

172Xy102AK - Loamy High Flood Plains, Frozen
White spruce/thinleaf alder open forest

Part A: Description of Site

1.c. Landscape Narrative: This site consists of level to moderately sloping, high flood plains formed in stratified loamy alluvium over very gravelly alluvium. Terrace height above the mean summer channel level typically ranges from 5 to 10 feet (1.5 to 3.0 m) and the site is rarely flooded. The surface organic mat is moderately thick and permafrost is usually present within the soil profile. Elevation is generally below about 2400 feet (732 m).

In the Gulkana River area, this site is found along the Main Stem south of canyon rapids and along the lower North and South Branches and the West Fork; to Sourdough. This site undoubtedly occurs along the other low and moderate gradient rivers and streams elsewhere in the Copper River basin.

MLRA (USDA 1981): 172X - Copper River Plateau

Ecological Unit (Nowacki and Brock 1995): 135A - Copper River Basin Section

1.d.(3). Associated Water Features Narrative: (BLM)

2.j. Climate Narrative: The subarctic continental climate of this site is characterized by long cold winters and short warm summers. Mean January temperature is -2 °F.; mean July temperature is 54 °F. Mean annual precipitation ranges from 15 to 19 inches. Annual snowfall ranges from 54 to 102 inches. The frost-free season is about 60 to 80 days (28 °F. base temperature). The growing season varies greatly from year to year and frosts can occur during any summer month.

3.s. Soils Narrative: The weakly developed soils on this site typically have a mantle of stratified sandy and silty alluvium 12 to more than 60 inches (30 to 152 cm) thick over very gravelly alluvium. The organic mat ranges from 2 to 9 inches (5 to 23 cm) thick and permafrost is usually present at a depth of 14 to 37 inches (36 to 94 cm). Except for a thin saturated zone in spring and early summer, no perched water table is found at the permafrost contact and the soils are well drained.

4.e. Vegetation Narrative: White spruce/thinleaf alder open forest is the correlated PNC on this site.

5.b. Wildlife Narrative: This site is utilized by a wide variety of wildlife. Migrating caribou frequently pass through areas of this site. Limited observations suggest that caribou generally pass through areas closely adjacent to both the river channel and the lacustrine uplands, apparently avoiding extensive dense tall shrub and forest vegetation. *Salix alexensis* and other willows are occasional to common in many stands and provide limited moose browse. Mature stands of *Picea glauca* provide habitat for marten and weasels, particularly areas with abundant woody debris on the forest floor. Bald Eagles use tall *Populus balsamifera* and occasionally *Picea glauca* for nest trees; both trees are utilized for perches. The spruce forest provides high quality Spruce Grouse habitat.

6. Community Dynamics (Fire, etc.): This site is susceptible to wild fires, which are commonly recurring events in the Copper River basin. In most instances, fire would kill the *Picea glauca* trees and destroy much, if not all, of the existing forest overstory and burn most of the understory back to ground level. Fire also would blacken and at least partially destroy the moss-organic layer on the soil surface, leading to soil warming, a drop in the permafrost level, and increased nutrient availability. It is unlikely, however, that post fire vegetative succession would pass through same seral stages characteristic

of flood plain succession that led to the original White spruce/thinleaf alder open forest. The flooding regime, soil moisture patterns, and growing conditions associated with flood plain succession not longer exist. In all probability, vegetative succession would pass through a sequence of scrub and woodland seral stages leading to mixed spruce with *Betula glandulosa* and ericaceous shrubs in the understory and a well-developed moss-organic layer on the soil surface similar to Spruce/shrub birch woodland.

7. *List of Commonly Associated Sites (number and names):*

a. Upland:

172Xy100AK - Loamy Flood Plains

172Xy103AK - Stream Terraces, Frozen

172Xy104AK - Stream Terraces

b. Riparian or Wetland:

8. *List of Competing Sites (number and names):*

172Xy100AK - Loamy Flood Plains: typically slightly lower flood plain position and occasional flooding; soils without permafrost; Balsam poplar-white spruce/thinleaf alder open forest vegetative potential.

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Part B: Interpretations for Use and Management of the Site

1.a. Plant Community Characteristics: see attached summary tables and diagrams for seral stages and stand characteristics.

1.b Riparian or Wetland Site Progressions:

(1) Aggradation: Based on observations and data collected in the Gulkana River area, this site is the end point of site progression and vegetative succession on flood plains within the alder zone. This site develops from site 172Xy100AK - Loamy Flood Plains as additional accretions of alluvium, channel migration, channel down-cutting, or a combination of these processes increase the height of the terrace surface and decrease the frequency and duration of flooding. White spruce/thinleaf alder open forest on this site is a later successional stage of Balsam poplar-white spruce/thinleaf alder open forest and represents the end point of succession on flood plains.

Eventually periodic flooding all but ceases because of increased terrace height. Continued development and thickening of the organic mat results in a decrease in soil temperatures, a rise in the level of the permafrost, and a reduction in nutrient availability and cycling. White spruce/ericaceous shrub open forest represents a transitional cover type in the flood plain-stream terrace site progression. This type develops as growing conditions on the site continues to deteriorate and the original white spruce forest on the flood plains begins to die off and be replaced by less productive white and black spruce characteristic of stream terraces. Tall white spruce snags and large diameter downfall are frequent in these stands. Labrador tea, bog blueberry, and other ericaceous shrub and willow, which are well adapted to the nutrient poor sites and begin to increase in abundance and dominate the understory.

Ultimately, site progression and vegetation succession would lead to site 172Xy104AK - Stream Terraces and Spruce/shrub birch woodland and/or 172Xy103AK - Stream Terraces, Frozen and Spruce/spruce muskeg sedge open forest.

1.e. Insects and Disease Pests and Animal Damage: Porcupine damage to smaller spruce trees is evident in occasional stands. In most observed instances, damage is not extensive enough to kill the trees.

1.g. Recreation and Natural Beauty: Deteriorating spruce stands in the transitional zone between high flood plains and stream terraces often contain abundant downfall suitable for firewood. Standing dead trees will provide a future source of firewood.

1.k. Applicable Field Offices: BLM, Glennallen District Office

Ecological Site: 172Xy102AK - Loamy High Flood Plains, Frozen
 Cover type: White spruce/thinleaf alder open forest
 Seral status: PNC
 Number of stands: 17
 Source of data: Gulkana River Area
 Key: Con = % constancy; Avg = average % canopy cover;
 Min = minimum % canopy cover; Max = maximum %
 canopy cover; Imp = importance value
 Note: Avg, Min, and Max based only on stands in which a
 taxon occurred; Imp = sq root of (Con * Avg)
 : Only taxa with >10% constancy included.

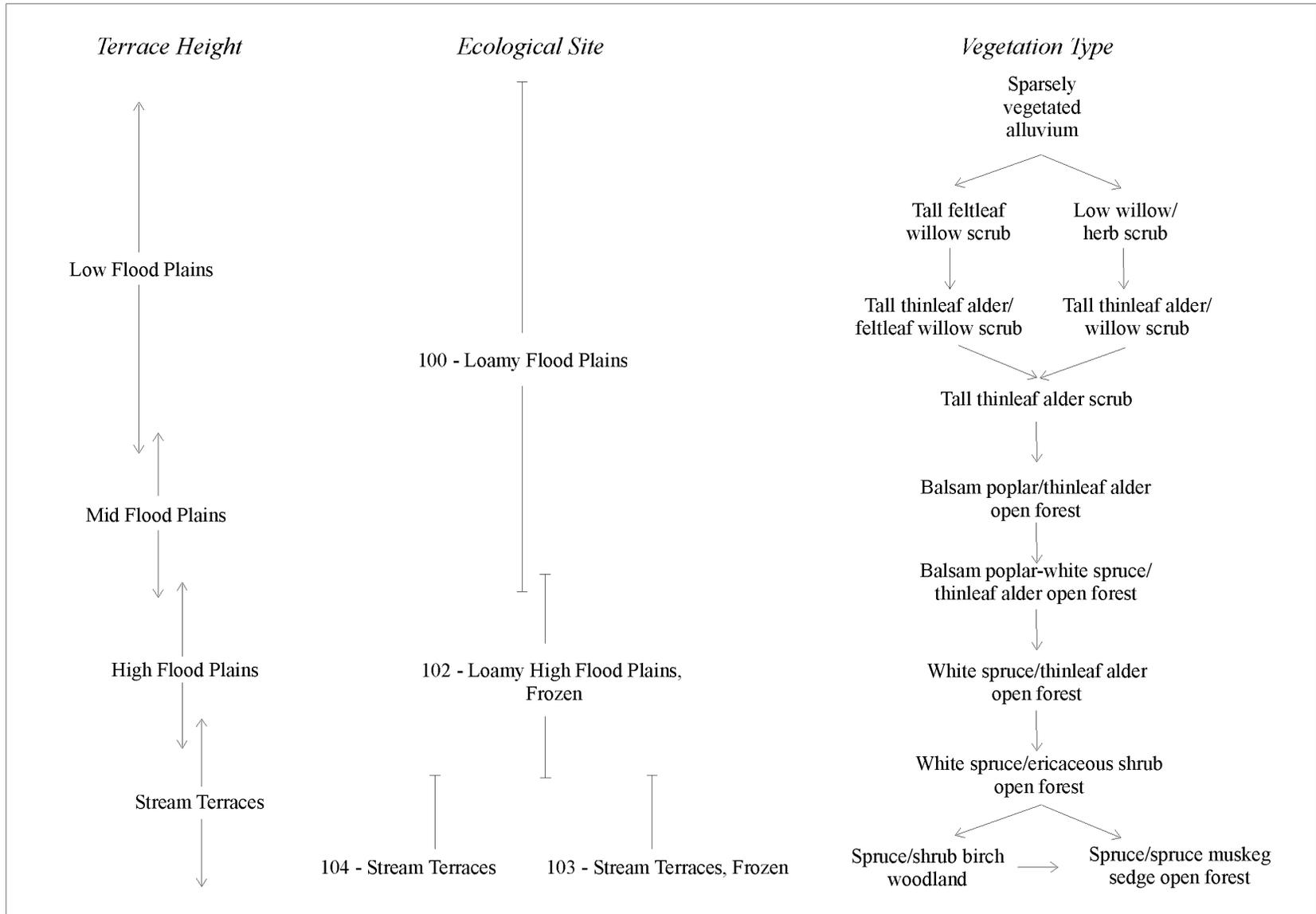
Common_name	Stratum	Con	Avg	Min	Max	Imp
balsam poplar	T1	29	4	1	10	11
white spruce	T1	94	41	10	75	62
white spruce	T2	47	17	1	35	28
balsam poplar	T3	18	1	1	1	3
quaking aspen	T3	12	2	1	3	5
white spruce	T3	41	2	1	5	9
Labrador-tea	SS	59	8	1	35	22
black crowberry	SS	82	11	1	65	30
blueberry willow	SS	12	2	1	2	4
bog blueberry	SS	65	10	1	50	26
gray willow	SS	12	17	3	30	14
grayleaf willow	SS	24	5	2	10	10
green alder	SS	18	17	10	25	17
highbush cranberry	SS	24	8	2	20	13
little tree willow	SS	12	1	1	1	2
lowbush cranberry	SS	82	10	2	45	28
prickly rose	SS	100	12	1	30	34
red bearberry	SS	12	4	2	5	6
russet buffalo-berry	SS	29	2	1	5	8
shrub birch	SS	12	8	8	8	10
shrubby cinquefoil	SS	18	2	1	2	5
swamp red currant	SS	18	6	1	15	10
thinleaf alder	SS	88	35	1	70	56
willow	SS	53	6	1	14	18
American twinflower	F	47	5	1	15	15
Canadian bunchberry	F	12	15	15	15	13
Tilesius' wormwood	F	47	2	1	5	10
alpine sweet-vetch	F	47	1	1	4	7
anemone	F	18	1	1	1	4
arctic aster	F	29	4	1	10	10
arctic sweet coltsfoot	F	41	6	1	15	15
cloudberry	F	12	2	1	2	4
common fireweed	F	47	1	1	2	7
gentian	F	12	1	1	1	2
horsetail	F	100	22	1	60	47
larkspur-leaf monkshood	F	29	1	1	2	5
marsh grass-of-parnassus	F	12	1	1	1	2
milk-vetch	F	12	1	1	2	4
northern bedstraw	F	12	3	1	5	6
northern blackberry	F	29	1	1	2	5
northern commandra	F	24	2	1	5	7
tall Jacob`s-ladder	F	12	1	1	1	2
tall bluebells	F	29	8	1	10	15
valerian	F	18	1	1	1	4
wintergreen	F	59	2	1	8	12
blue grass	G	12	2	1	3	5
bluejoint reedgrass	G	47	7	1	15	18
polar grass	G	65	3	1	10	14
spruce-muskeg sedge	G	12	3	2	4	6
Moss layer	M	100	64	10	95	80
Lichen layer	L	100	3	1	10	19
Bare soil	B	29	1	1	5	6
Litter and mulch	B	100	26	5	85	51
Rock fragments	B	12	1	1	1	2
Woody litter (>1" dia.)	B	100	8	1	20	27

Salix spp. includes: SABA3 SALIX SAMO2 SAPL2

Ecological Site: 172Xy102AK - Loamy High Flood Plains, Frozen
 Cover type: White spruce/ericaceous shrub open forest
 Seral status: post-PNC
 Number of stands: 18
 Source of data: Gulkana River Area
 Key: Con = % constancy; Avg = average % canopy cover;
 Min = minimum % canopy cover; Max = maximum %
 canopy cover; Imp = importance value
 Note: Avg, Min, and Max based only on stands in which a
 taxon occurred; Imp = sq root of (Con * Avg)
 : Only taxa with >10% constancy included.

Common_name	Stratum	Con	Avg	Min	Max	Imp
balsam poplar	T1	22	2	1	5	7
white spruce	T1	94	25	10	45	48
white spruce	T2	44	21	5	40	30
balsam poplar	T3	17	1	1	1	3
white spruce	T3	50	4	1	10	15
Labrador-tea	SS	94	18	1	35	41
black crowberry	SS	100	15	4	35	38
blueberry willow	SS	28	2	1	3	7
bog blueberry	SS	94	27	2	55	50
feltleaf willow	SS	50	5	1	20	16
gray willow	SS	11	1	1	1	2
grayleaf willow	SS	39	8	2	20	17
green alder	SS	17	3	1	5	7
little tree willow	SS	11	4	3	5	7
lowbush cranberry	SS	100	15	5	45	38
net vein willow	SS	22	1	1	2	5
prickly rose	SS	56	5	1	15	16
red bearberry	SS	50	3	1	10	13
russet buffalo-berry	SS	33	6	1	15	14
shrub birch	SS	33	7	1	20	15
shrubby cinquefoil	SS	50	1	1	2	8
swamp red currant	SS	11	4	1	8	7
thinleaf alder	SS	22	5	1	10	11
willow	SS	78	6	1	15	21
American twinflower	F	11	1	1	1	2
Bodin's milkvetch	F	11	3	1	5	6
Labrador lousewort	F	11	1	1	1	2
alpine sweet-vetch	F	33	3	1	7	10
arctic aster	F	11	1	1	1	2
arctic sweet coltsfoot	F	50	2	1	7	11
cloudberry	F	11	1	1	1	3
common fireweed	F	44	1	1	4	7
dwarf scouring-rush	F	11	1	1	1	2
horsetail	F	83	3	1	15	15
northern blackberry	F	11	1	1	1	2
northern commandra	F	39	3	1	10	12
tall Jacob`s-ladder	F	11	1	1	1	3
tall bluebells	F	11	2	2	2	5
valerian	F	22	1	1	1	3
wintergreen	F	17	3	1	4	6
bluejoint reedgrass	G	50	4	1	10	14
polar grass	G	67	2	1	5	11
rough fescue	G	11	1	1	1	2
sedge	G	33	2	1	4	7
spruce-muskeg sedge	G	28	4	1	7	10
Moss layer	M	100	71	60	85	84
Lichen layer	L	100	8	1	30	28
Bare soil	B	22	3	1	5	8
Litter and mulch	B	100	16	3	40	39
Woody litter (>1" dia.)	B	94	6	1	15	24

Salix spp. includes: SABA3 SALIX SAMO2 SAPL2



General relationships between terrace height, ecological sites, and vegetation types in the alder zone, Gulkana River Area, Alaska.

172Xy102AK - Loamy High Flood Plains, Frozen (102tech.doc)

Selected physical properties for typical stages of site progression on flood plains and stream terraces
in the alder zone, Gulkana River Area, Alaska.

Ecological Site (stage)	Cover Type(s)	Terrace Height avg(rge)	Flooding Frequency	Depth to SSK avg(rge)	Thickness of OM avg(rge)	Depth to Water Table Pedons w/ <60"	Depth when <60" avg(rge)	Depth to Permafrost Pedons w/ <60"	Permafrost Depth when <60" avg(rge)
		-- ft --		-- in --	-- in --	-- % --	-- in --	-- % --	-- in --
100 - Loamy Flood Plains (early)	SAAL SAAL/ALTE2	3 (1-6)	freq	20 (4-48)	0 (0-1)	94	37 (22-58)	0	-
100 - Loamy Flood Plains (mid)	ALTE2 ALTE2-SAAL ALTE2/SALIX	3 (1-7)	occas-freq	28 (3-60)	1 (0-2)	83	34 (12-58)	0	-
100 - Loamy Flood Plains (late)	POBA2/ALTE2 POBA2-PIGL/ALTE2	4 (2-8)	occas	26 (8-60)	1 (0-2)	62	42 (23-55)	0	-
102 - Loamy High Flood Plains, Frozen (PNC)	PIGL/ALTE2	6 (4-12)	occas-rare	31 (17-60)	3 (0-7)	26	40 (24-55)	61	32 (14-55)
102 - Loamy High Flood Plains, Frozen (post-PNC)	PIGL/erica	9 (4-25)	rare-none	30 (12-60)	5 (2-8)	15	40 (30-50)	65	31 (12-52)
103 - Stream Terraces, Frozen (PNC)	PICEA/CALU2	9 (4-20)	rare-none	30 (18-60)	7 (2-12)	100	8 (0-23)	100	15 (0-25)

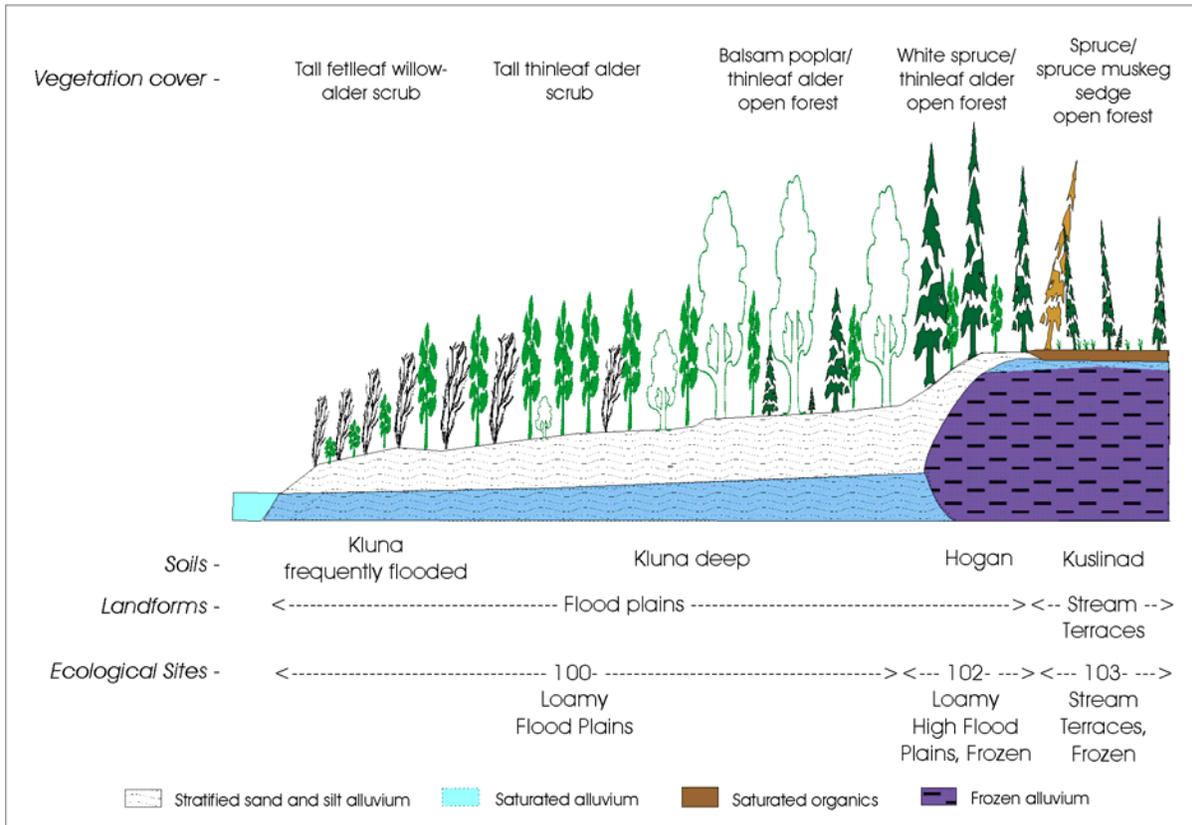
Notes:

Terrace height - estimated height of flood plain or stream terrace surface above the mid summer channel level.

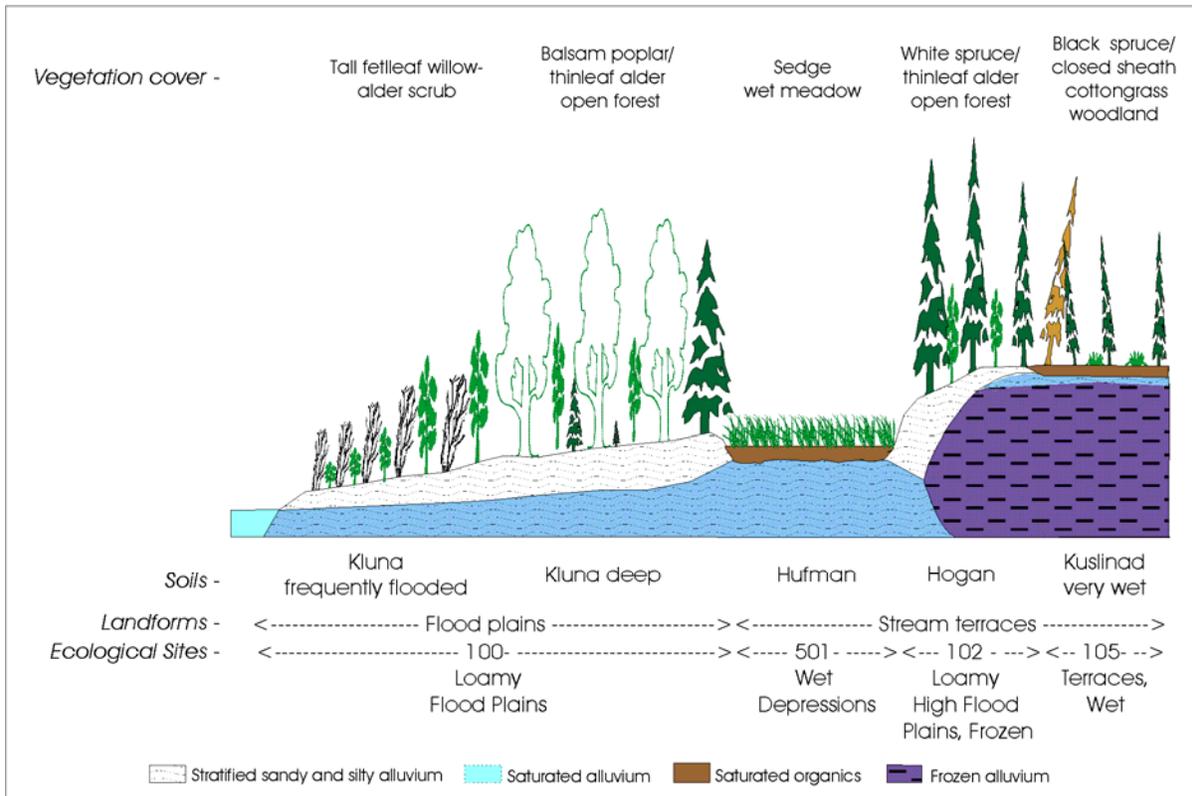
Depth to SSK - depth to sandy skeletal alluvium below the mineral soil surface in pedons without permafrost or in which the permafrost level was below the SSK contact; measured in the soil pit.

Thickness of OM - thickness of the surface organic mat; measured in the soil pit.

Depth to Water Table and Permafrost - Pedons w/ <60": pedons in which a water table or permafrost was present within 60 inches below the mineral surface. Depth when <60": depth below the mineral surface when present; measured in the soil pit.



Representative cross section in the alder zone along the middle West Fork.



Representative cross section in the alder zone along the middle West Fork.



Vegetation succession and site progression between ecological site 172Xy102AK - Loamy High Flood Plains, Frozen and 172Xy103AK - Stream terraces, Frozen is characterized by die-off of the productive white spruce overstory and replacement by less productive white and black spruce. Tall thinleaf alder and other understory species common on high flood plains are gradually replaced by ericaceous shrubs, shrub birch, and other species more typical of spruce woodlands.