Spatial and Temporal Dynamics of Large Woody Debris in Streams of the Alberta Foothills

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TREE RING LAB *at* UBC

foothills RESEARCH INSTITUTE
research growing into practice.

What is LARGE woody debris (LWD) and why is it important?

Accumulated dead wood in streams

What is LARGE woody debris (LWD) and why is it important?

Creates structure

What is LARGE woody debris (LWD) and why is it important?

Dissipates stream energy

What is LARGE woody debris (LWD) and why is it important?

Bank stability and sediment storage

Why are spatial and temporal variation in LWD important for streams?

LWD function depends on position relative to stream channel

LWD function changes over time

Research Questions

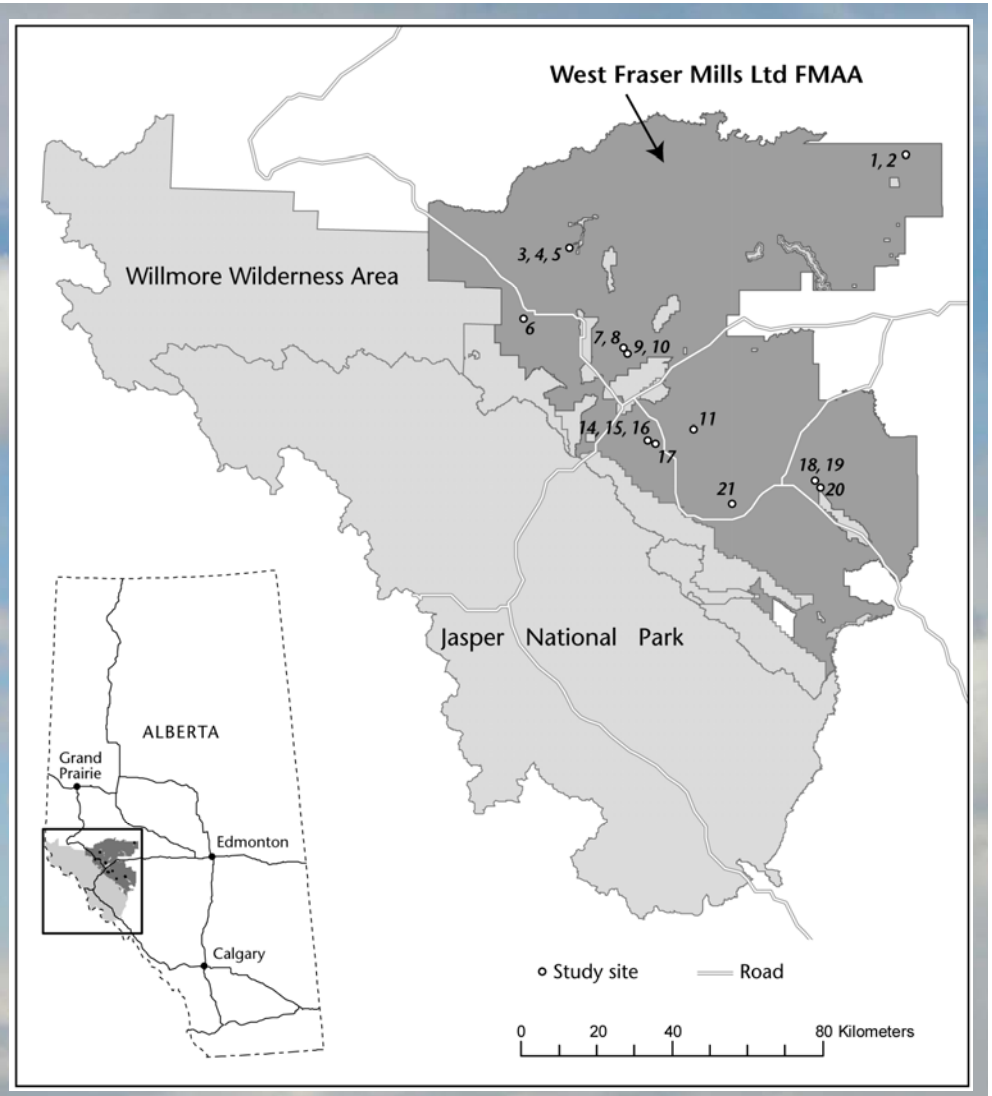
- How much LWD is in foothills streams?
- As LWD decays, how does function change?
- What dynamic processes affect LWD?
- How does disturbance affect LWD dynamics?
- How does terrestrial coarsewood differ from in-stream LWD?




Methods

- Surveys of stream reaches for abundance and function of in-stream LWD
- Surveys of riparian and upland forests for abundance of snags and logs
- Tree-ring reconstructions of forest dynamics and years of tree death
- Integration of tree-ring outcomes with HWP long-term permanent plot data

- **21 headwater streams**
- **width <3.5m, no transport**
- **mature riparian forests**




Large Woody Debris Position Classes:
Bridge
Partial Bridge
Loose
Buried
Bridge
Loose
Partial Bridge
Photo: Rich McCleary

Large Woody Debris Position Classes:

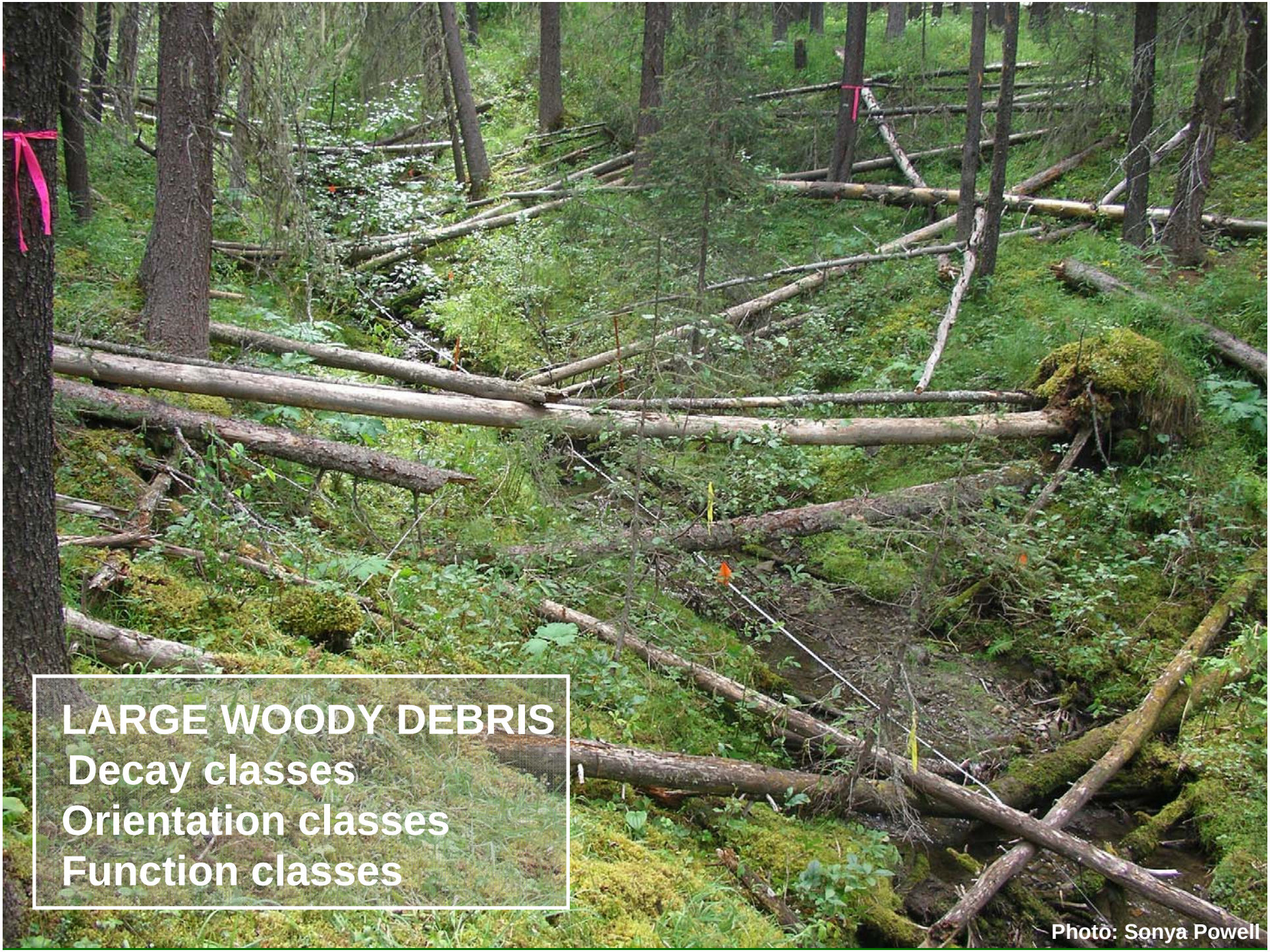
Bridge

Partial Bridge

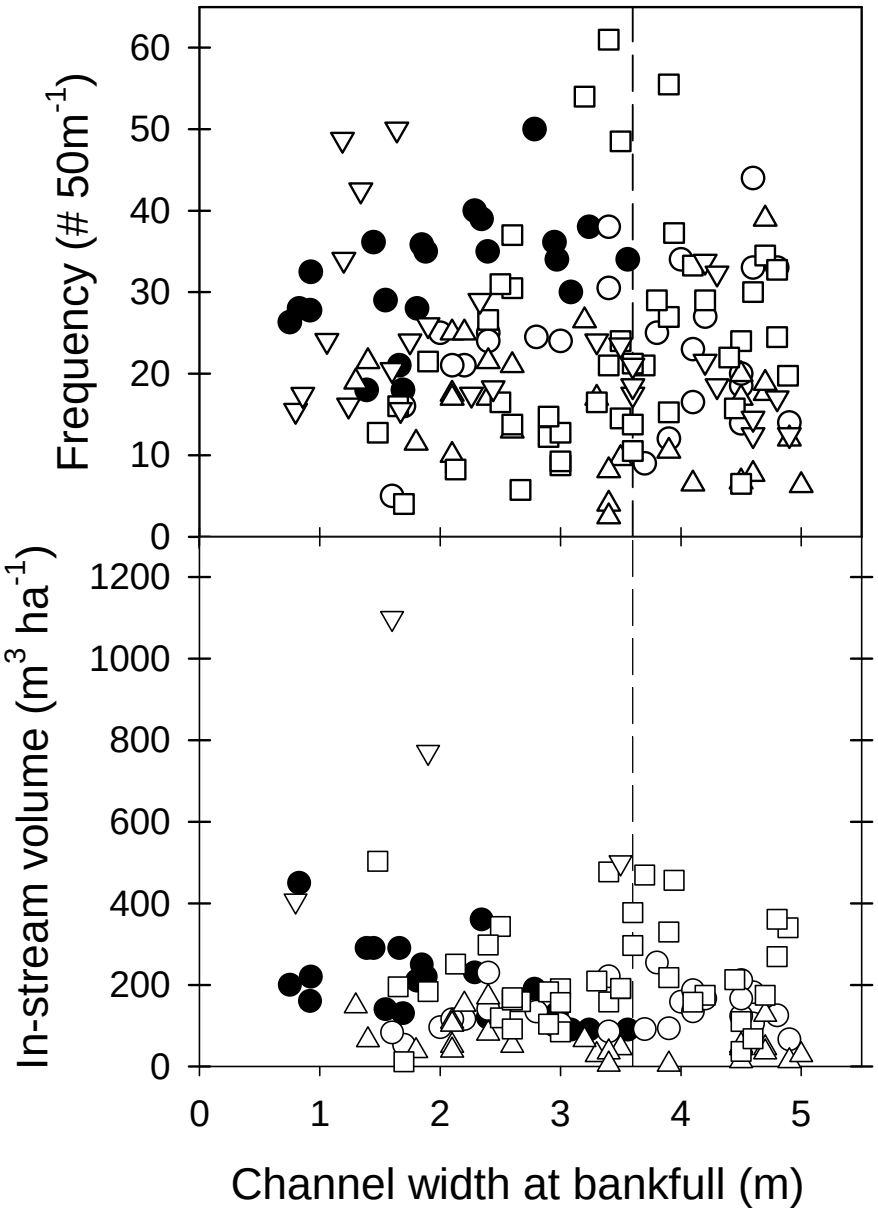
Loose

Buried

Photos: Rich McCleary


LARGE WOODY DEBRIS
Decay classes
Orientation classes
Function classes
Photo: Sonya Powell

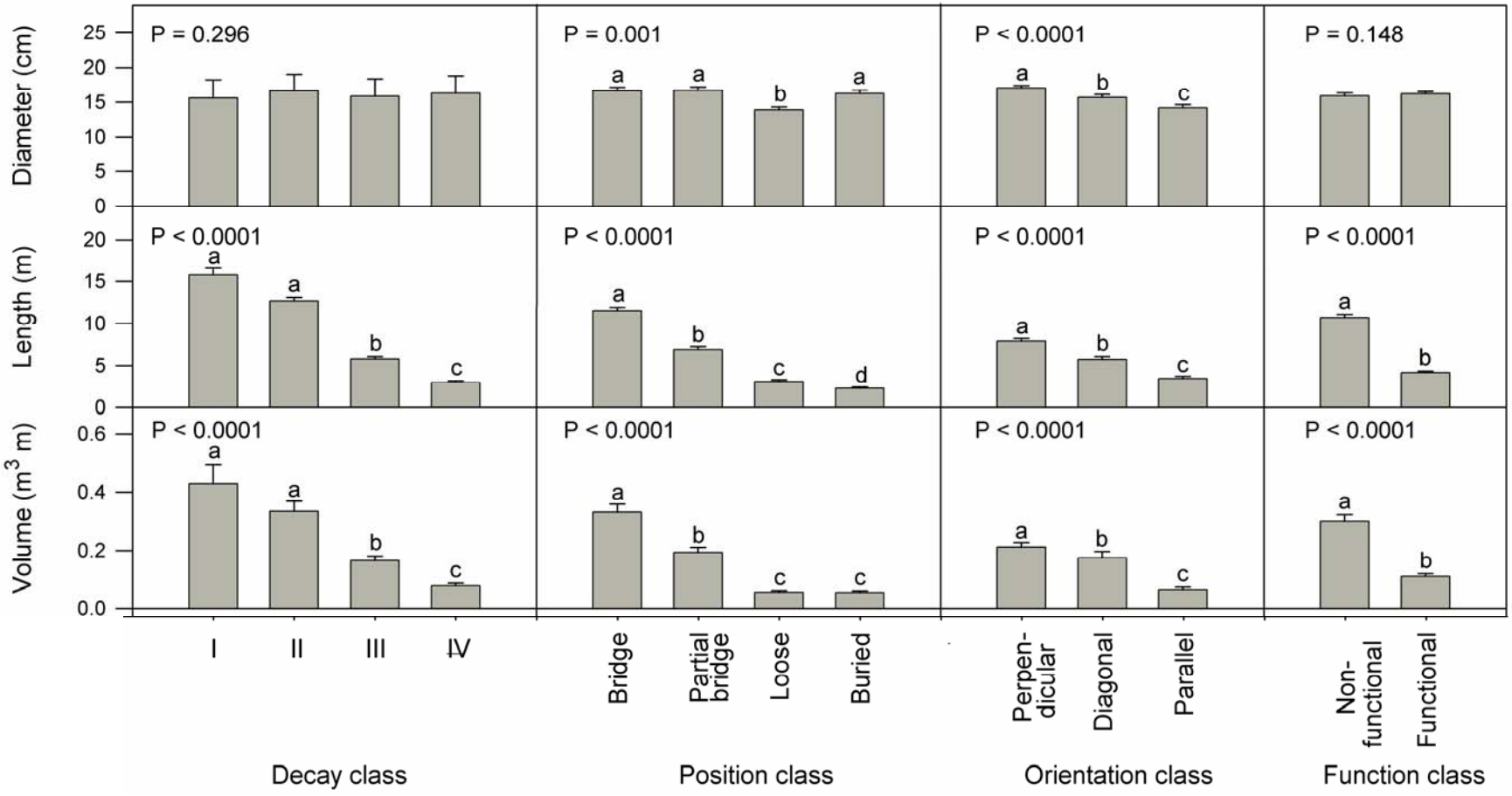
Photos: Trevor Jones

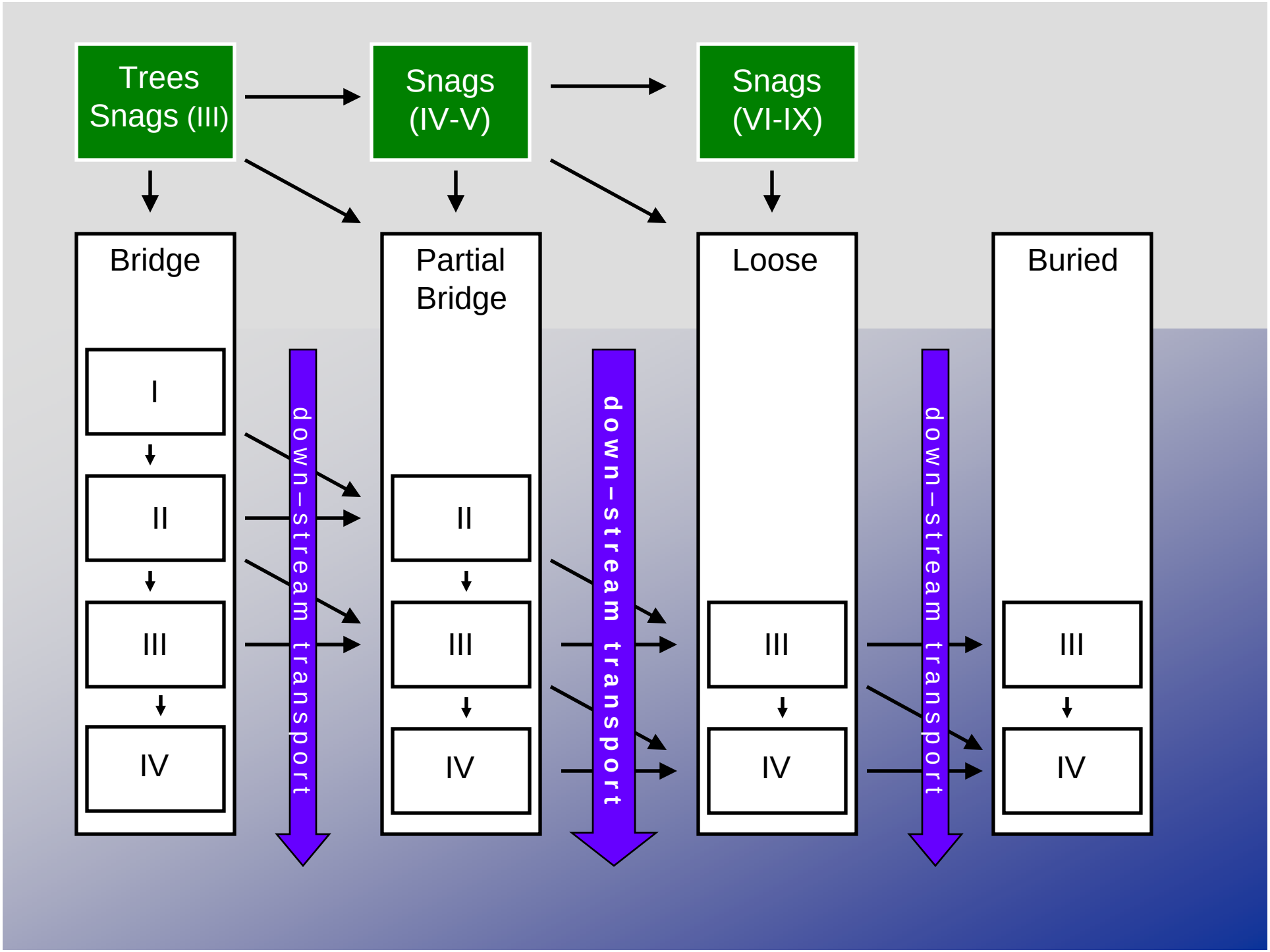


Mean frequency:
32±1.7 LWD 50 m^{-1}

Mean volume:
202±21 m^3 ha^{-1}

- Alberta foothills
- Mountain
- Boreal
- Mixed broadleaf
- Coastal


Diameter (cm)
Length (m)
Volume (m3 m)
P = 0.296
P = 0.001
P < 0.0001
P = 0.148
P < 0.0001
P < 0.0001
P < 0.0001
P < 0.0001
P < 0.0001
P < 0.0001
P < 0.0001
P < 0.0001
I
II
III
IV
Bridge
Partial bridge
Loose
Buried
Perpen-dicular
Diagonal
Parallel
Non-functional
Functional
Decay class
Position class
Orientation class
Function class


Trees
Snags (III)
Snags
(IV-V)
Snags
(VI-IX)
Bridge
Partial
Bridge
Loose
Buried
I
II
III
IV
II
III
IV
III
IV
III
IV
down-stream transport
down-stream transport
down-stream transport

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