

Leaky dams: influence on geomorphology, instream habitat and biodiversity

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Physical Habitat

Physical environment for biota

GEOMORPHOLOGY

- River bed shape
- Sediment size
- Channel width
- Gradient / slope

HYDROLOGY

- Water depth
- Water velocity
- Turbulence
- Bed shear stress



'Hydromorphology'

The diagram illustrates the synthesis of geomorphology and hydrology into hydromorphology. Two pink arrows originate from the 'Gradient / slope' bullet point under Geomorphology and the 'Bed shear stress' bullet point under Hydrology, pointing diagonally downwards and inwards to the term 'Hydromorphology'.

Naturally variable in space, and over time

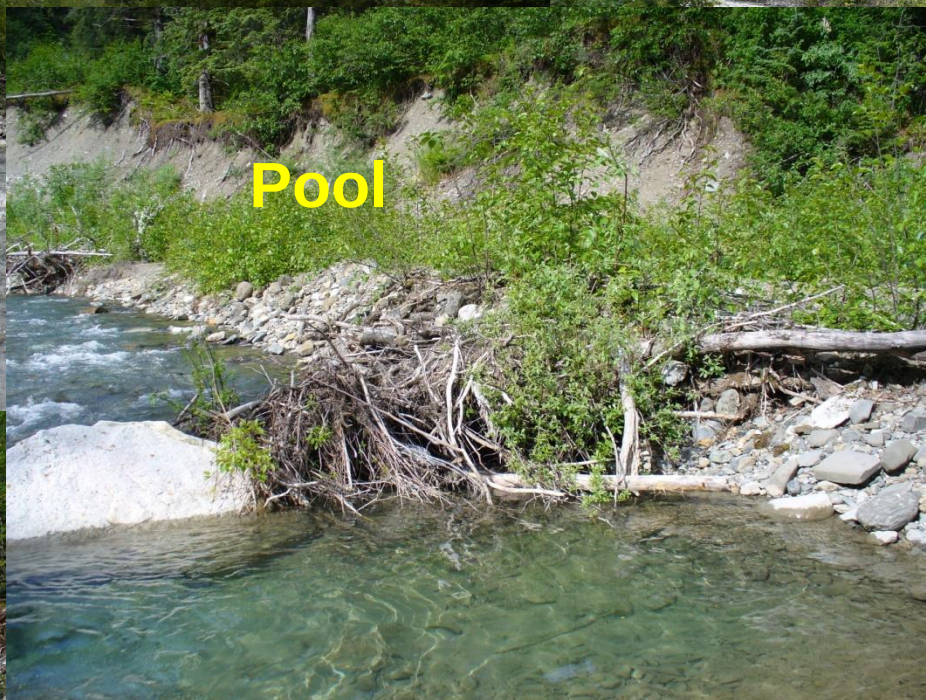
Channel Geomorphic Units (CGUs)

- Areas of homogenous sediment and flow characteristics
- Represent instream habitat
- Identify and map hydromorphic environment
- Instream wood acts as a roughness element which influences CGU presence and characteristics

Riffle



Pool



Glide



Rapid

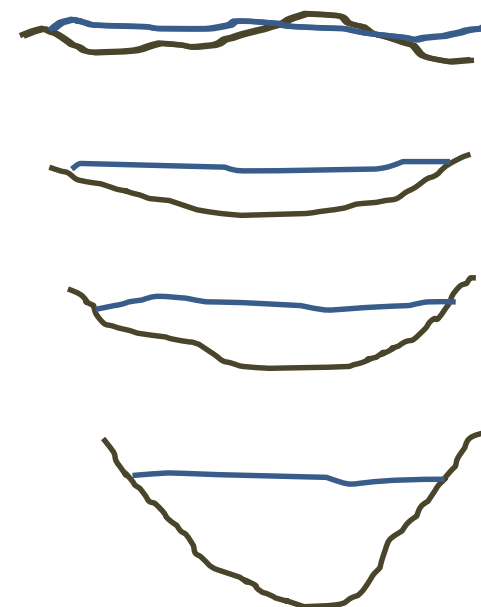


Run



Table 7.2: CGU Classification which utilises surface flow types and channel morphology to classify habitat units within the study streams, from Environment Agency River Habitat Survey Guidance Manual, 2003.

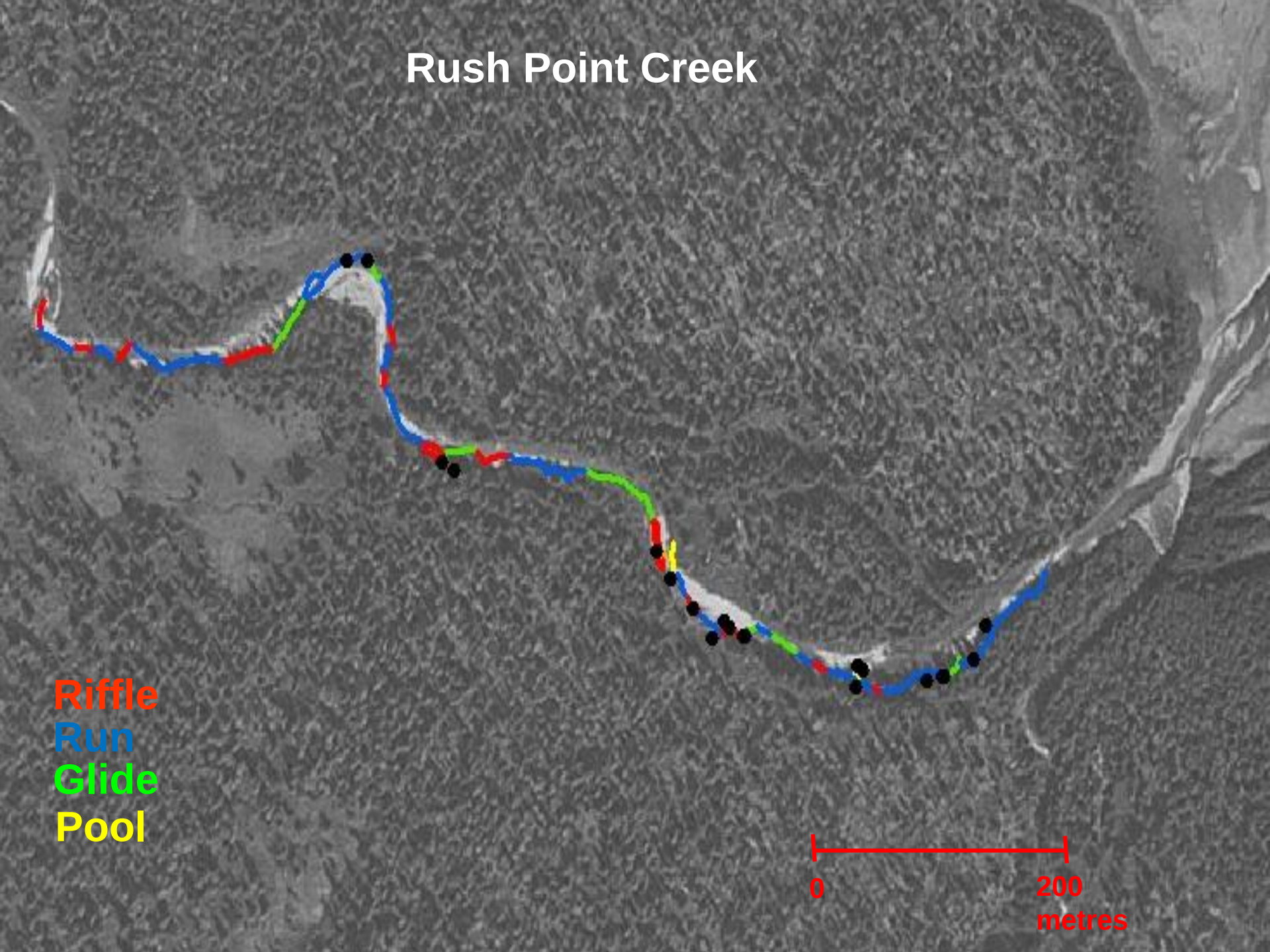
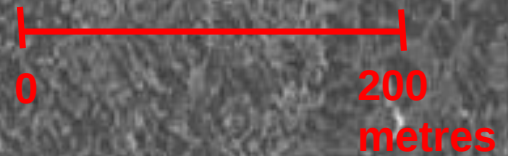
Mesohabitat	Turbulence	Description
<i>Fall (Fa)</i>	Turbulent & very fast	Vertical drops of water over the full span of the channel, commonly found in bedrock and step-pool stream reaches. Chaotic, free fall and upwelling flow.
<i>Cascade (Ca)</i>	Turbulent & very fast	Stepped rapids with very small pools behind boulders and small waterfalls. Chaotic SFT, with some standing waves.
<i>Rapid (Ra)</i>	Turbulent & fast	Higher gradient reach than a riffle, with faster current velocity, coarser substrate, and more surface turbulence. Convex streambed shape. SFT typically dominated by broken and unbroken standing waves
<i>Riffle (Ri)</i>	Turbulent & moderately fast	Shallow stream reach with moderate current velocity, some surface turbulence, with some substrate breaking the surface. SFT typically dominated by unbroken standing waves, and some rippled flow
<i>Run (Ru)</i>	Non- turbulent & moderately fast	Moderately fast and shallow gradient with ripples on the water surface. Laterally concave streambed, laminar flow. SFT typically rippled with some smooth areas
<i>Glide (Gl)</i>	Non-turbulent & moderately slow	Smooth, 'glass-like' surface, with visible flow movement along the surface, moderately shallow. SFT typically smooth, with occasional rippled flow.
<i>Backwater pool (Bw)</i>	Non-turbulent & slow	Associated with an obstruction; water flow diverges from the axis of the channel. SFT dominated by no perceptible flow
<i>Drawdown pool (Dd)</i>	Non-turbulent & slow	Associated with thalweg; flow rapid at entrance, slow in middle, and accelerates at the exit. Mixed SFT.
<i>Other (O)</i>		To be used in unusual circumstance where feature does not fit any recognised feature

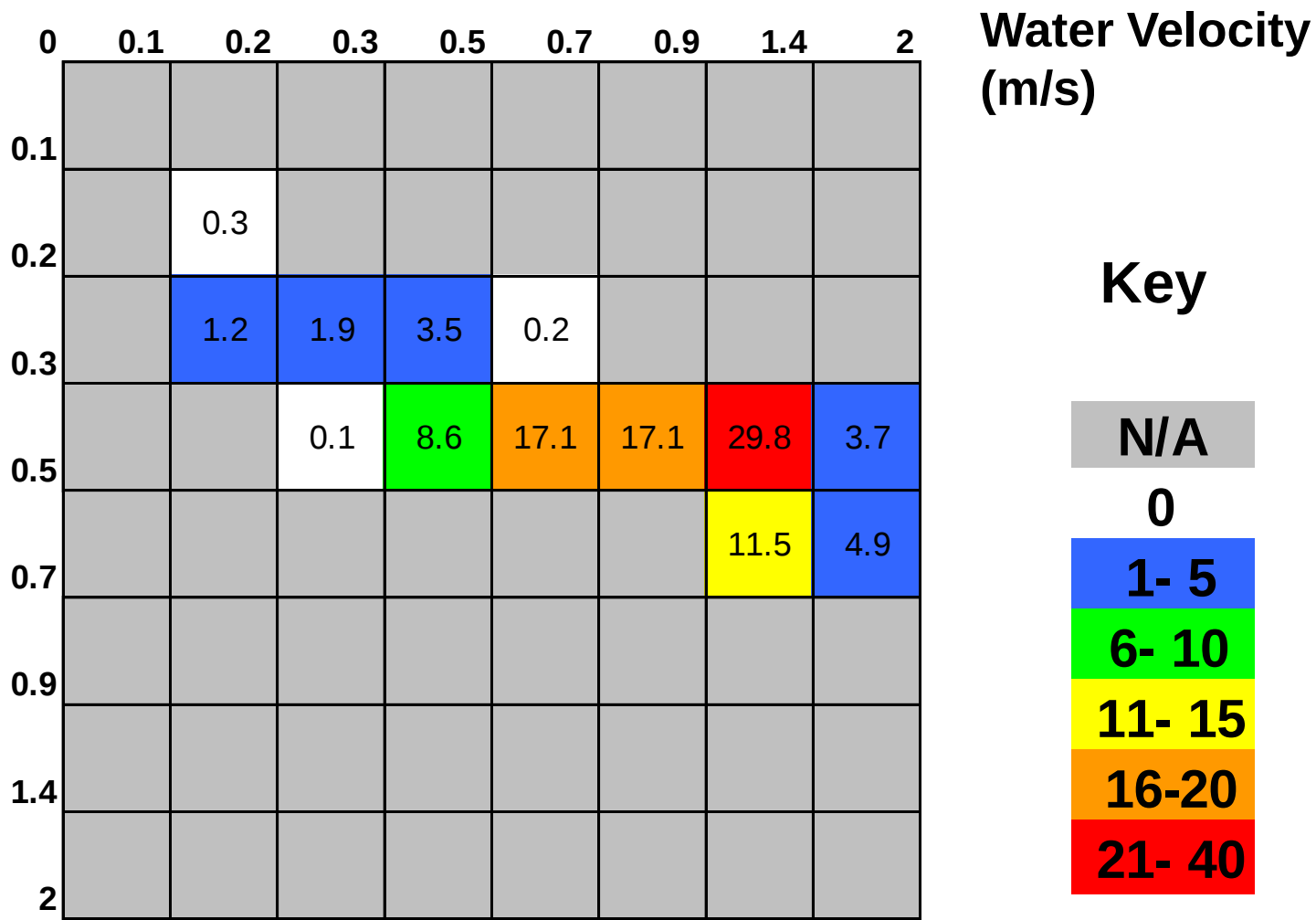




Rush Point Creek

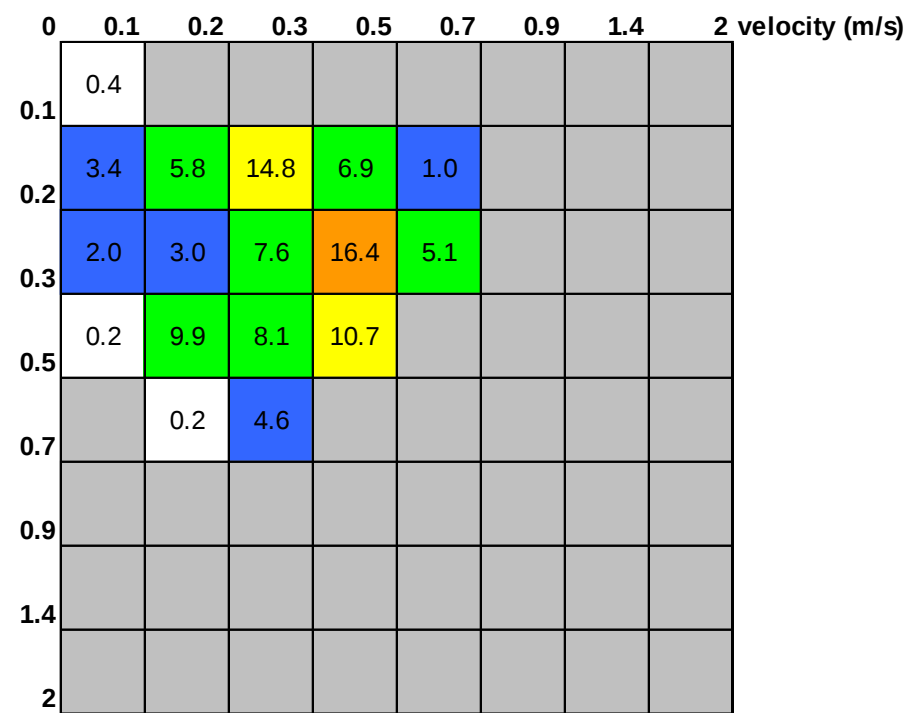
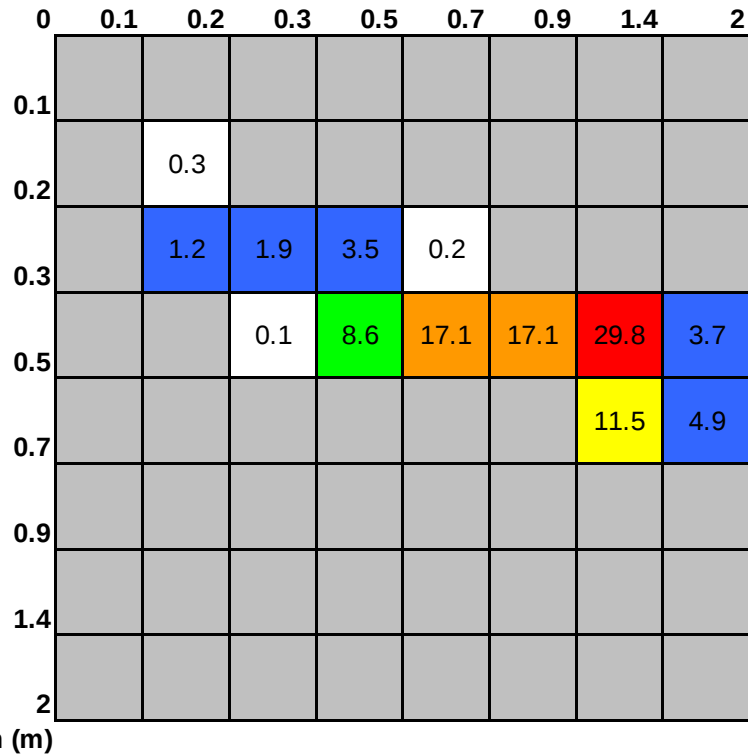
Riffle
Run
Glide
Pool





Example of a Hydrosignature output for a 'run' CGU at Wolf Point Creek

Instream habitat



‘Run’ in WPC- youngest stream

vs

‘Run’ in RPC- oldest stream





Instream wood & biodiversity

- Resource for instream biota
 - Directly, e.g. saprophytes; invertebrates, fungi, microorganisms
 - Indirectly e.g. 'fish food', sediment deposition and stability (biofilms, microbial processing), organic C, shelter

