

NOTES: Trees, or large woody debris (LWD), are placed on the floodplain where historic logging has impacted the natural hydrologic processes. By doing so, roughness is added to the floodplain which acts to dissipate energy during high flows. Additionally, floodplain LWD facilitates the regeneration of conifers. Floodplain roughness is typically added in conjunction with other LWD structures that are placed in the stream channel.

Tongass National Forest- Craig and Thorne Bay Ranger Districts

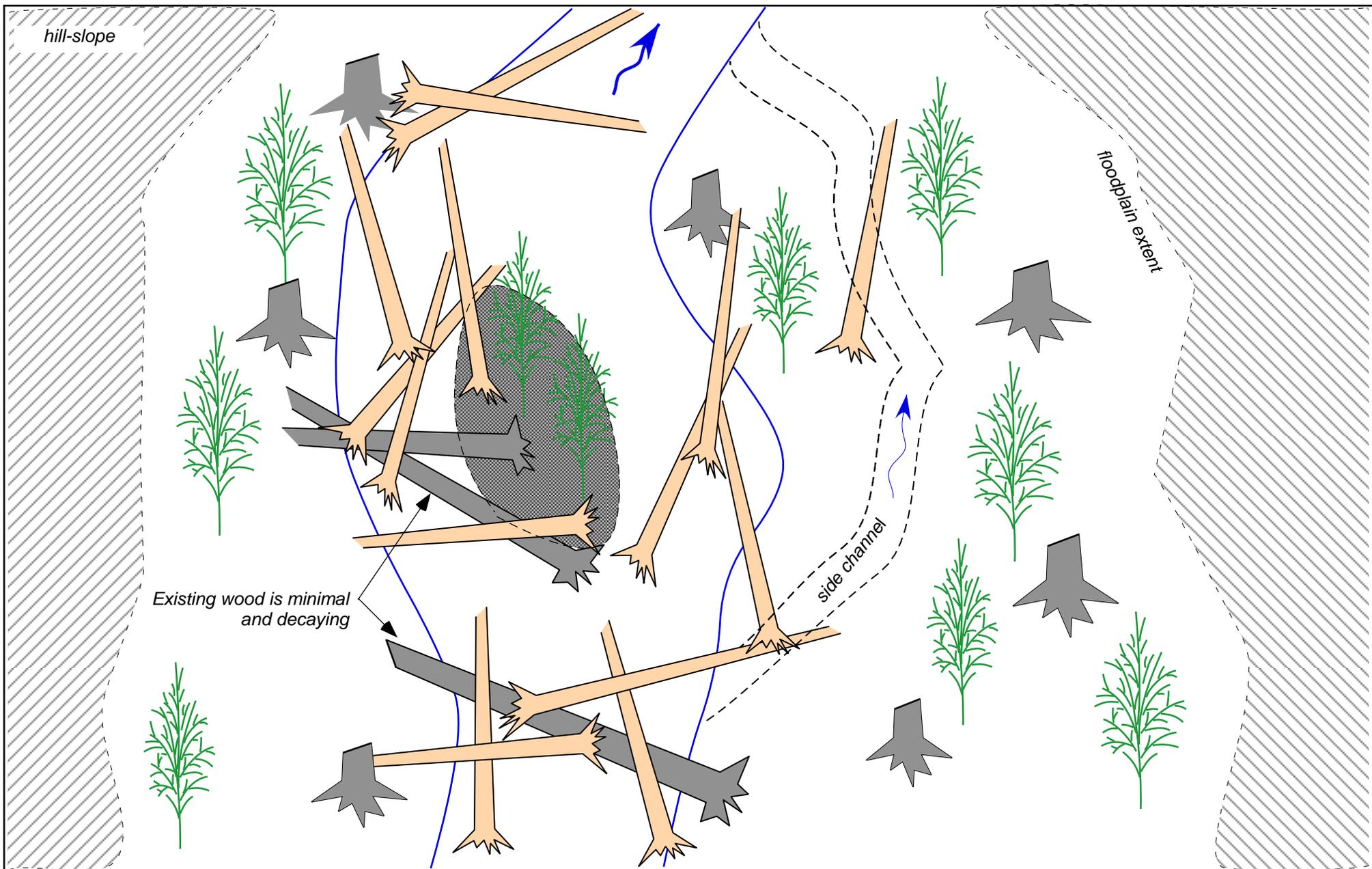
DESIGN TYPICAL- draft

STRUCTURE: **Floodplain Roughness (birds-eye view)**

DRAWN BY: Helen Sladek

DATE: April, 2019

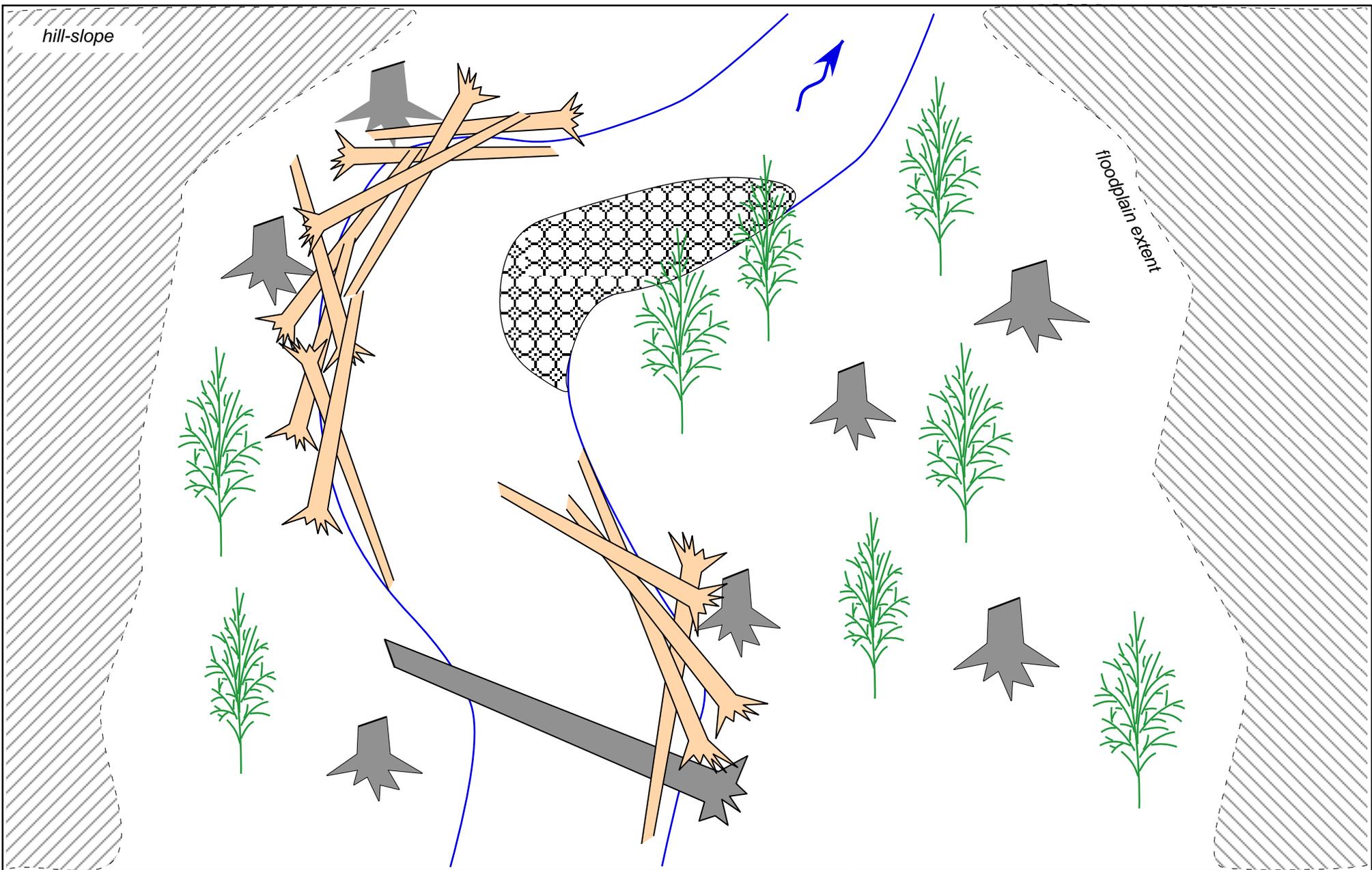
PROJECT: POWLLA, First Offering



Existing wood is minimal and decaying

NOTES: Trees, or large woody debris (LWD), are added to the stream channel where natural recruitment of wood into the channel has been impacted by historic management practices. By doing so, roughness is added in the channel which restores the natural hydrologic processes that develop a diverse aquatic habitat. LWD is not necessarily placed strategically, instead it is used to strengthen existing wood structures, provide LWD to sections of stream totally depleted of wood, or to provide LWD where it is anticipated it would mobilize, and “rack-up” downstream as a log jam.

Tongass National Forest- Craig and Thorne Bay Ranger Districts
 DESIGN TYPICAL- draft
 STRUCTURE: **Channel Roughness (birds-eye view)**
 DRAWN BY: Helen Sladek
 DATE: April, 2019
 PROJECT: POWLLA, First Offering



NOTES: Trees, or large woody debris (LWD), are placed along the stream bank provide roughness in order to minimize excessive bank erosion or excessive channel migration. LWD is interwoven and crisscrossed in order to remain relatively stable. LWD is also stacked in order to ballast the structure.

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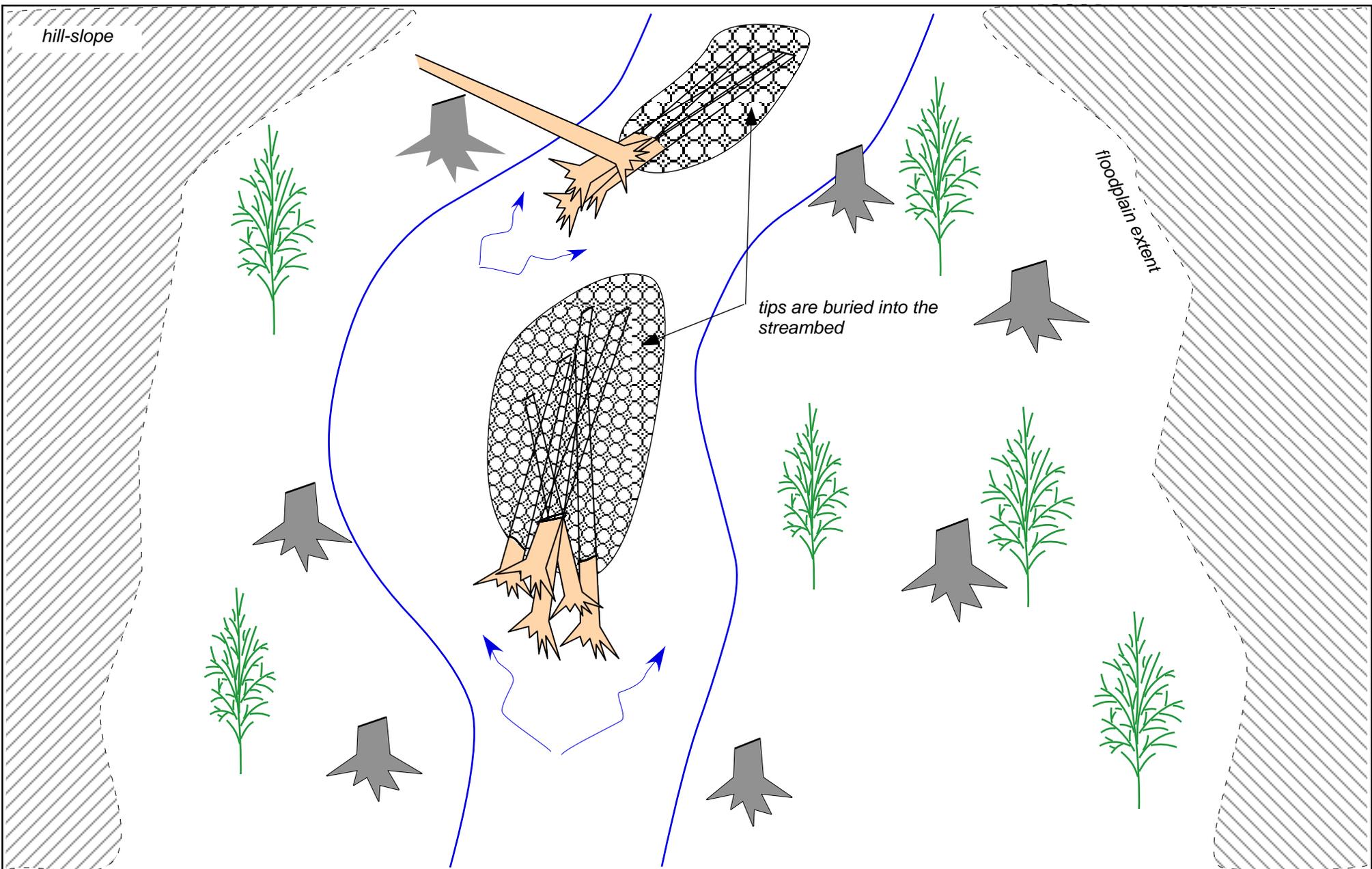
DESIGN TYPICAL- draft

STRUCTURE: **Streambank Roughness (birds-eye view)**

DRAWN BY: Helen Sladek

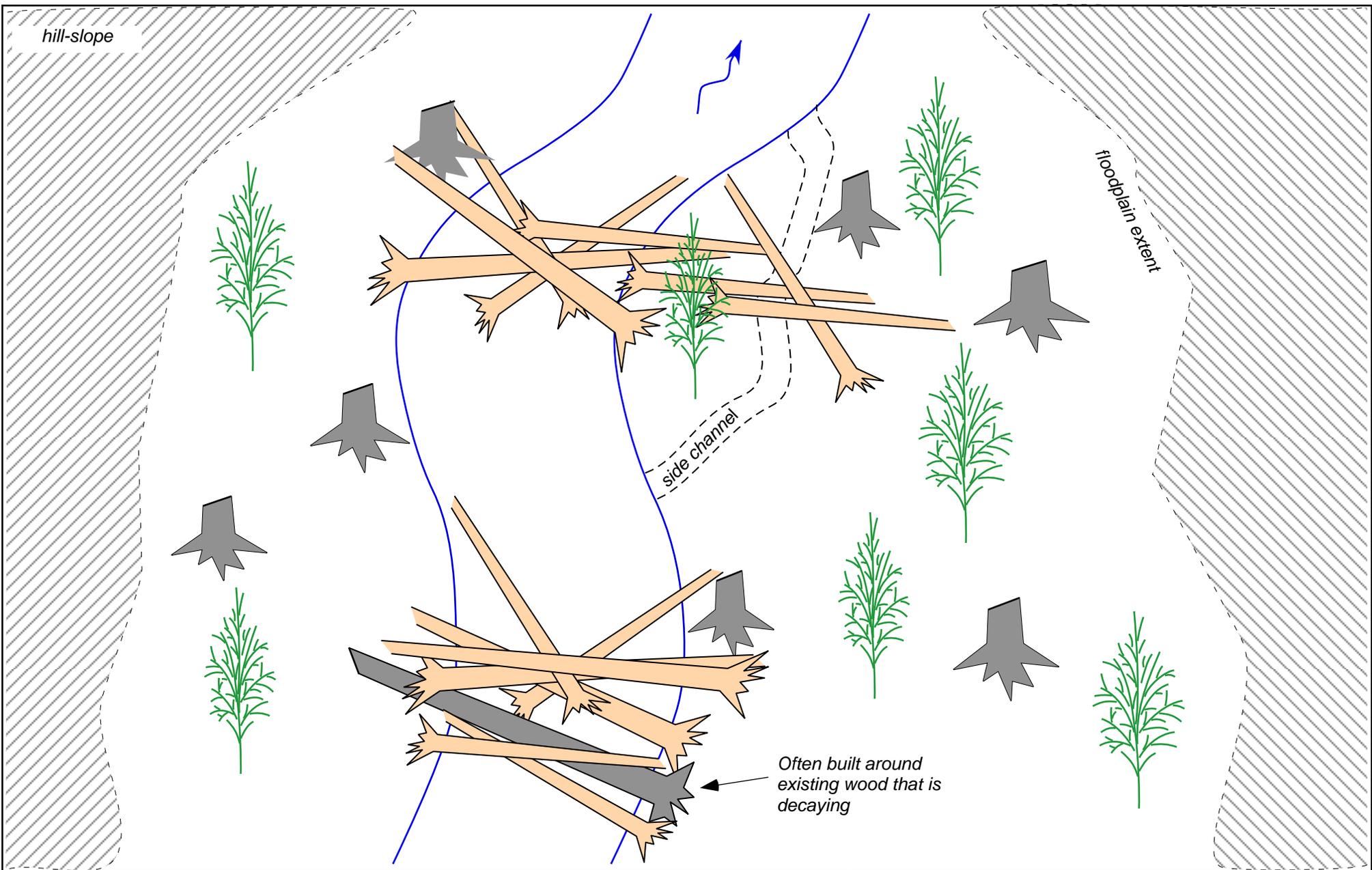
DATE: April, 2019

PROJECT: POWLLA, First Offering



NOTES: A mid-channel jam, or bar buddy, is built to deflect the stream into a split flow. Trees, or large woody debris (LWD), are stacked with the tips buried into the streambed to restore sediment retention processes in the channel. A gravel bar develops around the stems of the added LWD. In addition, sinuosity is increased slightly.

Tongass National Forest- Craig and Thorne Bay Ranger Districts
 DESIGN TYPICAL- draft
 STRUCTURE: **Mid-channel Jam "Bar Buddy"** (birds-eye view)
 DRAWN BY: Helen Sladek
 DATE: April, 2019
 PROJECT: POWLLA, First Offering



NOTES: Trees, or large woody debris (LWD), are intertwined and crisscrossed across the whole stream channel to rebuild to dissipate stream power and help aggrade the stream bed. The spanning jam is made to be porous while acting as a "trash-rack" where more LWD and can be accumulated. LWD may be partially buried into the banks with additional LWD stacked in order to ballast the structure.

Tongass National Forest- Craig and Thorne Bay Ranger Districts
 DESIGN TYPICAL- draft
 STRUCTURE: **Channel-spanning Log Jam (birds-eye view)**
 DRAWN BY: Helen Sladek
 DATE: April, 2019
 PROJECT: POWLLA, First Offering