

**172Xy103AK - Stream Terraces, Frozen**  
**Spruce/spruce muskeg sedge open forest**

**Part A: Description of Site**

*1.c. Landscape Narrative:* This site consists of level to moderately sloping, poorly drained stream terraces with shallow to very shallow permafrost. Elevation is generally 1850 to 2600 feet (564 to 792 m).

In the Gulkana River area, this site occurs along all reaches of the River except for the upper Middle Fork. This site is probably widespread on stream terraces at mid elevations throughout 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 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:* Soils on this site are very poorly or poorly drained and very shallow or shallow to permafrost. They typically have an organic mat 8 to 16 inches (20 to 41 cm) thick over stratified sandy and silty alluvium. Depth to permafrost ranges from 4 to 32 inches (10 to 81 cm) below the mineral soil surface. A water table is perched on the impermeable permafrost; depth to the top of the water table ranges from within the organic mat to about 12 inches (15 cm) below the mineral surface. A reduced matrix or common reduction mottles are present above the permafrost in most profiles.

*4.e. Vegetation Narrative:* Spruce/spruce muskeg sedge open forest is the correlated Potential Natural Plant Community on this site.

*5.b. Wildlife Narrative:* (BLM)

*6. Community Dynamics (Fire, etc.):* Wild fire impacts on this site are complex and difficult to predict. In most instances, fire would kill the spruce trees and destroy much if not all of the woodland overstory. Following fires of moderate severity, sprouting from root crowns and other underground plant parts should initially produce scrub vegetation similar to the understory of the potential natural plant community. A severe burn, one in which the moss-organic layer was consumed to mineral soil, would allow for the establishment of pioneering lichens, mosses, and herbs on the soil surface. With the insulating moss-organic layer burned off, the soil temperatures would be expected to increase, resulting in melting of the permafrost and a drop in the water table. Site productivity should improve markedly at this point and then gradually decrease once again as the moss-organic layer re-establishes and thickens. Stand replacement will depend to a large degree on proximity of seed sources, the severity of burn, and suitability of the seed bed. In the boreal forest zone, repeated fires generally favors the establishment of *Picea mariana* over *Picea glauca*.

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

a. Upland:

172Xy104AK - Stream Terraces

b. Riparian or Wetland:

172Xy100AK - Loamy Flood Plains

172Xy101AK - Loamy High Flood Plains

172Xy102AK - Loamy High Flood Plains, Frozen

172Xy105AK - Terraces, Wet

172Xy501AK - Wet Depressions

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

172Xy104AK - Stream Terraces: slightly elevated ridges and other microsites on similar stream terrace positions or areas burned by wild fire in the not to distant past; well drained soils without permafrost; Spruce/shrub birch woodland vegetative potential with Spruce/lichen woodland present in many places.

172Xy105AK - Terraces, Wet: slightly lower and concave microsites on similar stream terrace positions; hummocky micro-topography; very poorly drained soils with very shallow permafrost and a perched water table often within the surface organic mat; Black spruce/closed sheath cottongrass woodland 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 Progression*

(1) *Aggradation:* Based on observations and data collected in the Gulkana River area, this site is the end point of flood plain-stream terrace site progression and vegetation succession. As the terrace is elevated above the level of flooding by down-cutting of the channel and sediment accretion, this site develops from 172Xy101AK - Loamy High Flood Plains and 172Xy102AK - Loamy High Flood Plains, Frozen. As the surface moss layer and organic mat continues to develop and permafrost rises within the soil profile, the original *Picea glauca* stand dies-off and is replaced by less productive *P. glauca* and *P. mariana*. The understory changes from *Salix* spp. dominance on site 172Xy101AK or *Alnus tenuifolia* on site 172Xy102AK to dominance by *Betula glandulosa*, various ericaceous shrubs, and feathermosses. Apparently, *Carex lugens* becomes abundant in the herb layer only in places that have remained undisturbed by wild fire for an extended period of time. Prior to this point, vegetation on this site consists primarily of Spruce/shrub birch woodland.

1.g. *Recreation and Natural Beauty:* Deteriorating stands of *Picea glauca* in the transitional zone between high flood plains and frozen 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

172Xy103AK - Stream Terraces, Frozen (103tech.doc)

Ecological Site: 172Xy103AK - Stream Terraces, Frozen

Cover type: Spruce/spruce muskeg sedge open forest

Seral status: PNC

Number of stands: 6

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
black spruce	T2	50	22	15	30	33
spruce	T2	33	13	10	15	20
black spruce	TX	17	30	30	30	22
spruce	TX	17	25	25	25	20
black spruce	T3	33	10	5	15	18
spruce	T3	17	5	5	5	9
Labrador-tea	SS	100	25	15	35	50
black crowberry	SS	83	3	1	4	15
blueberry willow	SS	50	8	3	15	20
bog blueberry	SS	100	14	10	20	38
bog rosemary	SS	17	1	1	1	3
gray willow	SS	17	7	7	7	11
grayleaf willow	SS	33	8	5	10	16
leatherleaf	SS	17	3	3	3	7
lowbush cranberry	SS	100	5	1	10	23
net vein willow	SS	33	5	1	10	13
red bearberry	SS	83	9	1	20	27
shrub birch	SS	100	28	8	60	53
shrubby cinquefoil	SS	67	2	1	4	10
small cranberry	SS	17	1	1	1	3
willow	SS	83	6	1	15	22
Labrador lousewort	F	33	1	1	1	4
alpine sweet-vetch	F	17	7	7	7	11
arctic aster	F	17	1	1	1	3
arctic dock	F	17	1	1	1	4
arctic sweet coltsfoot	F	100	3	1	5	18
cloudberry	F	50	7	1	15	19
dwarf scouring-rush	F	17	1	1	1	3
gentian	F	17	1	1	1	3
horsetail	F	67	1	1	3	9
marsh grass-of-parnassus	F	17	1	1	1	3
narrow-leaf saw-wort	F	17	1	1	1	4
northern blackberry	F	17	2	2	2	6
northern false asphodel	F	17	1	1	1	3
ragwort	F	17	1	1	1	3
serpent-grass	F	17	1	1	1	3
closed-sheath cottongrass	G	50	11	3	15	23
polar grass	G	100	3	1	10	17
rush	G	17	1	1	1	3
sedge	G	33	3	1	5	10
spruce-muskeg sedge	G	100	33	20	45	57
water sedge	G	50	8	2	20	20
Moss layer	M	100	60	30	80	77
Lichen layer	L	100	18	10	25	42
Bare soil	B	17	1	1	1	3
Litter and mulch	B	100	18	10	40	43
Surface water	B	50	5	1	15	16
Woody litter (>1" dia.)	B	83	3	1	5	16

Salix spp. includes: SABA3 SAPL2 SARI4

172Xy103AK - Stream Terraces, Frozen (103tech.doc)

Ecological Site: 172Xy103AK - Stream Terraces, Frozen

Cover type: Spruce/shrub birch woodland

Seral status: mid-late

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
black spruce	T2	56	20	10	30	33
spruce	T2	22	20	15	30	21
white spruce	T2	17	12	10	15	14
black spruce	T3	28	8	1	15	15
white spruce	T3	11	3	1	5	6
Labrador-tea	SS	100	24	3	60	49
black crowberry	SS	78	6	1	18	21
blueberry willow	SS	11	1	1	1	3
bog blueberry	SS	83	18	4	40	39
gray willow	SS	11	10	4	15	10
grayleaf willow	SS	22	8	5	10	13
lowbush cranberry	SS	94	10	2	30	31
prickly rose	SS	50	5	1	15	15
red bearberry	SS	33	3	1	6	10
russet buffalo-berry	SS	11	3	2	3	5
shrub birch	SS	83	16	2	50	37
shrubby cinquefoil	SS	11	1	1	1	2
thinleaf alder	SS	17	8	1	20	12
willow	SS	78	7	2	25	23
Canadian bunchberry	F	11	2	1	3	5
alpine sweet-vetch	F	11	1	1	1	2
arctic sweet coltsfoot	F	94	5	1	15	21
cloudberry	F	61	2	1	5	11
common fireweed	F	11	1	1	1	3
horsetail	F	28	4	1	8	11
northern blackberry	F	17	5	2	7	9
tall bluebells	F	11	3	1	5	6
bluejoint reedgrass	G	17	5	1	10	9
closed-sheath cottongrass	G	22	7	2	10	12
cottongrass	G	28	2	1	5	8
polar grass	G	78	6	1	35	21
sedge	G	28	3	1	10	8
spruce-muskeg sedge	G	17	3	1	6	7
Moss layer	M	100	59	30	80	77
Lichen layer	L	100	10	1	35	32
Bare soil	B	22	2	1	3	6
Litter and mulch	B	100	10	1	25	32
Surface water	B	33	2	1	5	7
Woody litter (>1" dia.)	B	61	3	1	10	14

Salix spp. includes: SABA3 SAPL2

Ecological Site: 172Xy103AK - Stream Terraces, Frozen

Cover type: Low shrub birch scrub

Seral status: early-mid

Number of stands: 6

Source of data: Gulkana River Area

Key: Con = % constancy; Avg = average % canopy cover;

Min = minimum % canopy cover; Max = maximum %

canopy cover; Imp = importance value

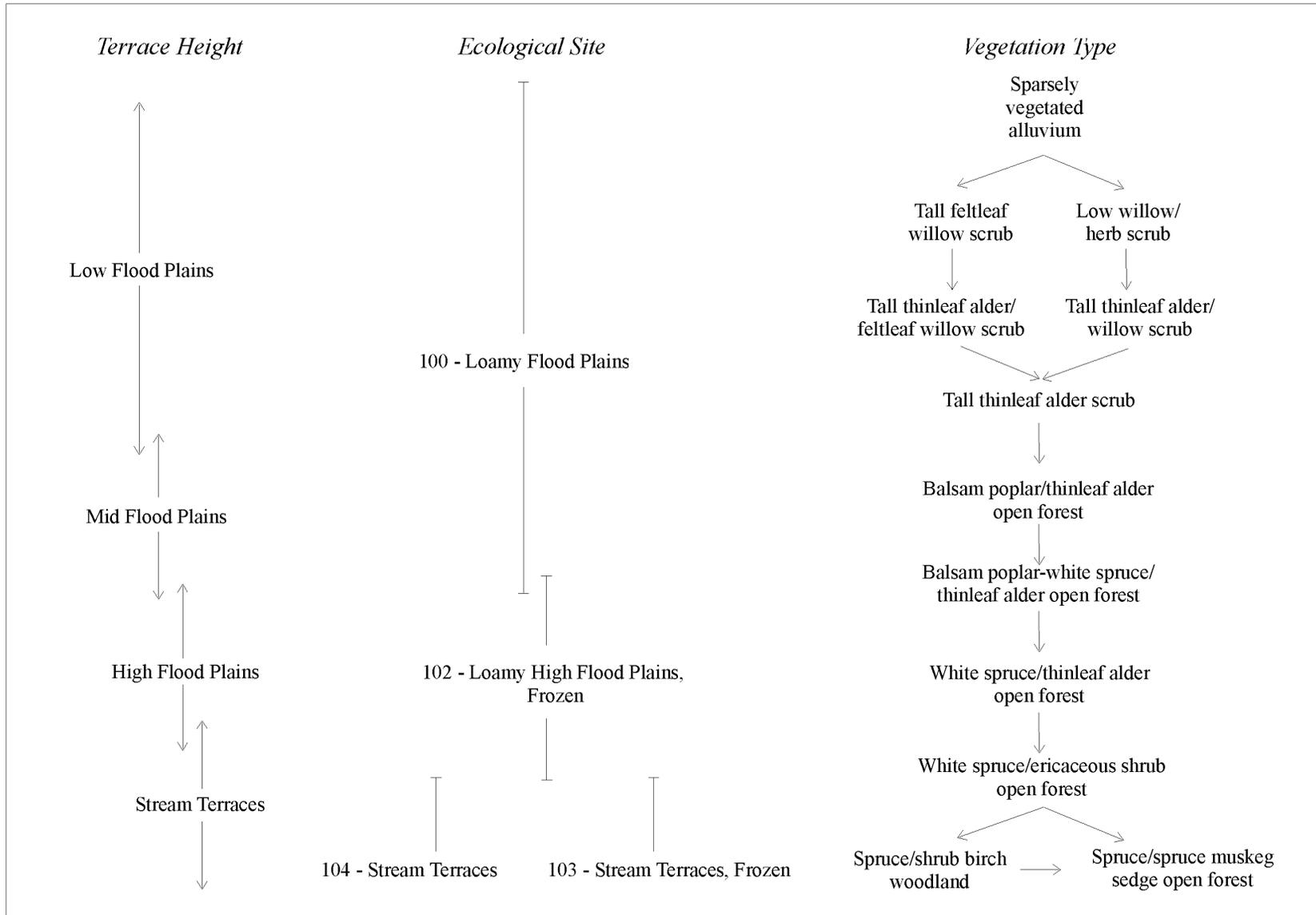
Note: Avg, Min, and Max based only on stands in which a

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	33	4	2	5	11
black spruce	T2	33	8	5	10	16
white spruce	T2	33	8	5	10	16
black spruce	T3	67	5	1	15	18
white spruce	T3	67	6	1	10	20
Beauverd spiraea	SS	17	1	1	1	3
Labrador-tea	SS	100	20	10	30	45
black crowberry	SS	83	5	2	10	20
blueberry willow	SS	50	9	6	15	21
bog blueberry	SS	100	24	10	35	49
bog rosemary	SS	17	2	2	2	6
gray willow	SS	17	4	4	4	8
grayleaf willow	SS	33	4	3	5	12
lowbush cranberry	SS	100	8	4	15	28
net vein willow	SS	17	1	1	1	3
prickly rose	SS	33	1	1	1	5
red bearberry	SS	50	7	4	10	19
shrub birch	SS	100	35	6	75	59
shrubby cinquefoil	SS	33	6	1	10	14
thinleaf alder	SS	17	4	4	4	8
willow	SS	67	4	1	5	16
arctic sweet coltsfoot	F	67	4	1	10	17
cloudberry	F	67	5	1	10	19
felwort	F	33	2	2	2	8
horsetail	F	33	18	1	35	24
ragwort	F	17	1	1	1	3
bluejoint reedgrass	G	17	3	3	3	7
closed-sheath cottongrass	G	17	1	1	1	3
cottongrass	G	17	4	4	4	8
polar grass	G	67	3	1	5	13
sedge	G	17	7	7	7	11
spruce-muskeg sedge	G	67	33	15	70	47
tall cottongrass	G	17	2	2	2	6
Moss layer	M	100	49	20	70	70
Lichen layer	L	100	23	1	70	48
Litter and mulch	B	100	18	4	35	43
Woody litter (>1" dia.)	B	100	2	1	6	16

Salix spp. includes: SABA3 SAPL2



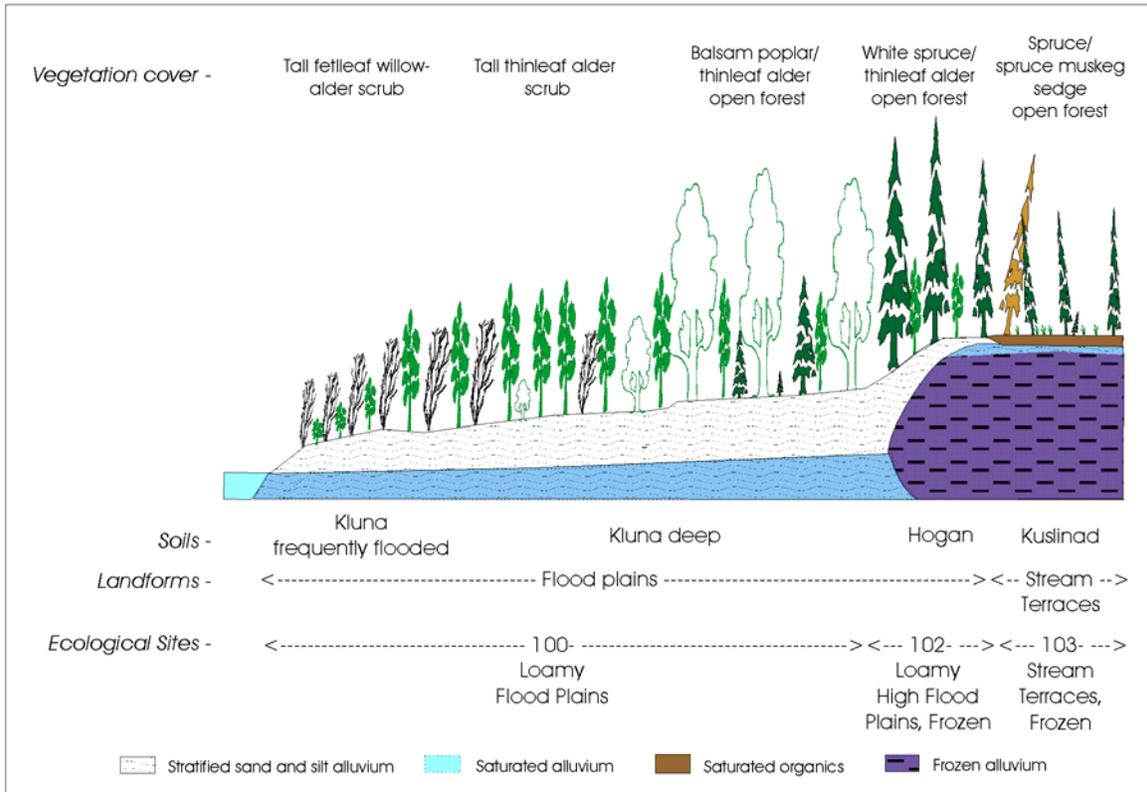
General relationships between terrace height, ecological sites, and vegetation types in the alder zone, Gulkana River Area, Alaska.

172Xy103AK - Stream Terraces, Frozen (103tech.doc)

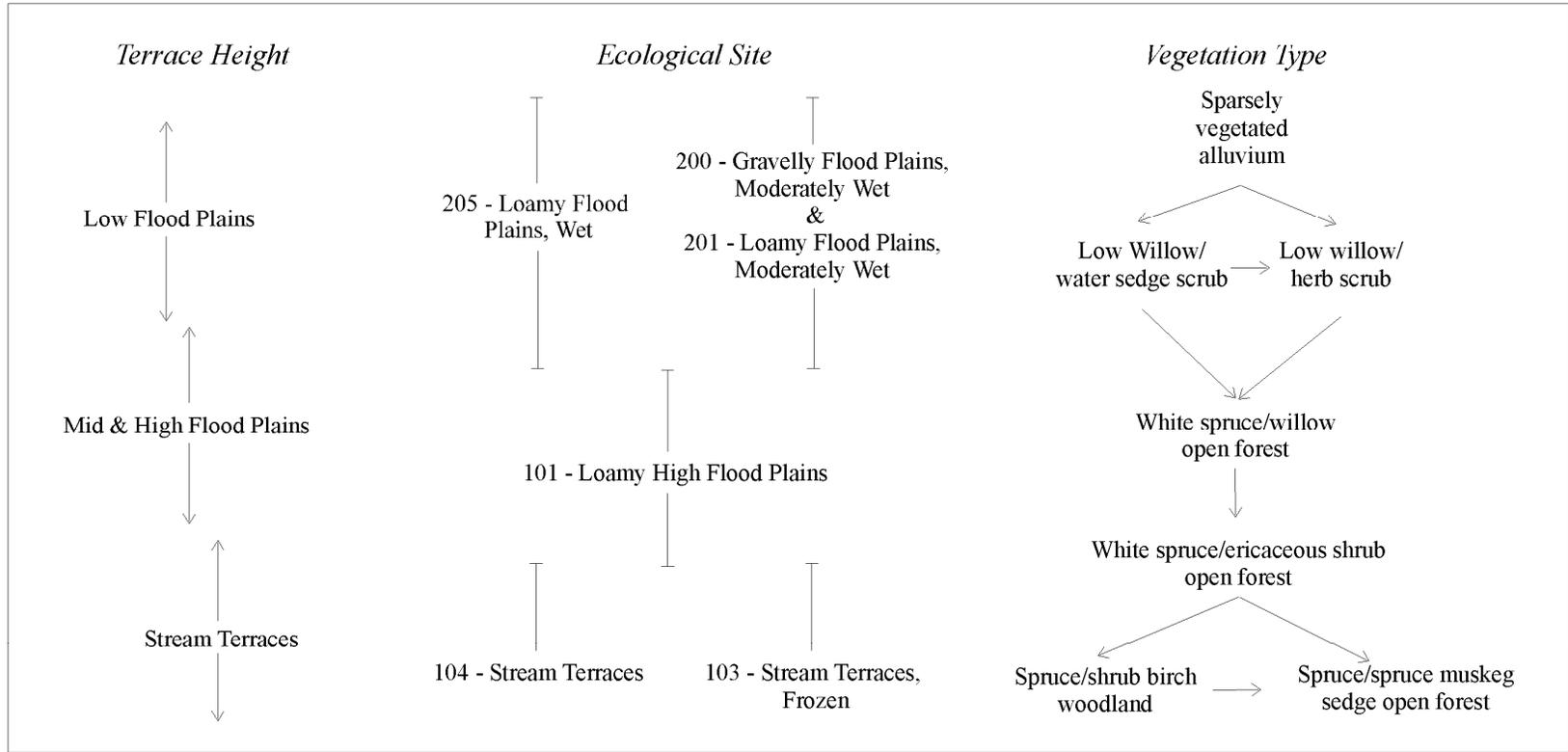
Selected physical properties for typical stages of site progression on flood plains and stream terraces in the alder zone, Gulkana River Area, Alaska.

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.



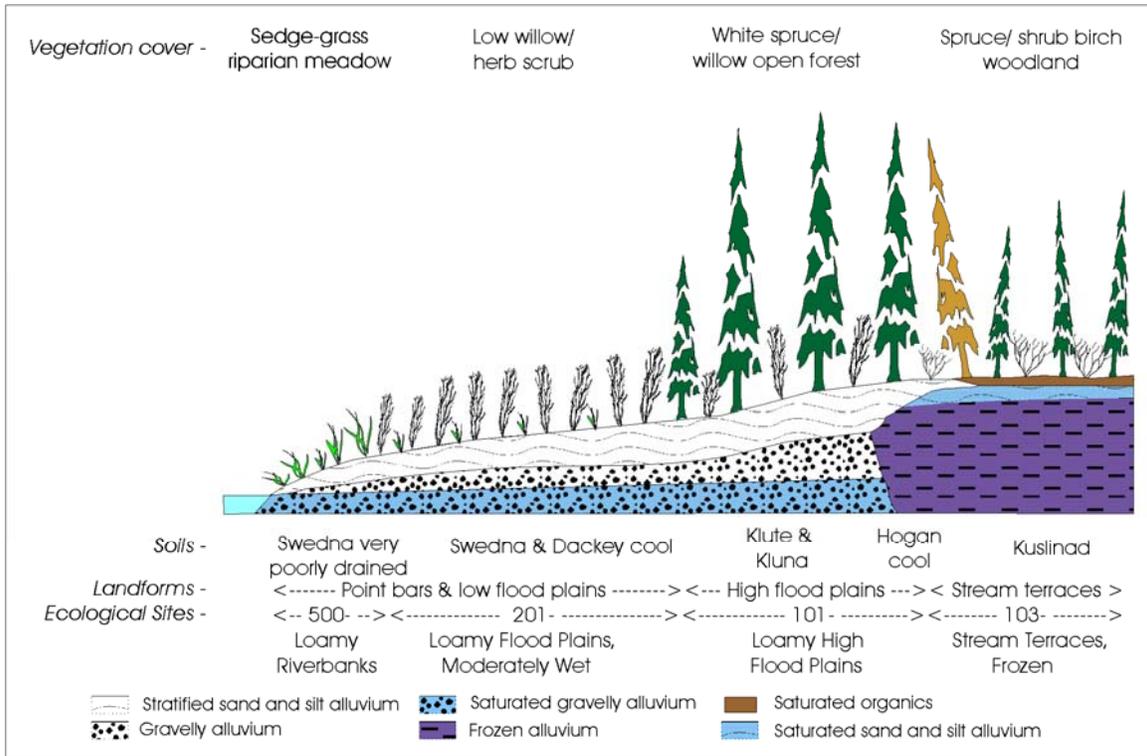
General relationships between terrace height, ecological sites, and vegetation types in the willow zone, Gulkana River Area, Alaska.

172Xy103AK - Stream Terraces, Frozen (103tech.doc)

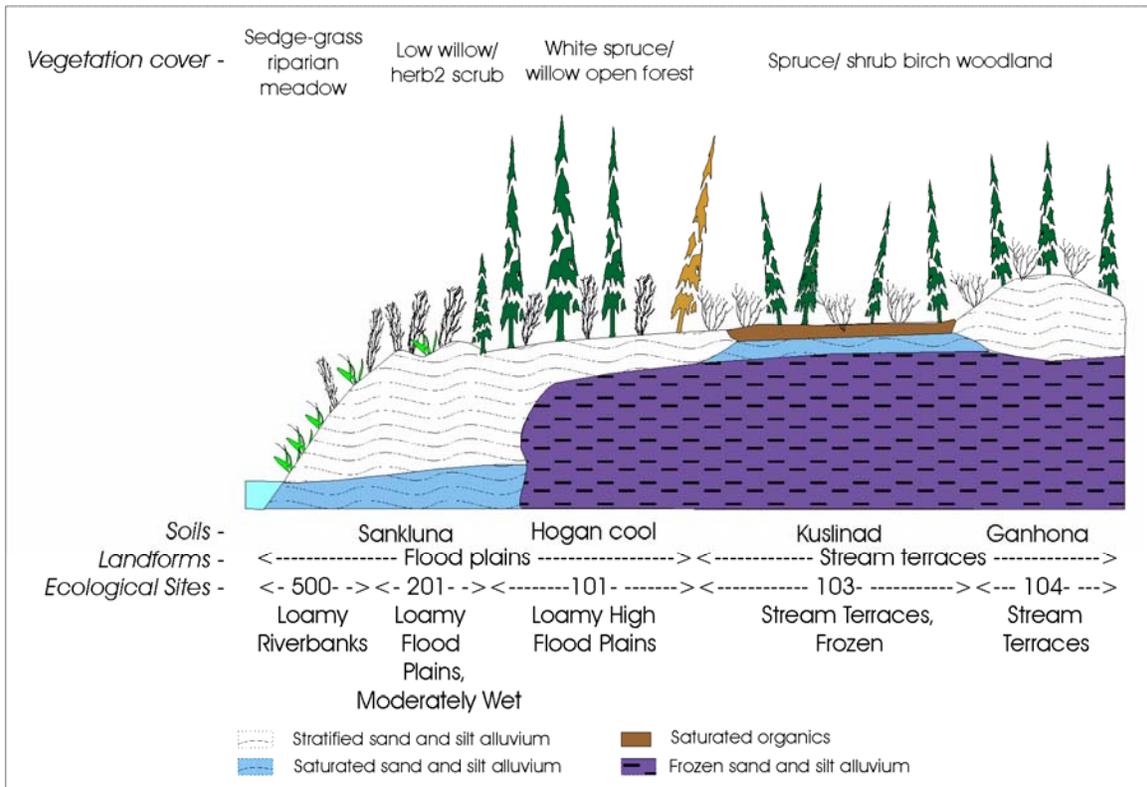
Selected physical properties for typical stages of site progression on flood plains and stream terraces in the willow zone, Gulkana River Area, Alaska.

Ecological Site (stage)	Cover Type(s)	Terrace Height 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"	Depth when <60" avg(rge)
		-- ft --		-- in --	-- in --	-- % --	-- in --	-- % --	-- 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.