots)		CALCAN-POTPAL (6 plots)		CARLYN (13 plots)		CARLYN-LATPAL (13 plot)		CARLYN/ mixed herb (11 plots)		CARLYN-RANCYM (20 plots)		CARPLU-CARLYN (2 plots)		CARROS (2 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Epilobium spp.	—	—	—	—	—	—	—	—	23	1	9	1	—	—	—	—	—	—
Equisetum arvense	—	—	25	1	50	10	15	6	38	17	27	14	20	2	—	—	—	—
Equisetum fluviatile	50	12	—	—	83	3	23	3	8	80	9	3	—	—	—	—	50	1
Equisetum palustre	—	—	—	—	50	30	8	3	—	—	9	1	—	—	—	—	50	3
Equisetum pratense	—	—	25	10	—	—	—	—	—	—	9	60	—	—	—	—	—	—
Equisetum variegatum	—	—	—	—	—	—	15	1	8	1	—	—	10	6	—	—	50	3
Fragaria chiloensis	—	—	—	—	—	—	—	—	—	—	—	—	5	1	—	—	—	—
Fritillaria camschatcensis	—	—	25	1	—	—	—	—	8	1	9	1	—	—	—	—	—	—
Galium boreale	—	—	—	—	—	—	8	1	—	—	—	—	—	—	—	—	—	—
Galium trifidum	—	—	50	5	33	1	15	1	31	2	27	8	—	—	—	—	—	—
Galium triflorum	—	—	—	—	—	—	8	10	62	3	18	6	10	2	—	—	—	—
Hedysarum alpinum	—	—	—	—	—	—	8	1	—	—	—	—	—	—	—	—	—	—
Hippuris vulgaris	17	1	—	—	—	—	—	—	—	—	18	2	—	—	—	—	—	—
Iris setosa	—	—	—	—	—	—	15	3	54	13	27	8	5	1	50	1	—	—
Lathyrus palustris	—	—	25	1	—	—	—	—	100	66	27	3	—	—	—	—	—	—
Ligusticum scoticum	—	—	25	10	—	—	—	—	8	1	—	—	—	—	—	—	—	—
Lupinus nootkatensis	—	—	25	60	—	—	—	—	—	—	—	—	5	1	—	—	—	—
Lysimachia thyrsiflora	17	1	—	—	17	10	8	3	31	28	9	1	—	—	—	—	—	—
Menyanthes trifoliata	—	—	—	—	17	20	—	—	—	—	9	1	—	—	—	—	50	1
Mimulus guttatus	—	—	—	—	—	—	8	1	—	—	—	—	—	—	—	—	—	—
Myriophyllum spicatum	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—	—	—
Parnassia palustris	—	—	—	—	—	—	23	2	15	1	9	1	25	1	50	1	—	—
Pedicularis labradorica	—	—	—	—	—	—	8	3	—	—	—	—	5	1	—	—	—	—
Pedicularis parviflora	—	—	—	—	—	—	31	1	—	—	27	1	10	1	50	1	—	—
Pedicularis spp.	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—	—	—
Plantago maritima	—	—	—	—	—	—	—	—	—	—	—	—	15	2	—	—	—	—
Platanthera dilatata	—	—	—	—	17	3	8	1	31	3	18	1	—	—	—	—	—	—
Platanthera hyperborea	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—
Polygonum viviparum	—	—	—	—	—	—	8	1	—	—	—	—	—	—	—	—	—	—
Potentilla egedii	—	—	—	—	—	—	23	7	46	8	9	1	90	15	50	1	—	—
Potentilla palustris	17	1	25	3	83	30	31	2	31	9	36	18	10	1	50	1	50	20
Ranunculus confervoides	17	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ranunculus cymbalaria	—	—	—	—	—	—	—	—	—	—	—	—	40	6	—	—	—	—
Ranunculus reptans	33	7	—	—	—	—	8	1	—	—	—	—	—	—	—	—	—	—
Rhinanthus minor	—	—	—	—	—	—	15	1	8	30	9	3	10	1	50	1	—	—
Rubus arcticus	—	—	—	—	—	—	—	—	8	3	9	3	—	—	—	—	—	—
Rumex fenestratus	—	—	—	—	—	—	—	—	8	1	—	—	5	1	—	—	—	—
Rumex longifolius	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—	—	—
Rumex spp.	—	—	—	—	—	—	—	—	8	3	9	1	—	—	—	—	—	—
Sanguisorba stipulata	—	—	—	—	17	1	—	—	15	2	—	—	—	—	—	—	—	—

Table 17A—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in graminoid-dominated community types (continued)

Community type	ARCFUL (6 plots)		CALCAN (4 plots)		CALCAN-POTPAL (6 plots)		CARLYN (13 plots)		CARLYN-LATPAL (13 plot)		CARLYN/ mixed herb (11 plots)		CARLYN-RANCYM (20 plots)		CARPLU-CARLYN (2 plots)		CARROS (2 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Sparganium angustifolium	17	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Spiranthes romanzoffiana	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Stellaria borealis	—	—	—	—	—	—	8	1	—	—	—	—	—	—	—	—	—	—
Stellaria crassifolia	—	—	—	—	17	1	—	—	8	1	9	1	15	2	—	—	—	—
Stellaria crispa	—	—	—	—	—	—	—	—	—	—	—	—	5	1	—	—	—	—
Stellaria spp.	—	—	—	—	17	1	8	1	—	—	9	10	—	—	—	—	—	—
Trientalis europaea	—	—	25	3	—	—	—	—	31	2	9	20	—	—	—	—	—	—
Triglochin maritimum	—	—	—	—	—	—	—	—	—	—	—	—	25	2	—	—	—	—
Triglochin palustre	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Utricularia vulgaris	—	—	25	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Veronica serpyllifolia	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—
Viola epipsila	—	—	—	—	—	—	—	—	23	14	—	—	—	—	—	—	—	—
Viola spp.	—	—	—	—	17	3	—	—	8	5	9	1	—	—	—	—	—	—
Graminoids:																		
Agrostis alaskana	—	—	—	—	17	1	31	6	54	4	36	18	15	2	—	—	—	—
Agrostis gigantea	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—
Agrostis scabra	—	—	—	—	—	—	—	—	8	1	—	—	5	1	—	—	—	—
Arctophila fulva	100	63	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—
Calamagrostis canadensis	—	—	100	89	100	67	8	20	77	34	45	9	5	1	50	1	—	—
Calamagrostis inexpansa	—	—	—	—	—	—	—	—	—	—	9	1	5	1	—	—	—	—
Calamagrostis lapponica	—	—	—	—	—	—	—	—	—	—	—	—	5	1	—	—	—	—
Calamagrostis neglecta	—	—	—	—	—	—	8	3	—	—	—	—	—	—	50	1	—	—
Carex canescens	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—	—	—
Carex flava	—	—	—	—	—	—	—	—	—	—	—	—	5	3	—	—	—	—
Carex kelloggii	—	—	—	—	—	—	8	1	—	—	9	3	—	—	—	—	—	—
Carex limosa	—	—	—	—	—	—	—	—	—	—	9	3	—	—	—	—	—	—
Carex lyngbyaei	—	—	—	—	50	17	100	71	100	70	100	71	100	71	50	10	—	—
Carex mackenziei	—	—	—	—	—	—	8	1	—	—	—	—	10	16	—	—	—	—
Carex pauciflora	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Carex pluriflora	—	—	—	—	—	—	8	10	15	7	18	3	5	1	100	40	—	—
Carex rostrata	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	80
Carex saxatilis	—	—	—	—	—	—	—	—	—	—	27	4	—	—	—	—	—	—
Carex sitchensis	—	—	—	—	67	15	—	—	—	—	36	18	—	—	50	20	—	—
Deschampsia beringensis	—	—	—	—	—	—	23	2	46	6	36	16	45	2	—	—	—	—
Deschampsia caespitosa	—	—	—	—	—	—	15	1	8	1	9	1	25	16	50	1	—	—
Eleocharis acicularis	33	27	—	—	—	—	—	—	—	—	9	10	10	12	—	—	—	—
Eleocharis kamtschatica	—	—	—	—	—	—	—	—	—	—	—	—	30	18	—	—	—	—
Eleocharis palustris	—	—	—	—	—	—	31	1	—	—	—	—	35	3	—	—	—	—
Eleocharis uniglumis	—	—	—	—	—	—	8	1	—	—	—	—	5	30	—	—	—	—

Table 17A—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in graminoid-dominated community types (continued)

Community type	ARCFUL (6 plots)		CALCAN (4 plots)		CALCAN-POTPAL (6 plots)		CARLYN (13 plots)		CARLYN-LATPAL (13 plot)		CARLYN/ mixed herb (11 plots)		CARLYN-RANCYM (20 plots)		CARPLU-CARLYN (2 plots)		CARROS (2 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Elymus arenarius	—	—	25	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Eriophorum angustifolium	—	—	—	—	17	1	—	—	—	—	9	1	—	—	50	10	—	—
Eriophorum russeolum	—	—	—	—	—	—	8	1	—	—	9	10	—	—	—	—	—	—
Festuca rubra	—	—	25	5	17	1	—	—	31	1	18	7	25	1	50	1	—	—
Festuca spp.	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—	—	—
Glyceria pauciflora	17	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hordeum brachyantherum	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—	—	—
Juncus alpinus	—	—	—	—	—	—	—	—	—	—	9	1	20	2	—	—	—	—
Juncus arcticus	—	—	—	—	—	—	—	—	—	—	—	—	35	5	—	—	—	—
Luzula multiflora	—	—	—	—	—	—	—	—	—	—	9	3	—	—	—	—	—	—
Poa eminens	—	—	—	—	—	—	—	—	—	—	—	—	10	1	—	—	—	—
Poa macrocalyx	—	—	—	—	—	—	—	—	—	—	9	10	—	—	—	—	—	—
Poa palustris	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—	—	—
Puccinellia pumila	—	—	—	—	—	—	—	—	—	—	—	—	10	6	—	—	—	—
Scirpus microcarpus	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—
Scirpus spp.	—	—	—	—	—	—	—	—	—	—	—	—	5	3	—	—	—	—
Ferns and allies:																		
Athyrium filix-femina	—	—	—	—	—	—	—	—	15	2	—	—	—	—	—	—	—	—
Mosses:																		
Amblystegium riparium	—	—	—	—	—	—	—	—	—	—	18	10	—	—	—	—	—	—
Aulocomnium palustre	—	—	—	—	—	—	—	—	—	—	9	10	—	—	—	—	—	—
Calliergon spp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	80
Campylium stellatum	—	—	—	—	—	—	8	40	—	—	—	—	—	—	—	—	—	—
Cinclidium spp.	—	—	—	—	—	—	—	—	—	—	9	30	—	—	—	—	—	—
Drepanocladus aduncus	—	—	—	—	—	—	—	—	—	—	9	80	—	—	—	—	—	—
Helodium blandowii	—	—	—	—	—	—	—	—	8	50	9	10	5	10	—	—	—	—
Hypnum cupressiforme	—	—	—	—	—	—	8	80	—	—	—	—	5	10	—	—	—	—
Meesia triquetra	—	—	—	—	—	—	—	—	—	—	—	—	5	1	50	40	—	—
Philonotis fontana	—	—	—	—	—	—	—	—	—	—	—	—	10	10	—	—	—	—
Plagiomnium rugicum	—	—	—	—	—	—	—	—	—	—	9	10	—	—	—	—	—	—
Polytrichum commune	—	—	—	—	—	—	15	25	—	—	9	20	—	—	—	—	—	—
Rhytidiadelphus squarrosus	—	—	25	50	—	—	—	—	—	—	9	20	—	—	—	—	—	—
Rhytidiadelphus triquetrus	—	—	25	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sphagnum capillifolium	—	—	—	—	—	—	15	7	—	—	9	10	—	—	—	—	—	—
Sphagnum fuscum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	50	—	—
Sphagnum papillosum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	50	—	—
Sphagnum spp.	—	—	—	—	—	—	—	—	54	34	27	60	—	—	—	—	—	—
Sphagnum squarrosum	—	—	—	—	17	80	8	10	8	20	9	70	—	—	—	—	—	—

Table 17A—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in graminoid-dominated community types (continued)

Community type	ARCFUL (6 plots)		CALCAN (4 plots)		CALCAN-POTPAL (6 plots)		CARLYN (13 plots)		CARLYN-LATPAL (13 plot)		CARLYN/ mixed herb (11 plots)		CARLYN-RANCYM (20 plots)		CARPLU-CARLYN (2 plots)		CARROS (2 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Lichens:																		
Cladonia scabriuscula	—	—	—	—	—	—	—	—	—	—	9	10	—	—	—	—	—	—
Peltigera membranacea	—	—	—	—	17	1	—	—	—	—	—	—	—	—	—	—	—	—
Unknowns:																		
Algae unknown	—	—	—	—	—	—	—	—	—	—	—	—	5	90	—	—	—	—
Lichen unknown	—	—	—	—	—	—	—	—	8	3	—	—	—	—	—	—	—	—
Moss unknown	50	31	—	—	17	10	54	39	85	23	27	21	30	8	—	—	—	—
Species richness (> 5 plots)	11		—		24		49		51		67		54		—		—	

Table 17B—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in graminoid-dominated community types (continued)

Community type	CARSIT (13 plots)		CARSIT-Sphagnum (3 plots)		DESBER (2 plots)		ELEPAL (9 plots)		ELYARE (6 plots)		ELYARE/ACHBOR (4 plots)		ERIANG (4 plots)		PUCNUT (6 plots)		CARCHO (1 plot)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Trees:																		
Picea sitchensis	—	—	—	—	—	—	—	—	—	—	25	3	50	1	—	—	—	—
Tsuga heterophylla	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—
Tall shrubs:																		
Alnus crispa subsp. *sinuata*	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Myrica gale	15	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Salix barclayi	15	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Salix hookeriana	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Salix sitchensis	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Low shrubs and subshrubs:																		
Andromeda polifolia	—	—	—	—	—	—	—	—	—	—	—	—	75	10	—	—	—	—
Empetrum nigrum	—	—	33	1	—	—	—	—	—	—	—	—	75	5	—	—	—	—
Oxycoccus microcarpus	—	—	33	3	—	—	—	—	—	—	—	—	75	2	—	—	—	—
Vaccinium uliginosum	—	—	33	1	—	—	—	—	—	—	—	—	25	3	—	—	—	—
Forbs:																		
Achillea borealis	—	—	—	—	—	—	—	—	33	1	100	28	—	—	—	—	—	—
Actaea rubra	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Angelica genuflexa	—	—	33	1	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Arabis drummondii	—	—	—	—	—	—	—	—	—	—	25	10	—	—	—	—	—	—
Arabis hirsuta	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—	—	—
Artemisia tilesii	—	—	—	—	—	—	—	—	17	1	—	—	—	—	—	—	—	—
Caltha palustris	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Castilleja unalascensis	—	—	—	—	—	—	—	—	—	—	25	10	—	—	—	—	—	—
Cicuta douglasii	8	1	33	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Conioselinum chinense	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Cornus canadensis	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—
Dodecatheon pulchellum	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Drosera rotundifolia	—	—	67	2	—	—	—	—	—	—	—	—	75	2	—	—	—	—
Epilobium adenocaulon	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Epilobium hornemannii	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Epilobium latifolium	—	—	—	—	—	—	—	—	17	10	—	—	—	—	—	—	—	—
Epilobium palustre	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Equisetum arvense	8	1	—	—	—	—	—	—	33	3	—	—	—	—	—	—	—	—
Equisetum fluviatile	69	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Equisetum palustre	38	5	67	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Equisetum pratense	15	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Equisetum variegatum	8	1	—	—	—	—	—	—	17	20	25	1	—	—	—	—	—	—

Table 17B—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in graminoid-dominated community types (continued)

Community type	CARSIT (13 plots)		CARSIT-Sphagnum (3 plots)		DESBER (2 plots)		ELEPAL (9 plots)		ELYARE (6 plots)		ELYARE/ACHBOR (4 plots)		ERIANG (4 plots)		PUCNUT (6 plots)		CARCHO (1 plot)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Fauria crista-galli	—	—	67	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fragaria chiloensis	—	—	—	—	—	—	—	—	—	—	75	1	—	—	—	—	—	—
Galium aparine	—	—	—	—	—	—	—	—	17	3	—	—	—	—	—	—	—	—
Galium trifidum	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Gentiana douglasiana	—	—	33	1	—	—	—	—	—	—	—	—	25	1	—	—	—	—
Glehnia littoralis	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Hippuris vulgaris	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—
Honckenya peploides	—	—	—	—	—	—	—	—	67	2	25	10	—	—	—	—	—	—
Lathyrus maritimus	—	—	—	—	—	—	—	—	50	4	50	35	—	—	—	—	—	—
Lupinus nootkatensis	—	—	33	30	—	—	—	—	—	—	25	30	—	—	—	—	—	—
Lysimachia thyrsiflora	—	—	33	10	—	—	—	—	—	—	—	—	25	1	—	—	—	—
Menyanthes trifoliata	31	6	100	27	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Myriophyllum spicatum	—	—	—	—	—	—	11	10	—	—	—	—	—	—	—	—	—	—
Nuphar polysepalum	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—
Parnassia palustris	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—
Pedicularis labradorica	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—
Pedicularis parviflora	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Plantago maritima	—	—	—	—	50	10	—	—	—	—	—	—	—	—	—	—	—	—
Platanthera dilatata	—	—	67	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Platanthera saccata	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Polygonum aviculare	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—
Potentilla egedii	—	—	—	—	100	12	11	1	—	—	—	—	—	—	—	—	—	—
Potentilla palustris	54	14	100	5	—	—	—	—	—	—	—	—	—	—	—	—	100	30
Prenanthes alata	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Primula egaliksensis	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—
Ranunculus cymbalaria	—	—	—	—	50	1	11	1	—	—	—	—	—	—	17	3	—	—
Rhinanthus minor	—	—	—	—	50	1	—	—	—	—	25	1	—	—	—	—	—	—
Rumex fenestratus	—	—	—	—	—	—	—	—	17	3	—	—	—	—	—	—	—	—
Sanguisorba stipulata	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Senecio pseudo-Arnica	—	—	—	—	—	—	—	—	17	1	—	—	—	—	—	—	—	—
Sparganium angustifolium	—	—	—	—	—	—	22	7	—	—	—	—	—	—	—	—	—	—
Sparganium minimum	—	—	—	—	—	—	11	3	—	—	—	—	—	—	—	—	—	—
Stellaria calycantha	—	—	—	—	—	—	—	—	—	—	50	2	—	—	—	—	—	—
Stellaria crassifolia	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Trientalis europaea	8	1	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Triglochin maritimum	—	—	—	—	—	—	22	1	—	—	—	—	—	—	17	1	—	—
Triglochin palustre	—	—	—	—	50	1	22	1	—	—	—	—	—	—	—	—	—	—
Utricularia vulgaris	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—
Viola epipsila	8	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Viola glabella	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Viola langsdorffii	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—

Table 17B—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in graminoid-dominated community types (continued)

Community type	CARSIT (13 plots)		CARSIT-Sphagnum (3 plots)		DESBER (2 plots)		ELEPAL (9 plots)		ELYARE (6 plots)		ELYARE/ACHBOR (4 plots)		ERIANG (4 plots)		PUCNUT (6 plots)		CARCHO (1 plot)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Graminoids:																		
Agrostis alaskana	15	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Agrostis exarata	—	—	—	—	50	1	—	—	—	—	25	30	—	—	—	—	—	—
Agrostis gigantea	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Arctophila fulva	8	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Calamagrostis canadensis	38	13	33	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Calamagrostis neglecta	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex aquatilis	15	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex canescens	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex chordorrhiza	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	60
Carex gmelini	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Carex kelloggii	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Carex limosa	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	10
Carex lyngbyaei	15	17	—	—	100	3	33	2	—	—	—	—	—	—	33	1	100	10
Carex pauciflora	—	—	—	—	—	—	—	—	—	—	—	—	25	10	—	—	—	—
Carex pluriflora	8	1	—	—	—	—	—	—	—	—	—	—	50	15	—	—	—	—
Carex rostrata	8	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex sitchensis	100	77	100	47	—	—	—	—	—	—	—	—	75	4	—	—	—	—
Deschampsia beringensis	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Deschampsia caespitosa	8	1	—	—	100	20	—	—	—	—	25	20	—	—	—	—	—	—
Eleocharis acicularis	—	—	—	—	50	20	—	—	—	—	—	—	—	—	—	—	—	—
Eleocharis palustris	—	—	—	—	—	—	100	48	—	—	—	—	—	—	—	—	—	—
Elymus arenarius	—	—	—	—	—	—	—	—	100	43	100	50	—	—	—	—	—	—
Eriophorum angustifolium	—	—	—	—	—	—	—	—	—	—	—	—	100	67	—	—	—	—
Eriophorum russeolum	8	1	67	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Festuca rubra	—	—	—	—	50	3	—	—	—	—	25	40	—	—	—	—	—	—
Juncus arcticus	—	—	—	—	50	3	—	—	—	—	—	—	—	—	—	—	—	—
Juncus bufonius	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—
Juncus effusus	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Luzula multiflora	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—	—	—
Poa macrantha	—	—	—	—	—	—	—	—	33	1	75	4	—	—	—	—	—	—
Puccinellia nutkaenis	—	—	—	—	50	10	—	—	—	—	—	—	—	—	—	—	—	—
Puccinellia pumila	—	—	—	—	50	1	—	—	—	—	—	—	—	—	100	35	—	—
Vahlodea atropurpurea	—	—	33	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mosses:																		
Amblystegium serpens	8	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Brachythecium spp.	15	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Campylium stellatum	—	—	—	—	—	—	—	—	—	—	25	30	—	—	—	—	—	—
Drepanocladus revolvens	—	—	—	—	—	—	—	—	—	—	25	30	—	—	—	—	—	—
Hypnum spp.	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—	100	70
Philonotis fontana	—	—	—	—	—	—	—	—	—	—	25	10	—	—	—	—	—	—

Table 17B—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in graminoid-dominated community types (continued)

Community type	CARSIT (13 plots)		CARSIT-Sphagnum (3 plots)		DESBER (2 plots)		ELEPAL (9 plots)		ELYARE (6 plots)		ELYARE/ACHBOR (4 plots)		ERIANG (4 plots)		PUCNUT (6 plots)		CARCHO (1 plot)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Plagiomnium insigne	—	—	—	—	—	—	—	—	—	—	25	10	—	—	—	—	—	—
Rhacomitrium heterostichum	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—	—	—
Rhizomnium nudum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Rhytidiadelphus squarrosus	8	1	—	—	—	—	—	—	—	—	50	16	—	—	—	—	—	—
Sphagnum fuscum	—	—	—	—	—	—	—	—	—	—	—	—	75	37	—	—	—	—
Sphagnum lindbergii	—	—	33	40	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sphagnum magellanicum	—	—	33	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sphagnum pacificum	—	—	33	50	—	—	—	—	—	—	—	—	25	20	—	—	—	—
Sphagnum papillosum	—	—	—	—	—	—	—	—	—	—	—	—	50	50	—	—	—	—
Sphagnum riparium	—	—	67	35	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sphagnum spp.	23	1	—	—	—	—	—	—	—	—	—	—	25	40	—	—	—	—
Sphagnum squarrosum	8	1	33	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unknowns:																		
Algae unknown	—	—	—	—	—	—	11	70	—	—	—	—	—	—	17	70	—	—
Lichen unknown	8	1	—	—	—	—	—	—	—	—	50	15	—	—	—	—	—	—
Moss unknown	23	10	—	—	50	1	—	—	—	—	50	70	—	—	—	—	—	—
Species richness (> 5 plots)	36		—		—		12		12		—		—		4		—	

Table 17C—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in graminoid-dominated community types (continued)

	CARGLA (1 plot)		CARLIM (1 plot)		CARSAX (2 plots)		ERIRUS (1 plot)		GLYPAU (2 plots)		HIEODO (1 plot)		JUNALP (1 plot)		JUNARC (1 plot)		POAMAC (1 plot)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Tall shrubs:																		
Myrica gale	100	1	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Salix alaxensis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3
Salix commutata	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Salix hookeriana	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3
Forbs:																		
Caltha palustris	—	—	—	—	50	10	—	—	—	—	—	—	—	—	—	—	—	—
Cicuta douglasii	—	—	100	10	50	30	—	—	—	—	—	—	—	—	—	—	—	—
Cicuta mackenzieana	—	—	100	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Drosera rotundifolia	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Epilobium angustifolium	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—
Epilobium palustre	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Equisetum arvense	—	—	—	—	—	—	—	—	—	—	—	—	100	10	—	—	—	—
Equisetum fluviatile	—	—	100	10	100	10	—	—	50	1	—	—	—	—	—	—	—	—
Fauria crista-galli	—	—	—	—	—	—	—	—	—	—	100	10	—	—	—	—	—	—
Galium trifidum	—	—	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hippuris vulgaris	—	—	—	—	—	—	100	3	50	1	100	10	—	—	—	—	—	—
Lysimachia thyrsiflora	—	—	—	—	50	1	100	1	—	—	—	—	—	—	—	—	—	—
Menyanthes trifoliata	—	—	100	30	100	22	100	1	—	—	—	—	—	—	—	—	—	—
Myriophyllum spicatum	—	—	—	—	—	—	—	—	50	20	—	—	—	—	—	—	—	—
Pedicularis parviflora	—	—	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Plantago maritima	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	5	—	—
Platanthera dilatata	—	—	100	1	50	1	—	—	—	—	—	—	—	—	—	—	—	—
Potamogeton pectinatus	—	—	—	—	—	—	—	—	50	80	—	—	—	—	—	—	—	—
Potentilla egedii	100	30	—	—	50	1	—	—	—	—	—	—	—	—	100	5	100	10
Potentilla palustris	—	—	100	10	100	11	—	—	—	—	—	—	—	—	—	—	—	—
Ranunculus confervoides	—	—	—	—	—	—	—	—	50	1	—	—	—	—	—	—	—	—
Ranunculus cymbalaria	—	—	—	—	—	—	—	—	—	—	—	—	100	1	100	10	100	3
Rumex occidentalis	—	—	—	—	—	—	—	—	—	—	100	10	—	—	—	—	—	—
Stellaria crassifolia	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Triglochin maritimum	100	1	—	—	—	—	—	—	—	—	—	—	100	3	100	1	—	—
Triglochin palustre	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—
Utricularia vulgaris	—	—	—	—	—	—	100	10	—	—	—	—	—	—	—	—	—	—
Graminoids:																		
Agrostis alaskana	—	—	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Calamagrostis canadensis	100	1	—	—	50	1	—	—	—	—	100	3	—	—	—	—	—	—
Carex aquatilis	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—
Carex bicolor	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex canescens	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—
Carex garberi	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Carex glareosa	100	40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 17C—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in graminoid-dominated community types (continued)

	CARGLA (1 plot)		CARLIM (1 plot)		CARSAX (2 plots)		ERIRUS (1 plot)		GLYPAU (2 plots)		HIEODO (1 plot)		JUNALP (1 plot)		JUNARC (1 plot)		POAMAC (1 plot)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Carex kelloggii	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Carex limosa	—	—	100	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex lyngbyaei	100	10	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—
Carex maritima	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Carex pluriflora	100	10	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex saxatilis	—	—	—	—	100	65	—	—	—	—	—	—	—	—	—	—	—	—
Carex sitchensis	—	—	—	—	—	—	—	—	—	—	100	20	—	—	—	—	—	—
Deschampsia beringensis	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	20
Deschampsia caespitosa	—	—	—	—	50	1	—	—	—	—	—	—	100	1	—	—	—	—
Eleocharis acicularis	—	—	—	—	—	—	—	—	50	1	—	—	—	—	—	—	—	—
Eleocharis kamtschatica	100	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Eleocharis palustris	—	—	—	—	—	—	—	—	50	1	—	—	—	—	—	—	100	10
Eleocharis spp.	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—
Eleocharis uniglumis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	10	—	—
Eriophorum russeolum	—	—	—	—	—	—	100	100	—	—	—	—	—	—	—	—	—	—
Festuca rubra	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Glyceria pauciflora	—	—	—	—	—	—	—	—	100	79	—	—	—	—	—	—	—	—
Hierochloe odorata	—	—	—	—	—	—	—	—	—	—	100	70	—	—	—	—	—	—
Juncus alpinus	—	—	—	—	—	—	—	—	—	—	—	—	100	20	—	—	—	—
Juncus arcticus	100	1	—	—	—	—	—	—	—	—	—	—	—	—	100	50	100	3
Juncus bufonius	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—
Juncus falcatus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Poa macrantha	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	30
Poa macrocalyx	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mosses:																		
Amblystegium polygonum	—	—	—	—	50	20	—	—	—	—	—	—	—	—	—	—	—	—
Bryum spp.	100	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hypnum spp.	—	—	100	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Rhizomnium nudum	—	—	100	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sphagnum spp.	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—
Sphagnum squarrosum	—	—	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unknowns:																		
Moss unknown	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	20
Species richness (> 5 plots)	—		—		—		—		—		—		—		—		—	

Table 18A—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in forb dominated community types

	EPIANG (3 plots)		EQUFLU (16 plots)		EQUVAR (7 plots)		FRACHI (3 plots)		HIPVUL (7 plots)		LATMAR (2 plots)		LUPNOO (4 plots)		MENTRI (8 plots)		POTEGE (4 plots)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Trees:																		
Populus trichocarpa	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Tsuga heterophylla	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—
Tall shrubs:																		
Alnus crispa subsp. *sinuata*	—	—	—	—	57	1	—	—	—	—	—	—	—	—	—	—	—	—
Myrica gale	—	—	6	1	29	1	33	1	—	—	—	—	25	3	13	3	—	—
Salix alaxensis	—	—	—	—	29	1	—	—	—	—	—	—	25	1	—	—	—	—
Salix barclayi	—	—	13	1	29	3	—	—	—	—	—	—	25	10	—	—	—	—
Salix commutata	—	—	—	—	43	5	—	—	—	—	—	—	—	—	—	—	—	—
Salix hookeriana	—	—	6	3	43	2	—	—	—	—	—	—	—	—	—	—	—	—
Salix sitchensis	—	—	—	—	57	1	—	—	—	—	—	—	—	—	—	—	—	—
Low shrubs and subshrubs:																		
Salix arctica	—	—	—	—	29	5	—	—	—	—	—	—	—	—	—	—	—	—
Forbs:																		
Achillea borealis	67	6	—	—	14	1	100	34	—	—	50	3	75	20	—	—	25	30
Angelica genuflexa	—	—	—	—	—	—	33	10	—	—	—	—	50	2	—	—	—	—
Angelica lucida	67	25	—	—	—	—	33	1	—	—	—	—	50	12	—	—	—	—
Arabis drummondii	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Arabis hirsuta	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
Callitriche hermaphroditica	—	—	—	—	—	—	—	—	14	85	—	—	—	—	—	—	—	—
Callitriche verna	—	—	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—
Caltha palustris	—	—	6	1	14	1	—	—	—	—	—	—	—	—	—	—	—	—
Cardamine pratensis angustifolia	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
Castilleja unalascensis	—	—	—	—	—	—	33	20	—	—	50	1	—	—	—	—	—	—
Cicuta douglasii	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Cicuta mackenzieana	—	—	13	7	14	3	—	—	—	—	—	—	—	—	13	3	—	—
Dodecatheon spp.	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
Drosera rotundifolia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Epilobium adenocaulon	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—
Epilobium angustifolium	100	67	—	—	—	—	33	10	—	—	—	—	50	1	—	—	—	—
Epilobium glandulosum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	1
Epilobium hornemannii	—	—	—	—	14	1	33	1	—	—	—	—	—	—	—	—	—	—
Epilobium palustre	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Equisetum arvense	67	20	6	10	71	9	33	1	—	—	—	—	—	—	—	—	—	—
Equisetum fluviatile	—	—	100	56	14	1	—	—	14	10	—	—	—	—	63	14	—	—
Equisetum palustre	—	—	19	2	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Equisetum pratense	—	—	6	1	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Equisetum variegatum	—	—	6	3	100	60	—	—	—	—	—	—	—	—	—	—	—	—
Fauria crista-galli	33	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fragaria chiloensis	—	—	—	—	—	—	100	60	—	—	50	3	50	17	—	—	—	—

Table 18A—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in forb dominated community types (continued)

	EPIANG (3 plots)		EQUFLU (16 plots)		EQUVAR (7 plots)		FRACHI (3 plots)		HIPVUL (7 plots)		LATMAR (2 plots)		LUPNOO (4 plots)		MENTRI (8 plots)		POTEGE (4 plots)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Galium trifidum	100	1	13	5	—	—	—	—	—	—	—	—	25	1	—	—	—	—
Galium triflorum	—	—	—	—	—	—	33	20	—	—	—	—	—	—	25	1	—	—
Gentiana amarella	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
Geum macrophyllum	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—
Heracleum lanatum	33	1	—	—	—	—	—	—	—	—	—	—	25	10	—	—	—	—
Hippuris vulgaris	—	—	19	2	—	—	—	—	100	50	—	—	—	—	13	1	—	—
Honckenya peploides	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—
Iris setosa	—	—	—	—	—	—	—	—	—	—	—	—	25	3	—	—	25	1
Lathyrus maritimus	—	—	—	—	—	—	33	1	—	—	100	55	50	1	—	—	—	—
Lathyrus palustris	—	—	—	—	14	1	—	—	—	—	—	—	25	1	—	—	25	20
Ligusticum scoticum	33	30	—	—	—	—	—	—	—	—	—	—	25	10	—	—	—	—
Lupinus nootkatensis	33	20	—	—	—	—	33	1	—	—	—	—	100	77	—	—	—	—
Lysimachia thyrsiflora	33	10	25	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Menyanthes trifoliata	—	—	38	2	—	—	—	—	—	—	—	—	—	—	100	55	—	—
Myriophyllum spicatum	—	—	6	1	—	—	—	—	14	1	—	—	—	—	—	—	—	—
Nuphar polysepalum	—	—	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—
Parnassia palustris	—	—	—	—	71	1	—	—	—	—	—	—	—	—	—	—	—	—
Pedicularis parviflora	—	—	13	1	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Pinguicula vulgaris	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—
Platanthera dilatata	—	—	6	1	57	1	—	—	—	—	—	—	25	1	—	—	25	1
Polygonum aviculare	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	3
Potamogeton filiformis	—	—	6	1	—	—	—	—	14	1	—	—	—	—	—	—	—	—
Potamogeton perfoliatus	—	—	—	—	—	—	—	—	29	43	—	—	—	—	—	—	—	—
Potentilla egedii	33	1	—	—	29	2	33	20	—	—	—	—	50	3	—	—	100	30
Potentilla palustris	33	10	31	6	14	1	—	—	14	1	—	—	—	—	50	7	—	—
Prenanthes alata	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—
Ranunculus confervoides	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	50	—	—
Ranunculus cymbalaria	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	75	2
Ranunculus reptans	—	—	6	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ranunculus trichophyllus	—	—	—	—	—	—	—	—	29	13	—	—	—	—	—	—	—	—
Rhinanthus minor	—	—	—	—	14	3	100	1	—	—	100	1	25	1	—	—	25	1
Rubus arcticus	—	—	—	—	14	1	33	3	—	—	—	—	25	1	—	—	—	—
Rumex fenestratus	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	25	1
Rumex longifolius	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—
Rumex spp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	3
Sanguisorba stipulata	33	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Solidago lepida	—	—	—	—	—	—	—	—	—	—	—	—	25	20	—	—	—	—
Sparganium angustifolium	—	—	—	—	—	—	—	—	29	16	—	—	—	—	—	—	—	—
Sparganium hyperboreum	—	—	—	—	—	—	—	—	14	5	—	—	—	—	—	—	—	—
Sparganium minimum	—	—	6	1	—	—	—	—	14	3	—	—	—	—	—	—	—	—
Spiranthes romanzoffiana	—	—	—	—	71	1	33	1	—	—	—	—	—	—	—	—	—	—
Stellaria crassifolia	67	11	—	—	—	—	33	20	—	—	—	—	75	1	13	1	—	—
Tofieldia glutinosa	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—

Table 18A—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in forb dominated community types (continued)

Community type	EPIANG (3 plots)		EQUFLU (16 plots)		EQUVAR (7 plots)		FRACHI (3 plots)		HIPVUL (7 plots)		LATMAR (2 plots)		LUPNOO (4 plots)		MENTRI (8 plots)		POTEGE (4 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Trientalis europaea	67	7	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
Triglochin maritimum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	1
Triglochin palustre	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	25	1
Utricularia vulgaris	—	—	13	2	—	—	—	—	43	31	—	—	—	—	38	7	—	—
Viola epipsila	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Viola glabella	—	—	6	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Graminoids:																		
Agrostis alaskana	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Arctophila fulva	—	—	6	1	14	1	—	—	—	—	—	—	—	—	—	—	—	—
Calamagrostis canadensis	67	22	6	20	—	—	—	—	14	1	—	—	25	30	25	1	—	—
Calamagrostis inexpansa	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—
Calamagrostis neglecta	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Carex aquatilis	—	—	6	1	14	10	—	—	—	—	—	—	—	—	—	—	—	—
Carex aurea	—	—	6	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex canescens	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Carex chordorrhiza	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Carex garberi	—	—	—	—	29	1	—	—	—	—	—	—	—	—	—	—	—	—
Carex gmelini	—	—	—	—	—	—	—	—	—	—	—	—	25	3	—	—	—	—
Carex kelloggii	—	—	6	10	14	1	—	—	—	—	—	—	—	—	—	—	—	—
Carex laeviculmis	—	—	—	—	14	1	—	—	—	—	—	—	—	—	25	3	—	—
Carex limosa	—	—	—	—	14	1	—	—	—	—	—	—	—	—	13	10	—	—
Carex lyngbyaei	—	—	19	10	57	2	—	—	14	1	—	—	—	—	—	—	25	1
Carex mackenziei	—	—	6	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex rostrata	—	—	6	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex saxatilis	—	—	13	10	14	10	—	—	—	—	—	—	—	—	25	6	—	—
Carex sitchensis	33	20	6	1	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Carex spectabilis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	20	—	—
Deschampsia beringensis	33	1	—	—	43	1	—	—	—	—	—	—	50	20	—	—	25	1
Deschampsia caespitosa	—	—	—	—	29	2	33	1	—	—	—	—	—	—	—	—	25	1
Eleocharis palustris	—	—	13	7	29	1	—	—	—	—	—	—	—	—	25	2	—	—
Eleocharis uniglumis	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—
Elymus arenarius	33	1	—	—	—	—	100	10	—	—	100	20	75	5	—	—	—	—
Eriophorum angustifolium	—	—	6	5	—	—	—	—	—	—	—	—	—	—	13	10	—	—
Eriophorum russeolum	—	—	—	—	29	1	—	—	—	—	—	—	—	—	25	1	—	—
Festuca altaica	—	—	—	—	—	—	—	—	—	—	—	—	25	30	—	—	—	—
Festuca rubra	33	80	—	—	43	1	67	6	—	—	100	1	75	15	—	—	25	1
Glyceria pauciflora	—	—	6	20	—	—	—	—	29	15	—	—	—	—	—	—	—	—
Hierochloe odorata	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—
Hordeum brachyantherum	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—
Juncus alpinus	—	—	—	—	29	1	—	—	—	—	—	—	—	—	—	—	—	—
Juncus arcticus	—	—	—	—	29	1	—	—	—	—	—	—	—	—	—	—	50	1
Juncus bufonius	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	3

Table 18A—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in forb dominated community types (continued)

Community type	EPIANG (3 plots)		EQUFLU (16 plots)		EQUVAR (7 plots)		FRACHI (3 plots)		HIPVUL (7 plots)		LATMAR (2 plots)		LUPNOO (4 plots)		MENTRI (8 plots)		POTEGE (4 plots)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Juncus falcatus	—	—	6	3	43	2	—	—	—	—	—	—	—	—	—	—	—	—
Luzula multiflora	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
Poa macrantha	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—
Puccinellia pumila	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	75	2
Ferns and allies:																		
Athyrium filix-femina	67	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	3
Cystopteris fragilis	33	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mosses:																		
Amblystegium riparium	—	—	6	80	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Bryum caespiticium	—	—	—	—	14	20	—	—	—	—	—	—	—	—	—	—	—	—
Bryum papillata	—	—	—	—	14	70	—	—	—	—	—	—	—	—	—	—	—	—
Calliergon giganteum	—	—	—	—	14	80	—	—	—	—	—	—	—	—	—	—	—	—
Campylium nispidulam	—	—	—	—	14	40	—	—	—	—	—	—	—	—	—	—	—	—
Cinclidium stygium	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	10	—	—
Hypnum spp.	—	—	—	—	14	10	—	—	—	—	—	—	—	—	—	—	—	—
Meesia triquetra	—	—	—	—	14	30	—	—	—	—	—	—	—	—	13	10	—	—
Philonotis fontana	—	—	—	—	14	30	—	—	—	—	—	—	—	—	—	—	—	—
Rhytidiadelphus squarrosus	67	50	—	—	—	—	67	65	—	—	—	—	50	40	—	—	25	20
Sphagnum spp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—
Sphagnum squarrosum	—	—	6	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lichens:																		
Peltigera spp.	—	—	—	—	14	3	—	—	—	—	—	—	—	—	—	—	—	—
Algae:																		
Chara	—	—	13	54	—	—	—	—	14	90	—	—	—	—	—	—	—	—
Unknowns:																		
Algae unknown	—	—	—	—	—	—	—	—	14	100	—	—	—	—	—	—	—	—
Moss unknown	—	—	31	17	29	40	67	55	—	—	—	—	—	—	38	2	—	—
Species richness (> 5 plots)	—		37		45		—		17		—		—		31		—	

Table 18B—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in forb dominated community types (continued)

	POTPAL (3 plots)		Sparganium (7 plots)		ATHFIL (1 plot)		EPIADE (1 plot)		EPILAT (1 plot)		EQUARV (3 plots)		EQUPAL (1 plot)		FAUCRI (2 plots)		HEDALP (1 plot)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Trees:																		
Populus trichocarpa	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—
Tall shrubs:																		
Alnus crispa subsp. *sinuata*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	10
Myrica gale	—	—	—	—	100	20	—	—	—	—	—	—	—	—	—	—	—	—
Salix alaxensis	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	100	3
Salix barclayi	33	1	—	—	—	—	—	—	—	—	—	—	100	10	—	—	—	—
Salix commutata	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Salix hookeriana	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—
Salix sitchensis	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—
Low shrubs and subshrubs:																		
Andromeda polifolia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Empetrum nigrum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	2	—	—
Ledum palustre	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	—	—
Loiseleuria procumbens	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Oxycoccus microcarpus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Salix arctica	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3
Vaccinium uliginosum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	—	—
Forbs:																		
Achillea borealis	—	—	—	—	—	—	100	70	—	—	33	1	—	—	—	—	—	—
Angelica genuflexa	—	—	—	—	100	10	—	—	—	—	—	—	—	—	—	—	—	—
Apargidium boreale	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Artemisia tilesii	—	—	—	—	—	—	—	—	—	—	33	10	—	—	—	—	—	—
Callitriche verna	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Chrysanthemum arcticum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Cicuta mackenzieana	—	—	—	—	—	—	—	—	—	—	—	—	100	20	—	—	—	—
Conioselinum chinense	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—
Cornus suecia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	2	—	—
Dodecatheon jeffreyi	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	—	—
Dodecatheon pulchellum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	—	—
Drosera rotundifolia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	—	—
Epilobium adenocaulon	—	—	—	—	—	—	100	90	—	—	—	—	—	—	—	—	—	—
Epilobium angustifolium	—	—	—	—	100	10	—	—	—	—	—	—	—	—	—	—	—	—
Epilobium glandulosum	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—
Epilobium latifolium	33	1	—	—	—	—	—	—	100	10	67	11	—	—	—	—	—	—
Epilobium palustre	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Epilobium sertulatum	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—	—	—
Equisetum arvense	—	—	—	—	100	20	100	1	—	—	100	33	—	—	50	20	—	—
Equisetum fluviatile	33	20	14	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 18B—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in forb dominated community types (continued)

	POTPAL (3 plots)		Sparganium (7 plots)		ATHFIL (1 plot)		EPIADE (1 plot)		EPILAT (1 plot)		EQUARV (3 plots)		EQUPAL (1 plot)		FAUCRI (2 plots)		HEDALP (1 plot)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Equisetum palustre	—	—	—	—	—	—	—	—	—	—	—	—	100	60	—	—	—	—
Equisetum pratense	33	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Equisetum variegatum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Erigeron peregrinus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Fauria crista-galli	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	50	—	—
Galium trifidum	—	—	—	—	100	1	—	—	—	—	—	—	100	10	—	—	—	—
Galium triflorum	—	—	—	—	—	—	100	20	—	—	—	—	—	—	—	—	—	—
Gentiana douglasiana	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Geum macrophyllum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Hedysarum alpinum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	30
Hippuris vulgaris	33	1	29	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Iris setosa	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Lathyrus palustris	—	—	—	—	100	10	—	—	—	—	—	—	—	—	—	—	—	—
Menyanthes trifoliata	33	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Myriophyllum spicatum	33	1	29	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Parnassia palustris	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Pedicularis spp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Pinguicula vulgaris	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Platanthera dilatata	33	1	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Platanthera saccata	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Polygonum viviparum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3
Potamogeton filiformis	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Potamogeton pectinatus	—	—	14	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Potamogeton perfoliatus	—	—	43	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Potentilla egedii	—	—	—	—	—	—	—	—	—	—	33	20	—	—	—	—	100	3
Potentilla palustris	100	63	14	1	—	—	—	—	—	—	—	—	100	10	—	—	—	—
Pyrola asarifolia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3
Ranunculus confervoides	—	—	14	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ranunculus reptans	—	—	—	—	—	—	—	—	—	—	—	—	100	60	—	—	—	—
Ranunculus trichophyllus	—	—	14	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Rhinanthus minor	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3
Rorippa islandica	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Rubus arcticus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—
Rumex fenestratus	—	—	—	—	100	1	—	—	—	—	33	3	—	—	—	—	—	—
Sparganium angustifolium	33	10	43	62	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sparganium hyperboreum	—	—	14	60	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sparganium minimum	—	—	43	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Spiranthes romanzoffiana	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
Swertia perennis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Tiarella trifoliata	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Utricularia vulgaris	33	90	29	51	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 18B—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in forb dominated community types (continued)

Community type	POTPAL (3 plots)		Sparganium (7 plots)		ATHFIL (1 plot)		EPIADE (1 plot)		EPILAT (1 plot)		EQUARV (3 plots)		EQUPAL (1 plot)		FAUCRI (2 plots)		HEDALP (1 plot)	
	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Graminoids:																		
Agropyron violaceum	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—
Agrostis alaskana	33	1	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Agrostis borealis	—	—	—	—	—	—	—	—	—	—	33	3	—	—	—	—	—	—
Calamagrostis canadensis	33	3	—	—	100	20	—	—	—	—	33	3	100	3	50	1	—	—
Carex kelloggii	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—
Carex lyngbyaei	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	30
Carex maritima	—	—	—	—	—	—	—	—	—	—	33	3	—	—	—	—	—	—
Carex pauciflora	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	15	—	—
Carex pluriflora	33	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carex saxatilis	—	—	—	—	—	—	—	—	—	—	—	—	100	40	—	—	—	—
Carex sitchensis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	7	—	—
Deschampsia beringensis	—	—	—	—	—	—	—	—	—	—	33	3	—	—	—	—	—	—
Eleocharis palustris	33	1	—	—	—	—	—	—	—	—	—	—	100	20	—	—	—	—
Elymus arenarius	—	—	—	—	—	—	100	3	—	—	67	6	—	—	—	—	—	—
Eriophorum angustifolium	—	—	—	—	—	—	—	—	—	—	—	—	100	10	50	20	—	—
Eriophorum russeolum	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Festuca rubra	—	—	—	—	—	—	—	—	—	—	33	10	—	—	—	—	100	3
Glyceria pauciflora	—	—	14	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hordeum brachyantherum	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—
Juncus arcticus	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—
Juncus filiformis	—	—	—	—	—	—	—	—	—	—	—	—	100	30	—	—	—	—
Poa eminens	—	—	—	—	—	—	—	—	—	—	33	10	—	—	—	—	—	—
Ferns and allies:																		
Athyrium filix-femina	—	—	—	—	100	90	100	1	—	—	—	—	—	—	—	—	—	—
Mosses:																		
Campylium stellatum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
Pohlia spp.	—	—	—	—	—	—	—	—	—	—	—	—	100	60	—	—	—	—
Rhytidiadelphus squarrosus	—	—	—	—	100	30	—	—	—	—	—	—	—	—	—	—	—	—
Sphagnum fuscum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	30	—	—
Sphagnum pacificum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	40	—	—
Sphagnum spp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	60	—	—
Unknowns:																		
Moss unknown	33	70	43	27	—	—	100	50	—	—	—	—	—	—	—	—	100	10
Species richness (> 5 plots)	—		15		—		—		—		—		—		—		—	

Table 18C—Constancy (Con) and average canopy cover (Cov) (in percentage) of the plants in forb dominated community types (continued)

	HIPTET (2 plots)		HONPEP (1 plot)		NUPPOL (1 plot)	
Community type	Con	Cov	Con	Cov	Con	Cov
Forbs:						
Hippurus tetraphylla	100	25	—	—	—	—
Ranunculus cymbalaria	50	1	—	—	—	—
Honckenya peploides	—	—	100	30	—	—
Nuphar polysepalum						
Graminoids:						
Puccinellia nutkaenis	50	10	—	—	—	—
Eleocharis palustris	50	3	—	—	—	—
Species richness (> 5 plots)	—		—		—	

Table 19—Constancy (con) and average canopy cover (cov) (in percentage) of plants in aquatic community types

	CALHER (4 plots)		CHARA (2 plots)		MYRSPI (4 plots)		POTFIL (10 plots)		POTPER (28 plots)		RANTRI (7 plots)		ZANPAL (1 plot)	
Community type	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov	Con	Cov
Forbs:														
Callitriche verna	50	5	50	1	25	1	20	3	14	6	29	5	—	—
Callitriche hermaphroditica	100	38	—	—	25	1	10	1	18	8	14	1	—	—
Equisetum fluviatile	—	—	—	—	—	—	—	—	—	—	14	5	—	—
Myriophyllum spicatum	25	20	50	20	100	50	30	4	4	1	—	—	—	—
Nuphar polysepalum	—	—	—	—	25	10	—	—	—	—	—	—	—	—
Potamogeton friesii	—	—	—	—	—	—	—	—	—	—	14	1	—	—
Potamogeton perfoliatus richardsonii	50	10	50	10	75	10	50	10	100	32	43	7	—	—
Potamogeton natans	—	—	—	—	25	40	—	—	—	—	—	—	—	—
Potamogeton filiformis	50	1	—	—	50	18	100	45	14	48	—	—	—	—
Ranunculus trichophyllus	50	1	50	25	50	1	40	3	36	4	100	26	—	—
Subularia aquatica	25	5	—	—	—	—	10	10	—	—	—	—	—	—
Zannichellia palustris	—	—	—	—	—	—	—	—	—	—	—	—	100	10
Graminoids:														
Eleocharis spp.	—	—	—	—	—	—	10	4	—	—	—	—	—	—
Glyceria pauciflora	25	1	—	—	—	—	—	—	4	10	—	—	—	—
Algae:														
Chara	25	1	100	78	50	63	30	30	—	—	29	6	—	—
Unknowns:														
Algae unknown	25	100	50	90	25	20	10	100	21	58	43	100	—	—
Forb unknown	—	—	—	—	—	—	—	—	4	1	14	1	—	—
Moss unknown	—	—	50	1	—	—	—	—	—	—	—	—	—	—
Species richness for types > 5 plots	—		—		—		9		7		7		—	

Glossary

Absent—Any plant species not found in the site or plot.

Aerobic—Condition in which molecular oxygen is present in the environment.

Alluvium—Sediments deposited on land by streams and rivers.

Anaerobic—Condition in which molecular oxygen is absent from the environment. This commonly occurs in wetlands where soils are saturated by water.

Bank—That portion of the channel bank cross section that controls the lateral movement of water.

Bog—Wetlands that have developed in a depression, such as former ponds or lakes, with poor drainage. Generally characterized by extensive peat deposits, acidic water, floating sedge or *Sphagnum* (peat moss) mats, heath shrubs, and occasionally by coniferous trees. The water table is close to the surface, but bogs usually lack standing water except in scattered openings. Bogs are nutrient poor because of leaching of surface peats by rain water and lack of contact with underlying nutrient-rich pond water. In contrast, fens receive nutrients from underlying mineral soil and water.

Browse—Shrubby and woody forage consumed by wildlife.

Canopy coverage—The percentage of ground covered by the gross outline of the foliage of an individual plant, or collectively covered by all individuals of a species within a stand or a sample plot.

Carr—Wetland on organic soil with greater than 25 percent cover of shrubs.

Community (plant community)—An assembly of plants living together, reflecting no particular ecological status.

Community type—An aggregation of all plant communities distinguished by floristic and structural similarities in both overstory and undergrowth layers. A unit of vegetation within a classification.

Dominance type—An aggregation of all stands (individual plant communities), grouped and named simply by the species with the greatest canopy coverage in the overstory or upper layer.

Estuary—An inlet of the sea reaching a river valley as far as the upper limit of tidal rise.

Fen—Wetlands with organic soils dominated by sedges, grasses, or reeds. The water source in a fen has been in contact with mineral soils and provides a much greater supply of nutrients than the nutrient-poor water associated with bogs. The water table is at or close to the surface most of the year. Waters may be acidic or basic.

Floodplain—An alluvial plain caused by the overbank deposition of alluvial material. They typically appear as flat expanses of land bordering a stream or river. Most floodplains are accompanied by a series of alluvial terraces of varying levels.

Fluvial—Pertaining to or produced by the action of a stream or river.

Forb—A herbaceous plant, usually broadleaved, that is not a graminoid.

Gleyed soils—Soils influenced by reduced conditions resulting from anaerobic conditions, such as long-term standing water; indicated by blue, gray, or green colors. Common in wet, fine-textured soils; rare in coarse, sandy soils.

Graminoid—Grass or grasslike plant, such as species of the Poaceae (grasses), Cyperaceae (sedges), and Juncaceae (rushes).

Ground water—That portion of the water below the surface of the ground whose pressure is greater than atmospheric pressure.

Growing season—The portion of the year when soil temperatures are above biologic zero (41°F) as defined by "Soil Taxonomy"; the following growing season months are assumed for each of the soil temperature regimes: (1) thermic (February-October), (2) mesic (March-October), (3) frigid (May-September), (4) cryic (June-August), and (5) pergelic (July-August).

Herbaceous—Nonwoody vegetation, such as graminoids and forbs.

Histic epipedon—An 8- to 16-inch soil layer at or near the surface that is saturated for 30 consecutive days or more during the growing season in most years and contains a minimum of 20 percent organic matter when no clay is present or a minimum of 30 percent of organic matter when 60 percent or more clay is present; generally a thin horizon of peat.

Horizon—A distinct layer of soil, more or less parallel with soil surface, having similar properties such as color, texture, and permeability; the soil profile is subdivided into the following major horizons: (1) A-horizon—characterized by an accumulation of organic material; (2) B-horizon—characterized by relative accumulation of clay, iron, organic matter, or aluminum; and (3) C-horizon—the undisturbed and unaltered parent material. (Note: some soils have an E-horizon—characterized by leaching of organic and other material).

Hydric soil—A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile.

Hydrology—The science dealing with the properties, distribution, and circulation of water.

Hydrophytic vegetation—Plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content.

I**ncidental type—**Refers to a site or community type that rarely occurs within the region of study.

Inundation—A condition in which water temporarily or permanently covers a land surface.

Landform—The form of the land surface and associated ecosystems at a smaller scale than associated with landscapes; e.g., as a dune or levee.

Landscape—An ecological unit defined by general topography, geomorphic process, surficial geology, soil and potential natural community patterns, and local climate, such as an outwash plain or delta.

Major type—Refers to a site or community type that occupies extensive acreages within the region of study.

Marsh—A wetland on mineral soils often developing in shallow ponds, depressions, and river margins. Marshes are dominated by herbaceous plants, such as grasses (e.g., *Phragmites*), sedges, cattails (*Typha*), and bulrushes (*Scirpus*). Waters usually are neutral to basic.

Meander channel—A former stream channel that was cut off from the rest of the river.

Mineral soil—Soils composed of predominantly mineral materials (sand, silt, and clay) instead of organic materials.

Minor type—Refers to a site or community type that seldom occupies large acreages but may be common within the region of study.

Monotypic stands—Stands composed primarily of a single species.

Mottling—Usually red spots or patches in a soil profile that indicate alternating wet and dry conditions caused by fluctuations in the water table. Generally associated with poorly aerated and drained soils.

Nonwetland—Any area that has sufficiently dry conditions that hydrophytic vegetation, hydric soils, and wetland hydrology are lacking; it includes upland as well as former wetlands that are effectively drained.

Ombrotrophic—Refers to areas that are entirely dependent on nutrients from precipitation.

Organic soil—Soils composed of primarily organic rather than mineral material; equivalent to Histosols and includes peats and mucks.

Outwash plain—A broad fluvial plain consisting of braided and meandering active streams, abandoned channels, alluvial terraces, and levees of varying levels.

Oxbow lake—A meander channel of a stream or river that is formed by breaching of a meander loop during flood stage. The ends of the cutoff meander are blocked by bank sediments.

Perched water table—Water elevated to, or near, the soil surface because of impermeability of the soil.

Permeability—The quality of the soil that enables water to move downward through the profile, measured as the number of inches per hour that water moves downward through the saturated soil.

Pioneer species—Species that colonize bare areas (e.g., gravel bars) where there is little or no competition from other species.

Pond—Bodies of water encircled by wetland vegetation. Wave action is minimal, thereby allowing emergent vegetation to establish.

Poorly drained—Water is removed from the soil so slowly that the soil is saturated periodically during the growing season or remains wet for periods greater than 7 days.

Present—Refers to any plant species found in the site.

Primary succession—Occurs on a bare surface not previously occupied by plants, such as a recently deposited alluvial bar.

Progradation—Seaward expansion of the land surface of a delta.

River—Physical waterways defined as fourth order or larger.

Saline—Soil or water containing sufficient soluble salts to be detrimental to the average plant.

Saturated—In soils, a condition where water has filled the soil pores, replacing oxygen.

Secondary succession—Occurs following disturbances to a site that previously supported vegetation.

Seral—Refers to vegetation that has not theoretically attained a steady state with its environment, and current populations of some species are being replaced by other species (a community or species that is replaced by another community or species as succession progresses).

Site—Any plant community that is relatively uniform in composition, structure, and abiotic conditions; a sample unit.

Stable community—The condition of little or no perceived change in plant communities that are in relative equilibrium with existing environmental conditions; describes persistent but not necessarily climax stages in plant succession.

Stand—A forested plant community that is relatively uniform in composition, structure, and abiotic conditions; a sample unit.

Stream—A physical water feature defined as first to third order.

Succession—The progressive change in plant communities toward a steady state. Primary succession begins on a bare surface not previously occupied by plants, such as a recently deposited gravel bar. Secondary succession occurs following disturbances on sites that previously supported vegetation.

Terrace—Deposits of alluvial soil that were former floodplains. Typically, a floodplain may have several sets of alluvial terraces at different elevations and of different ages (the higher the elevation, the older the age).

Uplands—Any area that does not qualify as a wetland because the associated hydrologic regime is not sufficiently wet to elicit development of vegetation, soils, and hydrologic characteristics associated with wetlands. Such areas occurring in floodplains are more appropriately termed nonwetlands.

Water table—The zone of saturation at the highest average depth during the wettest season; it is at least 6 inches thick and persists for more than a few weeks.

Wetlands—Areas that under normal circumstances have hydrophytic vegetation, hydric soils, and wetland hydrology. Included are landscape units such as bogs, fens, carrs, freshwater marshes, tidal marshes, sloughs, oxbows, and lowlands covered with shallow and sometimes ephemeral or intermittent waters. Permanent waters of streams and water deeper than 9 feet in lakes and reservoirs are not considered wetlands.

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