Riparian Concepts

- ESD’s and Riparian Complex concepts
- Similarities and perplexing difficulties
- Riparian vegetation and stream channel pattern, dimension and profile
- Stream channels and water tables
- Water table and vegetation

Ecological Site Description

A distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.

Riparian Complex

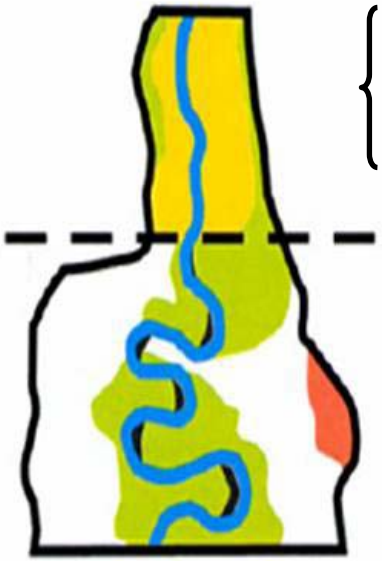
- **A unit of land with a unique set of biotic and abiotic factors (Winward 2000)….***that differs from other kinds of land in its ability to produce a distinctive riparian complex defined by distinctive riparian community types.*

- Factors: geomorphology, substrate characteristics, stream gradient and associated water flow features and general vegetation patterns (Winward 2000)

- Riparian complex describes the full width of the riparian area across a particular portion of a valley.


Complex A
Complex B

Riparian Complex: Illustrated

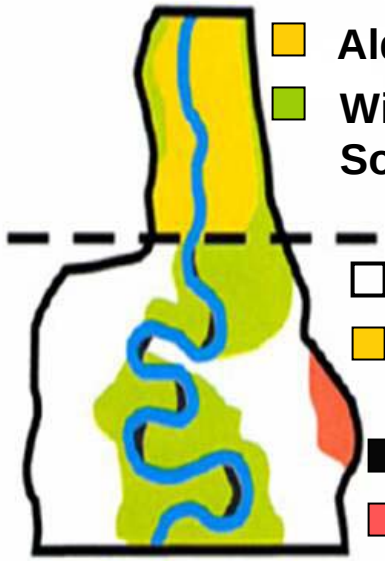


Complex 1

Alder / Dogwood
Narrow Valley
Steep Gradient

Complex 2

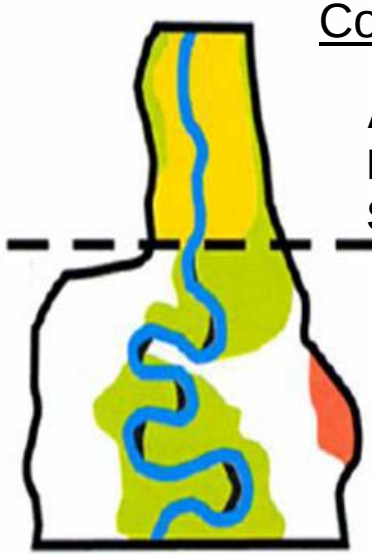
Tufted Hairgrass
Wide Valley
Low Gradient



Composition

- **Alder/Dogwood 85%**
- **Willow & Soloman Seal 15%**
- **Hairgrass 50%**
- **Willow/Soloman Seal 40%**
- **Water sedge 4%**
- **Silver sage 6%**

Winward 2000



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Wide Valley
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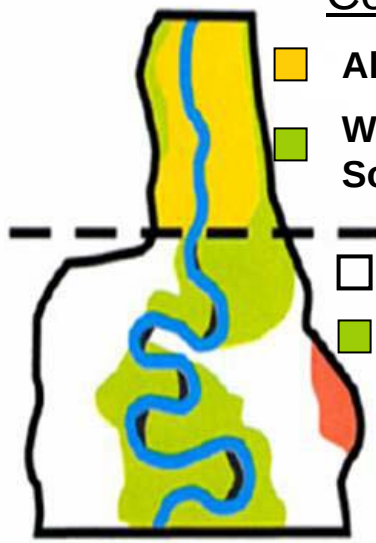
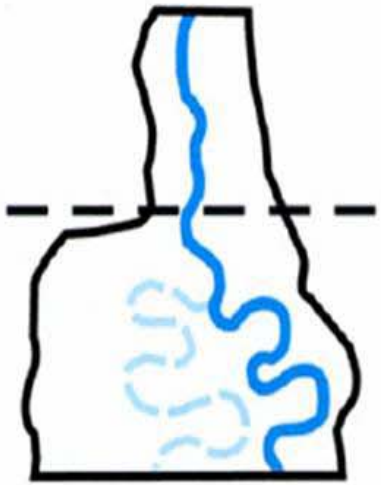


Composition

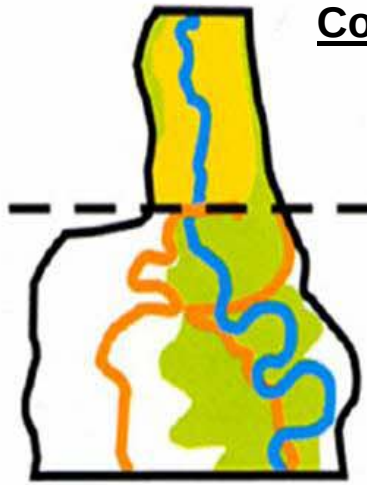
- **Alder Dogwood 85%**
- **Willow & Solomon Seal 15%**
- **Hairgrass 50%**
- **Willow/Solomon Seal 40%**
- **Water sedge 4%**
- **Silver sage 6%**

Channel Change



- **Abandoned Channel**
- **Current Channel**

Willow / Solomon Seal Community Type



- **Old Boundary**
- **New Location**

Winward 2000

“Perplexing Difficulties”

- Mosaic pattern of community types (CT) within the riparian complex
- Riparian complex’s most often have 6 to 12 CTs
- Distribution is tied to the soils or more likely the water table features within the complex
- Water table is most often controlled by channel location and the dimension, pattern and profile of the channel

Process of Change

- Often continual process of change
- Broad valleys – channels move
- Stable plant communities *such as those found in uplands* can be short lived even under natural conditions

Process of Change cont.

- Long term, self-perpetuating plant communities on a specific area are more often achieved in armored settings where bedrock or large boulders / cobbles keep the stream intact (channel types: A & B)

Process of Change cont.

- Low gradient meadows may have stable enough environments for CT’s to reach a long-term balance with their environment (channel type: E)

Process of Change cont.

- Low gradient valleys MAY NOT exhibit long term stable plant communities do to frequent disturbances


Note: fresh sediment

Common Characteristics of Riparian Ecosystems

- Gradual movement or swapping of stands of CT's within a riparian complex
  - Channel movement
  - Meander cutoff
  - Low-gradient, broad valley's
  - Channel type C; sometimes E

Common Characteristics cont.

- CT’s gradually develop to fit the newly created environment caused through channel migration etc.
- CT’s suited to the original area also develop
- Normally ,all types were present in the complex – “drifted” to new locations

Wetland Vegetation Classification

- Plant species that have exhibited an ability to develop to maturity and reproduce in an environment where the soil within the root zone is periodically or continually saturated or inundated during the growing season.
- Stream types have different characteristic hydrologies that support different plant CT's

Wetland Status cont.

- Obligate species (OBL): a plant that occurs in wetlands 99% of the time.
- Facultative wetland species (FACW): found in wetlands 67 – 99 % of the time.
- Facultative species (FAC): equally likely to occur in wetlands as non-wetlands.
- Facultative upland species (FACU): ditto OBL for uplands

Vegetation Associated with Functional Stream Types

- General Rules
  - High gradient (> 2%) = woody riparian plants
  - Low gradient (< 2%) = herbaceous plants

Why would high gradient channels support a dominance of woody riparian plants?

Complex A = gradient > 2%, B-type channel. Vegetation = alder/cottonwood

Complex B = gradient < 2%, C-type channel. Vegetation = ???

Does complex B violate the general rule on vegetation and gradient?

What other factors influence vegetation within these riparian systems?

Vegetation Associated with Functional Stream Types

- Additional guidelines
  - Gradients between 1 – 2% often support a mix stand of riparian woody's and herbaceous vegetation
  - Typically C-type channels that naturally experience cutting of outside bends and deposition on point bars with common out-of-bank flows

Vegetation Associated with Functional Stream Types cont.

- Cottonwood, alder, birch and willow species require or at least regenerate best on disturbed or open ground.
- Require some level of aeration in the soil profile during periods of the growing season
- Soils with coarse materials such as sands or gravels are more likely to support woody vegetation

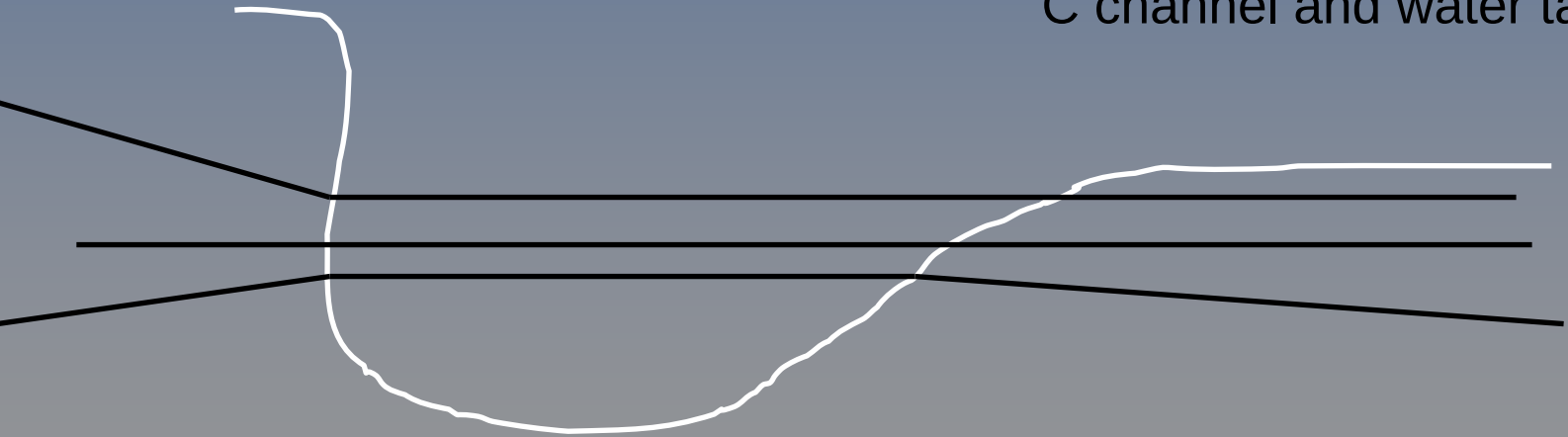
Vegetation Associated with Functional Stream Types cont.

- “Flat” channels (gradients < 1%) typically are finer sediment supporting obligate or facultative wetland plants
- E and C type channels

Channel type, water table, vegetation General Rules

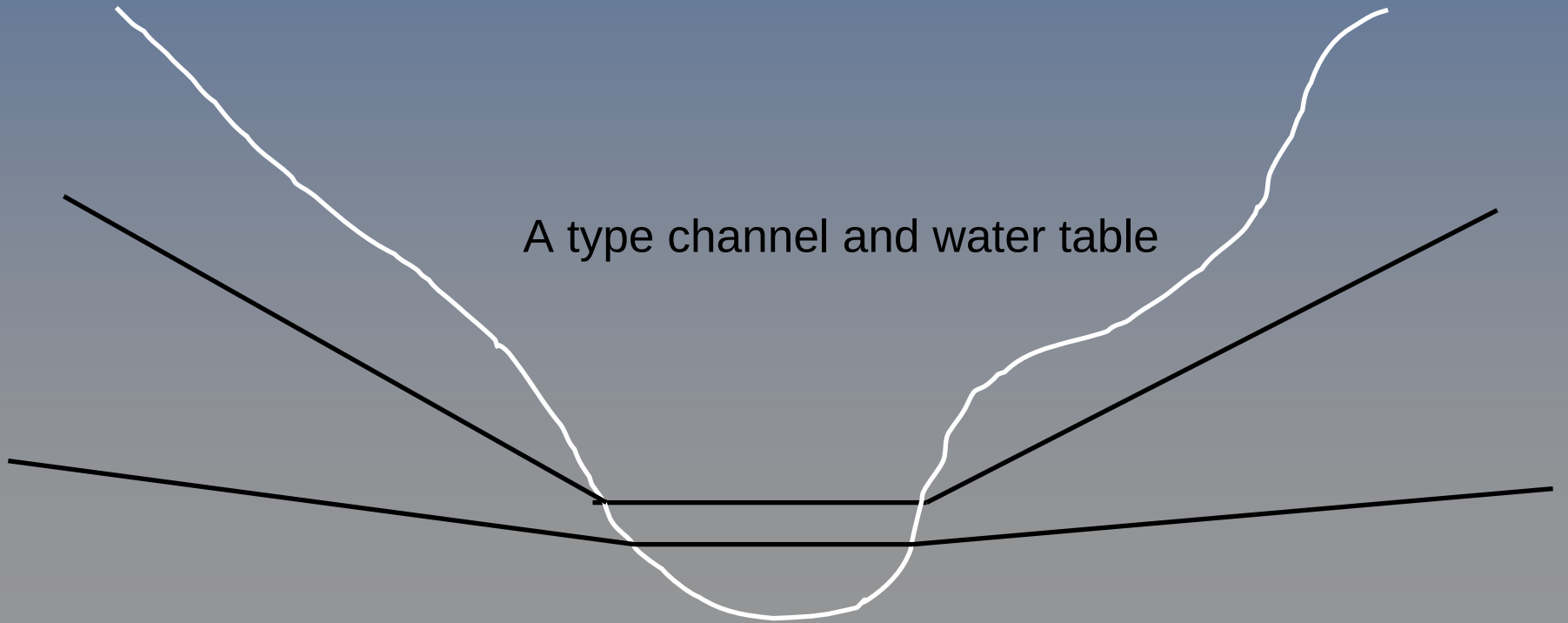
- E types = water table near or at surface during growing season; OBL and FACW
- C types = water table drops slightly through the growing season; OBL, FACW, and FAC
- B types = water table drops through growing season; OBL (rare), FACW, FAC and FACU (rare)
- A types = water table drops though out growing season: FACW, FAC, and FACU (rare)

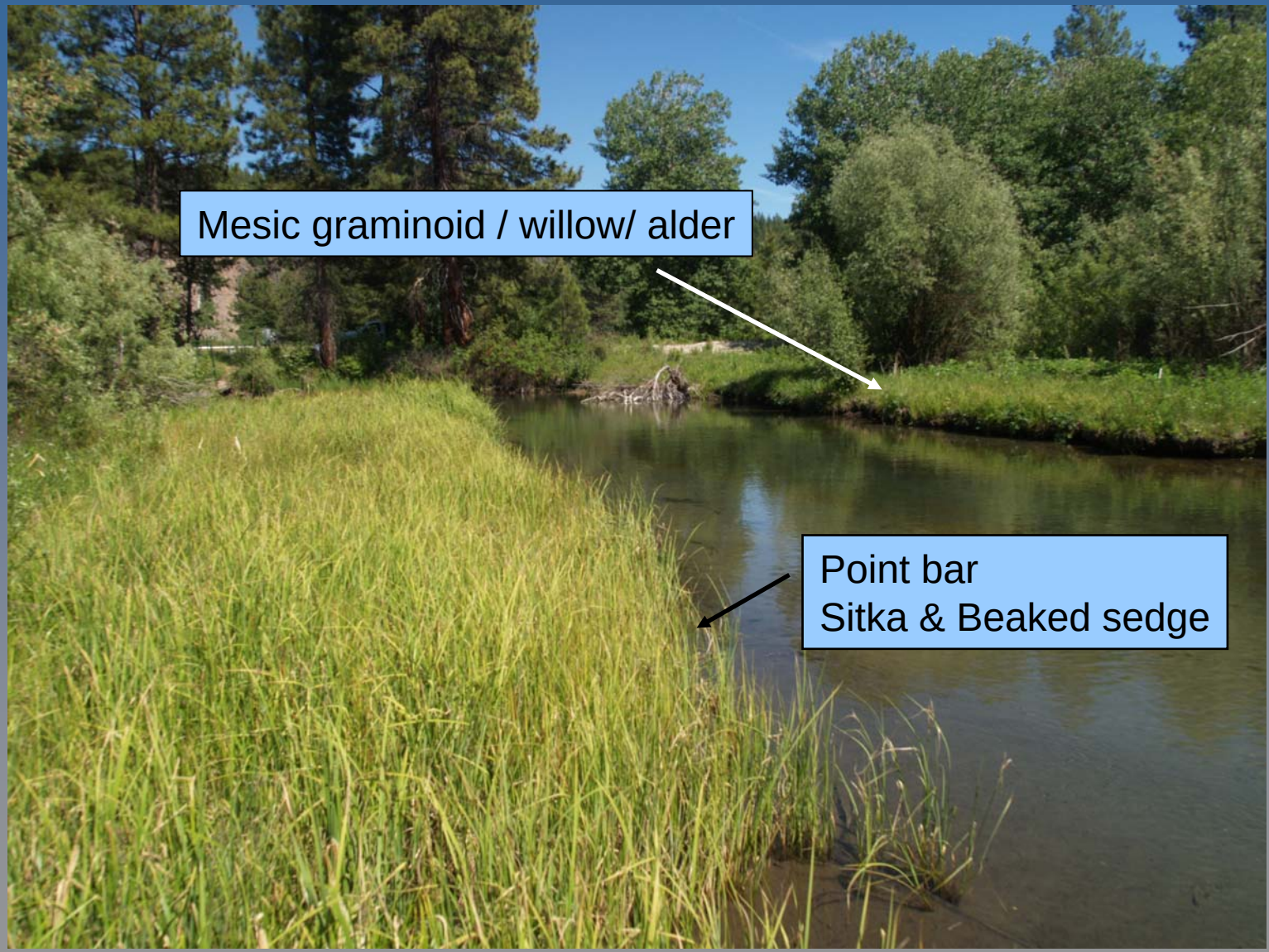
E channel and water table



C channel and water table


B type channel and water table


A type channel and water table



C type channel; gradient < 1%; point bars vegetating; mesic graminoid – Willow/alder type on opposite bank

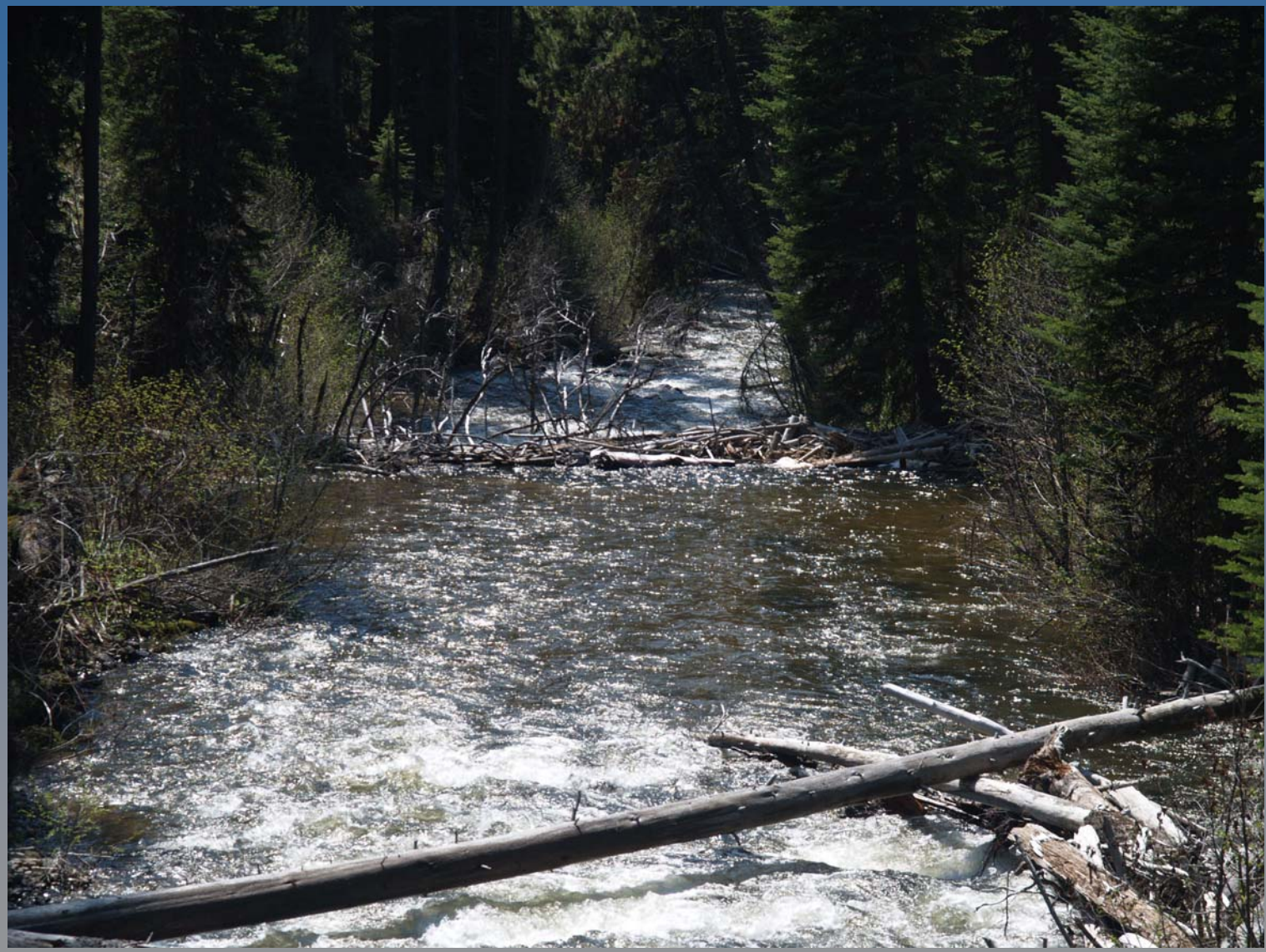
Soil sample taken from the sedge dominated area indicating potential for willow establishment IF water table lowers during growing season.

Surface: sandy loam
Note the dark colored subsurface coarse sands, starting at approximately 10 centimeters from the soil surface.

Profile indicates a young soil with on-going sedimentation.

E Channel with Sitka sedge as the dominant; Lemmon and Geyers willow present beyond bankfull.

E type channel dominated by Sitka sedge. No willows within the riparian Complex. Soil saturated to surface. Subsoil consists of layers of diatomaceous earth.



B type channel; gradient > 2%; bedrock / boulder controlled; large wood important to channel complexity; vegetation = alder / fir

Conclusions

- Steam type, water table, soil, climate and watershed hydrology determines vegetation
- Riparian complex concept incorporates channel type, soils, landform, climate and allows for multiple community types
- Community types may drift within the complex based on channel change
- CT’s more stable in A and B type channels