

**172Xy101AK - Loamy High Flood Plains**  
**White spruce/willow 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 sandy and silty alluvium over very gravelly and cobbly alluvium. Terrace height above the mean summer channel level is typically 3 to 10 feet (0.9 to 3.0 m) and the site is occasionally to rarely flooded. In many areas, particularly on the highest flood plains positions, permafrost is present within the soil profile. Elevation is generally 2300 to 2600 feet (701 to 792 m).

In the Gulkana River area, this site is common along the Middle Fork, the Main Stem north of canyon rapids, and the upper reaches of the North and South Branches. It also occurs along major side streams and drainages above the river corridor. This site undoubtedly occurs along the other rivers and streams in the Copper River basin.

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

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

*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 1 °F.; mean July temperature is 54 °F. Mean annual precipitation ranges from 18 to 21 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 over 60 inches (30 to 152 cm) thick over very gravelly and cobbly alluvium. Rarely, the sandy and silty layer is less than 12 inches (30 cm; Tangoe soils). The depth to seasonal high water table ranges from 40 to over 60 inches (102 to 152 cm) and the soils are moderately well to well drained. Aquic conditions, including redox depletions and/or a reduced matrix are found on occasions below 40 inches (102 cm). On some of the older terraces, permafrost is found between about 20 to more than 60 inches (102 to 152 cm). Permafrost soils usually do not have a perched water table on the permafrost surface.

*4.e. Vegetation Narrative:* White spruce/willow open forest is the correlated PNC on this site. This PNC is best characterized as a riparian plant association and may only exist during the life span of the initial generation of trees.

*5.b. Wildlife Narrative:* This site is utilized by a wide variety of wildlife. Dense *Salix* spp. in the understory provides abundant moose browse; moderate to severe hedging is observed in most stands. This site also provides staging areas for bears fishing for salmon in summer and fall. Bald Eagles use tall *Picea glauca* and the occasional *Populus balsamifera* for perches and occasionally for nesting, particularly those trees close to the river channel. Beaver activity is common throughout and adjacent to areas of this site.

*6. Community Dynamics (Fire, etc.):* This site is susceptible to wild fire, which are commonly recurring events in the Copper River basin. Because of its thin bark, *Picea glauca* is poorly adapted to survive wild fire and most trees are usually killed when a stand burns. The *Salix* spp. that dominant the forest understory readily sprout after burning and post-fire succession would be expected to pass through a short herb-shrub

sprout stage to a dense low willow scrub stage. If suitable seed trees remain in or adjacent to the burned stand, *Picea glauca* should eventually re-establish itself. The presence of *Picea mariana* in the pre-fire stand or in nearby unburned stands could lead to a black spruce or mixed spruce stage in the post-fire succession.

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

a. Upland:

172Xy103AK - Stream Terraces, Frozen

b. Riparian or Wetland:

172Xy200AK - Gravelly Flood Plains, Moderately Wet

172Xy201AK - Loamy Flood Plains, Moderately Wet

172Xy500AK - Loamy Riverbanks

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

**172Xy101AK - Loamy High Flood Plains**  
**White spruce/willow open forest**

**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 appears to develop from 172Xy200AK - Gravelly Flood Plains, Moderately Wet or 172Xy201AK - Loamy Flood Plains, Moderately Wet. In some places, a short steep escarpment separates adjacent flood plain levels. The higher flood plains support White spruce/willow forest characteristic of site 172Xy101AK - Loamy High Flood Plains while Low willow/herb scrub is found on the low flood plains characteristic of sites 172Xy200AK and 172Xy201AK. In many places on islands and in areas of high channel sinuosity, a gradual increase in terrace height away from the channel is evident. The transition to site 172Xy101AK - Loamy High Flood Plains and White spruce/willow open forest on the higher positions usually includes a relatively narrow zone dominated by white spruce saplings and small trees protruding through the dense willow scrub.

Site 172Xy101AK - Loamy High Flood Plains is the end point of site progression and vegetative succession on flood plains. Over the life of the initial white spruce stand, the willow understory gradually is replaced by ericaceous shrubs and the organic mat on the soil surface accumulates and thickens. Continued development and thickening of the organic mat results in a gradual decrease in soil temperatures and depth to permafrost and a reduction in nutrient availability and cycling. Observations in the Gulkana River area suggest that, without some degree of disturbance, which delays or retards succession, permafrost develops within the soil profile and site productivity decreases markedly towards the end of the life span of the original forest stand. Without disturbance, site progression and vegetative succession would lead to site 172Xy104AK - Stream Terraces and Spruce/shrub birch woodland and in some places possibly even 172Xy103AK - Stream Terraces, Frozen and Spruce/spruce muskeg sedge open forest.

The transition between 172Xy101AK - Loamy High Flood Plains and 172Xy104AK - Stream Terraces is usually indicated by the White spruce/ericaceous shrub open forest vegetation type. This type consists of decadent stand of tall, large diameter white spruce, many of which have already died and fallen partly to completely over. Below the deteriorating overstory is a younger, smaller stand of mixed white and black spruce. Trees within this layer often appear poorly formed, slow growing, and have yellowish green foliage characteristics of cold, low productivity sites. Ericaceous shrubs are prominent in the understory by this point.

*1.e. Insect and Disease Pests and Animal Damage:* Most stands experience seasonally heavy browsing by moose and the willow is often moderately to severely hedged. Beaver cut willow stems are common in many places.

*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

172Xy101AK - Loamy High Flood Plains (101tech.doc)

Ecological Site: 172Xy101AK - Loamy High Flood Plains

Cover type: White spruce/willow open forest

Seral status: PNC

Number of stands: 25

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	16	13	5	20	14
white spruce	T1	80	29	7	65	48
white spruce	T2	48	30	10	60	38
white spruce	T3	64	5	1	25	19
Labrador-tea	SS	40	3	1	10	11
black crowberry	SS	64	2	1	5	11
bog blueberry	SS	92	7	1	20	26
feltleaf willow	SS	28	6	1	10	13
lowbush cranberry	SS	80	3	1	10	15
net vein willow	SS	12	12	1	20	12
prickly rose	SS	28	4	1	10	11
red bearberry	SS	24	2	1	7	7
russet buffalo-berry	SS	36	2	1	5	8
shrub birch	SS	40	2	1	5	9
shrubby cinquefoil	SS	60	3	1	15	14
willow	SS	100	40	7	75	63
American twinflower	F	12	1	1	2	4
Canadian bunchberry	F	44	4	1	10	14
Sitka burnet	F	12	1	1	3	4
Tilesius' wormwood	F	36	2	1	5	7
alpine sweet-vetch	F	48	2	1	7	10
anemone	F	16	1	1	3	4
arctic aster	F	20	1	1	1	3
arctic sweet coltsfoot	F	68	7	1	30	21
boreal sagebrush	F	12	1	1	3	4
cloudberry	F	12	1	1	2	3
common fireweed	F	68	2	1	6	11
felwort	F	16	1	1	3	4
horsetail	F	92	32	2	80	54
larkspur-leaf monkshood	F	76	1	1	2	7
marsh grass-of-parnassus	F	12	1	1	1	2
milk-vetch	F	20	1	1	2	4
northern bedstraw	F	36	1	1	5	7
northern blackberry	F	76	2	1	7	12
ragwort	F	36	1	1	1	4
serpent-grass	F	12	1	1	1	2
single delight	F	32	1	1	1	4
starwort	F	12	1	1	1	2
stonecrop	F	12	1	1	1	2
tall Jacob`s-ladder	F	48	1	1	2	6
tall bluebells	F	72	2	1	15	13
valerian	F	56	1	1	5	7
western arctic shootingstar	F	12	1	1	1	2
wintergreen	F	44	1	1	2	7
blue grass	G	28	3	1	15	9
bluejoint reedgrass	G	44	4	1	7	13
polar grass	G	72	7	1	20	22
rough fescue	G	16	1	1	2	4
sedge	G	20	3	1	5	8
water sedge	G	12	10	1	30	11
Moss layer	M	100	58	15	85	76
Lichen layer	L	92	4	1	15	20
Bare soil	B	24	1	1	3	5
Litter and mulch	B	100	14	1	60	38
Woody litter (>1" dia.)	B	60	4	1	10	15

Salix spp. includes: SABA3 SALIX SAMO2 SAPL2

172Xy101AK - Loamy High Flood Plains (101tech.doc)

Ecological Site: 172Xy101AK - Loamy High Flood Plains  
 Cover type: White spruce/ericaceous shrub open forest  
 Seral status: post-PNC

Number of stands: 3

Source of data: Gulkana River Area

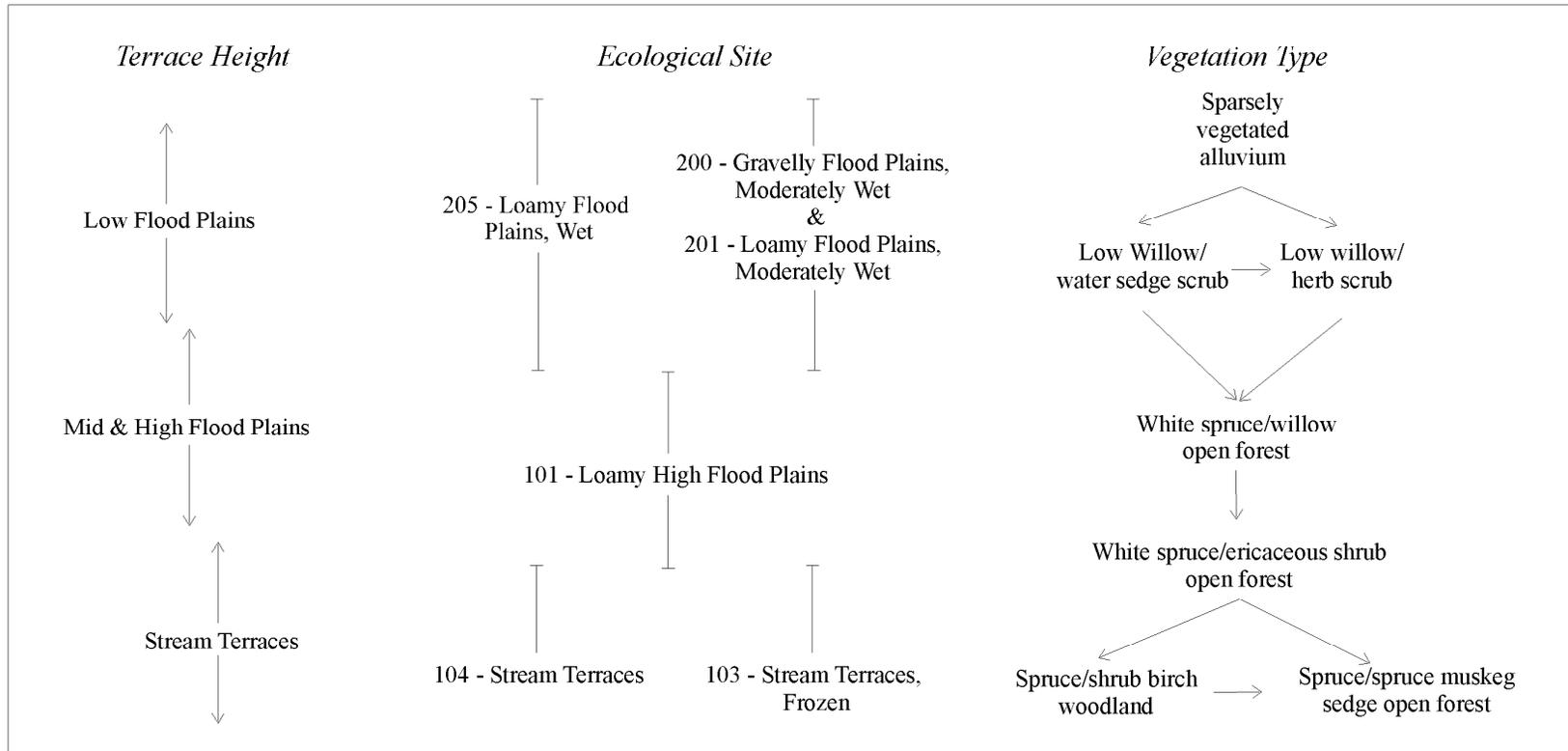
Key: Con = % constancy; Avg = average % canopy cover;  
 Min = minimum % canopy cover; Max = maximum %  
 canopy cover; Imp = importance value

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
white spruce	T1	100	58	45	65	76
white spruce	T3	33	1	1	1	4
Labrador-tea	SS	33	2	2	2	8
black crowberry	SS	100	4	1	5	19
bog blueberry	SS	100	18	10	25	43
grayleaf willow	SS	67	2	1	3	12
lowbush cranberry	SS	100	17	1	30	41
prickly rose	SS	33	5	5	5	13
red bearberry	SS	67	2	1	2	10
russet buffalo-berry	SS	67	6	1	10	19
shrubby cinquefoil	SS	67	1	1	2	9
stink currant	SS	33	1	1	1	4
willow	SS	100	7	1	11	27
Canadian bunchberry	F	33	3	3	3	10
alpine sweet-vetch	F	67	5	4	5	17
arctic lupine	F	33	1	1	1	4
arctic sweet coltsfoot	F	100	3	1	5	16
common fireweed	F	100	1	1	1	9
horsetail	F	100	17	5	30	41
larkspur-leaf monkshood	F	67	1	1	1	6
milk-vetch	F	33	1	1	1	4
northern bedstraw	F	33	1	1	1	4
northern blackberry	F	100	2	1	3	14
serpent-grass	F	33	1	1	1	4
single delight	F	33	1	1	1	4
tall bluebells	F	67	3	2	3	13
valerian	F	100	1	1	1	7
violet	F	33	1	1	1	4
wintergreen	F	67	3	2	3	13
blue grass	G	33	1	1	1	6
bluejoint reedgrass	G	67	2	1	2	10
polar grass	G	67	1	1	1	8
rough fescue	G	33	1	1	1	4
Moss layer	M	100	73	65	85	86
Lichen layer	L	100	4	3	5	21
Bare soil	B	100	2	1	3	12
Litter and mulch	B	100	15	5	25	39
Woody litter (>1" dia.)	B	100	10	10	10	32

Salix spp. includes: SABA3 SAMO2 SAPL2



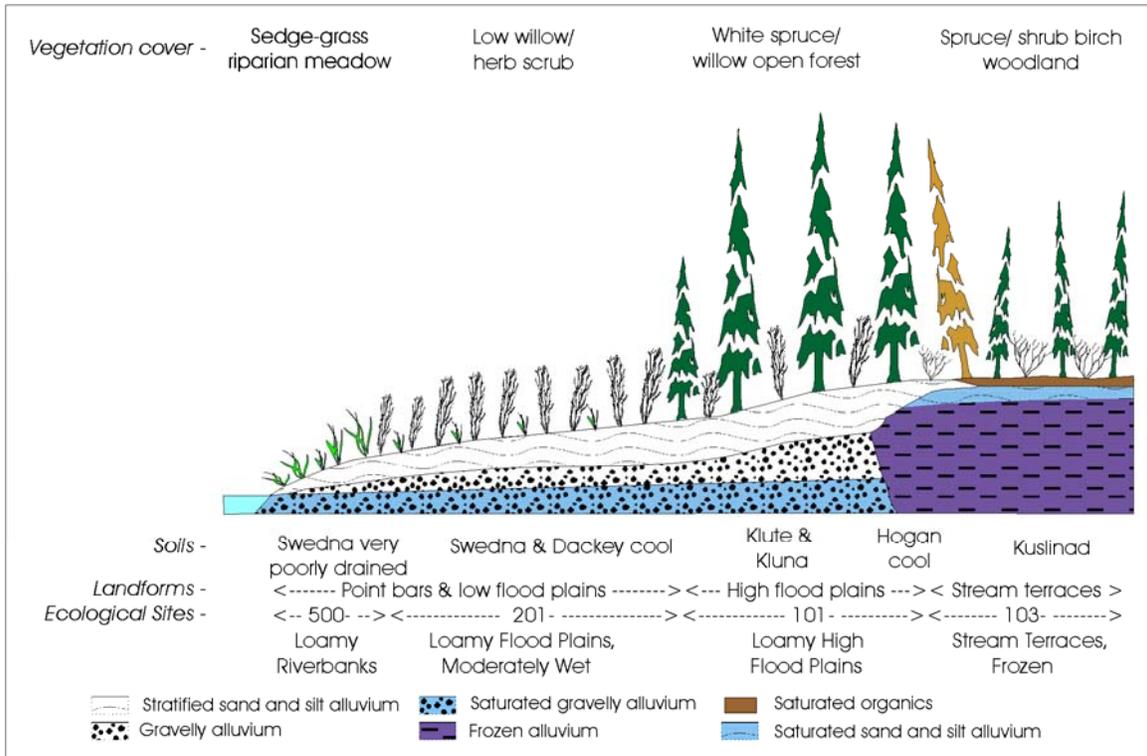
General relationships between terrace height, ecological sites, and vegetation types in the willow zone, Gulkana River Area, Alaska.

172Xy101AK - Loamy High Flood Plains (101tech.doc)

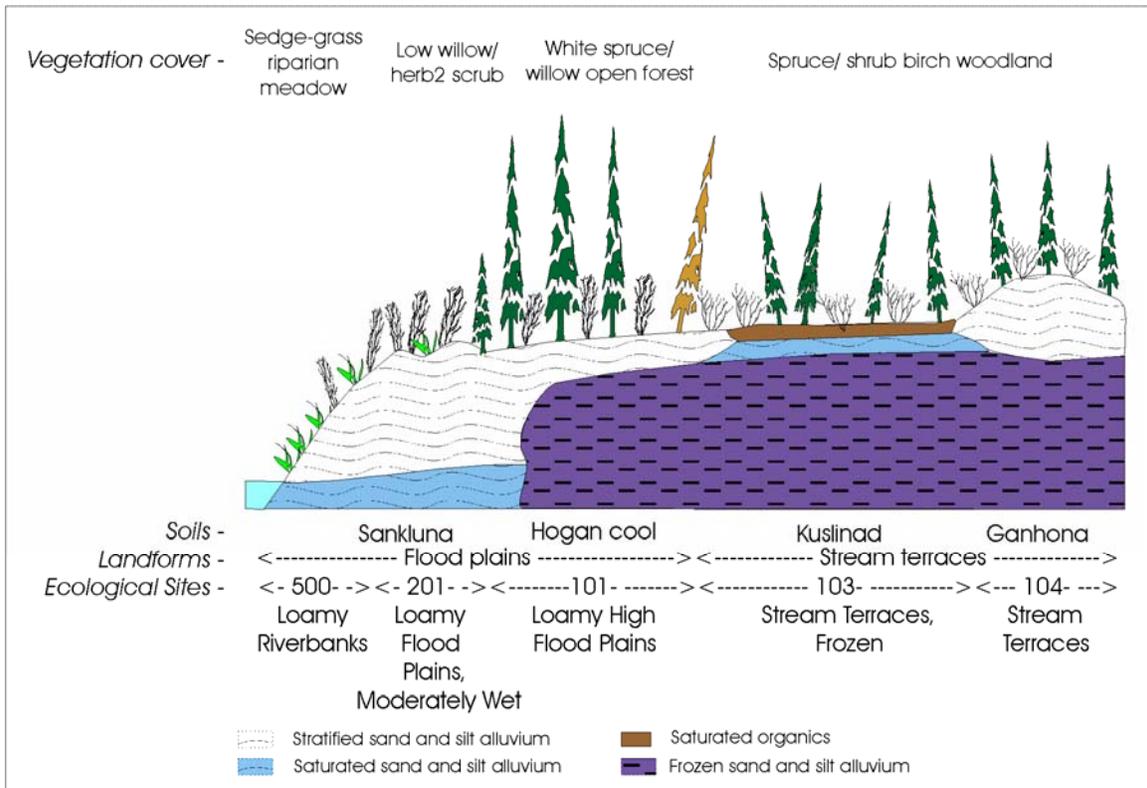
Selected physical properties for typical stages of site progression on flood plains and stream terraces in the willow zone, Gulkana River Area, Alaska.

Ecological Site (stage)	Cover Type(s)	Terrace Height	Flooding Frequency	Depth to SSK	Thickness of OM	Depth to Water Table		Depth to Permafrost	
		avg(rge) -- ft --		avg(rge) -- in --	avg(rge) -- in --	w/ <60" -- % --	Depth when <60" avg(rge) -- in --	w/ <60" -- % --	Depth when <60" avg(rge) -- in --
205 - Loamy Flood Plains, Wet	SALIX/CAAQ	2 (1-5)	freq-occas	17 (0-42)	4 (1-10)	100	13 (0-30)	0	-
200 - Gravelly Flood Plains, Moderately Wet	SALIX/herb	3 (2-4)	occas-freq	28 (3-60)	1 (0-3)	100	28 (12-44)	0	-
201 - Loamy Flood Plains, Moderately Wet	SALIX/herb	3 (1-8)	occas-freq	25 (9-50)	1 (0-6)	79	36 (32-45)	0	-
	SALIX/herb2	7 (4-12)	occas	60 (58-60)	1 (0-1)	12	46 (46-60)	0	-
101 - Loamy High Flood Plains (PNC)	PIGL/SALIX	6 (3-15)	occas-rare	27 (3-60)	2 (0-7)	39	40 (31-58)	24	33 (17-49)
101 - Loamy High Flood Plains (post-PNC)	PIGL/erica	9 (4-25)	rare-none	30 (12-60)	4 (0-10)	21	35 (8-50)	54	29 (6-52)
104 - Stream Terraces (mid to late seral)	PICEA/BEGL	11(6-25)	rare-none	30 (18-60)	4 (1-9)	9	31 (16-40)	27	36 (18-55)
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)

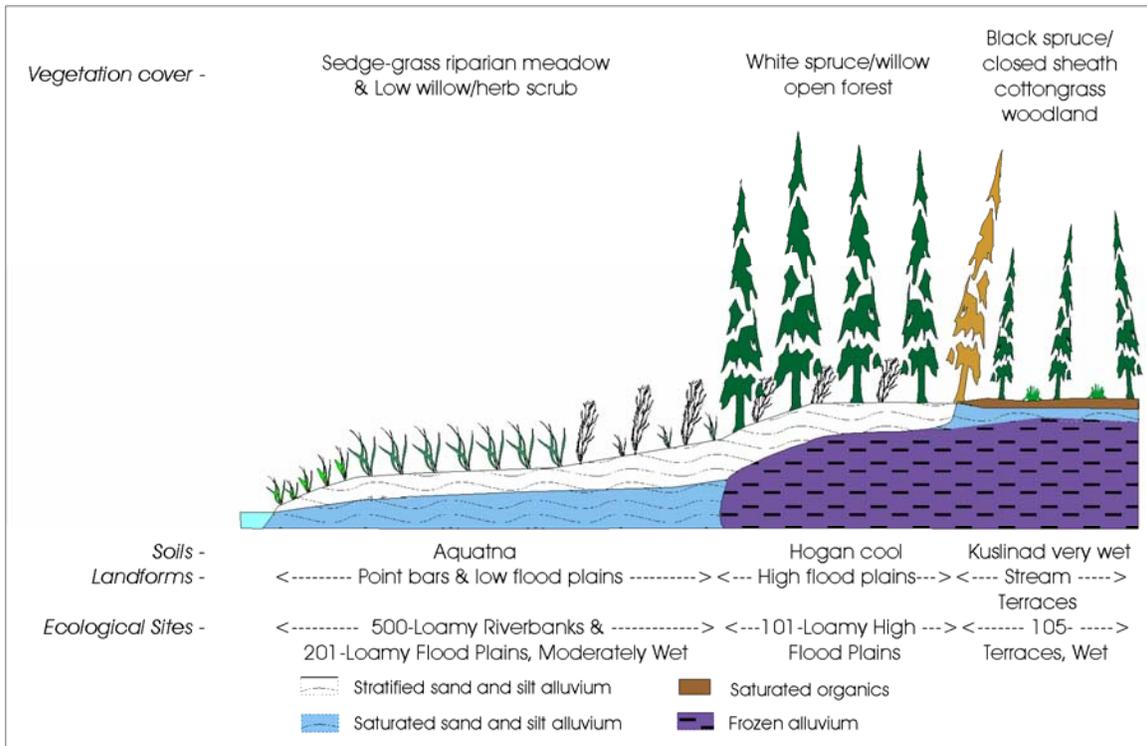
Notes:  
 Terrace height - estimated height of flood plain or stream terrace surface above the mid summer channel level.  
 Depth to SSK - depth to sandy skeletal alluvium below the mineral soil surface in pedons without permafrost or in which the permafrost level was below the SSK contact; measured 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.



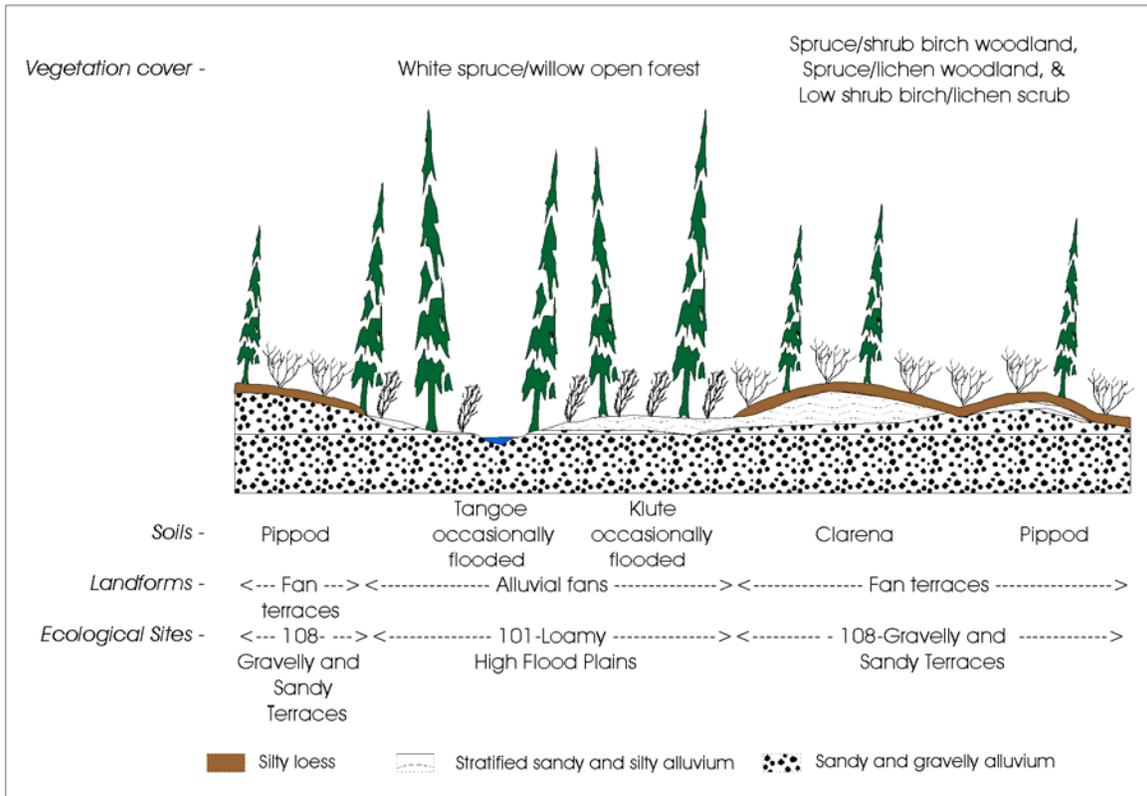
Representative cross section in the willow zone along the upper Main Stem.



Representative cross section in the willow zone along the lower Middle Fork.



Representative cross section in the willow zone along the upper South Branch.



Representative cross section across an alluvial fan along the upper Middle Fork.



Representative stand of White spruce/willow open forest on ecological site 172Xy101AK - Loamy High Flood Plains. Scarring on the boles of white spruce is caused by ice jams on the adjacent river channel.