

Descriptive Notes

Physiography and Drainage
This map area lies within the Boundary Ranges of the Coast Mountain physiographic region. The terrain has a rugged plateau character with peaks exceeding 2000 m. Deeply incised narrow valleys cut the plateau surface (Figure 1).

The Wheaton River flows eastward into Bennett Lake. Its main tributaries include Berner, Fenwick, Butte, Summit, Becker and Partridge creeks (Figure 2). Small tarn lakes are present in the well-formed cirques.

The McConnell Glaciation in the Whitehorse area
During the Late Wisconsinan McConnell Glaciation (~20 000 years ago), the Whitehorse map area (NTS 105D) was glaciated by ice lobes originating in the Coast Mountains and the Cassiar Mountains of southern Yukon. Initial ice accumulations in the map area probably began in the higher regions of the Coast Mountains. At the height of the last glaciation, ice from the Cassiar lobe covered with the Coast Mountain lobe over this map area. The movement of ice over this area was to the north-northwest and was unobstructed by topography.

The pattern of deglaciation is highlighted by periods of differential retreat and fluctuating ice fronts. A re-advance of the Cassiar Lobe occurred into this area and had a significant influence on sediment deposition on the landscape. The re-advance flowed westward into the Coast Mountains. In this map area, the Cassiar ice lobe would have advanced westward up the Wheaton River valley, and northward into the map area from the Bennett Lake area via Partridge and Becker creek headwaters. The westward flow of ice would have reached the Wheaton River headwaters where it likely converged with local alpine glaciers (Figure 3). Local alpine glaciers also persisted at this time in the Becker and Butte creek drainages (see circle symbols). As ice retreated eastward out of the Wheaton River valley the drainage was impounded by the ice front and Glacial Lake Wheaton developed. This glacial lake was among the deepest in the greater Whitehorse area reaching depths of 300 m (3000 ft).

Landforms
Wheaton River valley
The floodplain of the Wheaton River changes from a meandering (see "Fp" picture in legend) to a braided morphology (Figure 4) near the outlet of Berner Creek. This occurs for two reasons: 1) 3 km upstream from the Berner Creek outlet the Wheaton River current increases due to a drainage gradient change 2) the influx of gravel from Berner Creek increases the sediment load being carried by the Wheaton River. The braided river morphology is maintained by the addition of sediment from other tributaries down-valley.

In the southwest corner of the map area, bordering the Wheaton River is an impressive rock glacier extending out of a cirque on northwest side of Mount Ward (Figure 5). This landform is a mass of broken rock with in situ pure ice. It has a distinctive lobate morphology and is actively flowing into the Wheaton River.

Glacial Lake Wheaton shorelines are visible in the vicinity of Summit Creek pass and on the northwest slope of Tally-Ho Mountain. Also remnant of the glacial lake history is a well-preserved perched delta (Fdg) in the



Figure 1. An aerial view to the south of a group of unnamed peaks at the headwaters of the Wheaton River valley. The topographic variability is evident from this photograph. The elevation of the plateau surfaces average 1700 m. The higher peaks in the distance have elevations up to 2400 m. The elevation of the valley floor is about 1000 m.



Figure 2. Large active alluvial fans spill into the Wheaton River valley from tributary streams. In this photograph at the base of Tally-Ho Mountain a debris flow hazard exists where the Wheaton River Road traverses the fan (see arrow). These surficial deposits are a good source of aggregate.

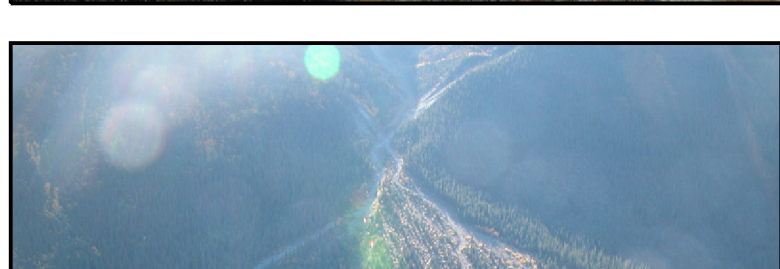


Figure 3. An aerial view to the south of a group of unnamed peaks at the headwaters of the Wheaton River. Alpine glaciers still exist in this upland providing a consistent water supply to the drainage. The glacial limit from the Little Ice Age advance is visible down-valley from the glacier and is indicated by the arrow.



Figure 4. A reach of the Wheaton River below Berner Creek showing the active and inactive portions of the floodplain.

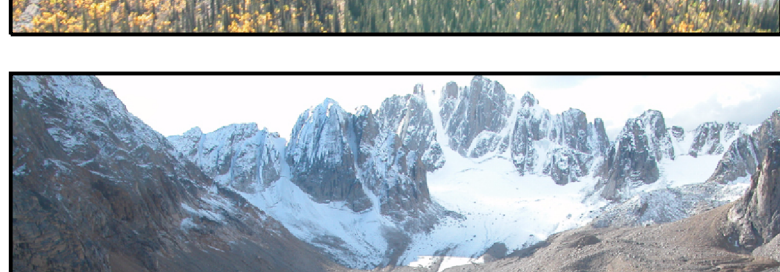


Figure 5. The Mount Ward rock glacier in the southwestern part of the map area. The Wheaton River is eroding into the ice of the rock glacier.



Figure 6. A reach of the Wheaton River below Berner Creek showing the active and inactive portions of the floodplain.



Figure 7. A reach of the Wheaton River below Berner Creek showing the active and inactive portions of the floodplain.



Figure 8. A reach of the Wheaton River below Berner Creek showing the active and inactive portions of the floodplain.



Figure 9. A reach of the Wheaton River below Berner Creek showing the active and inactive portions of the floodplain.

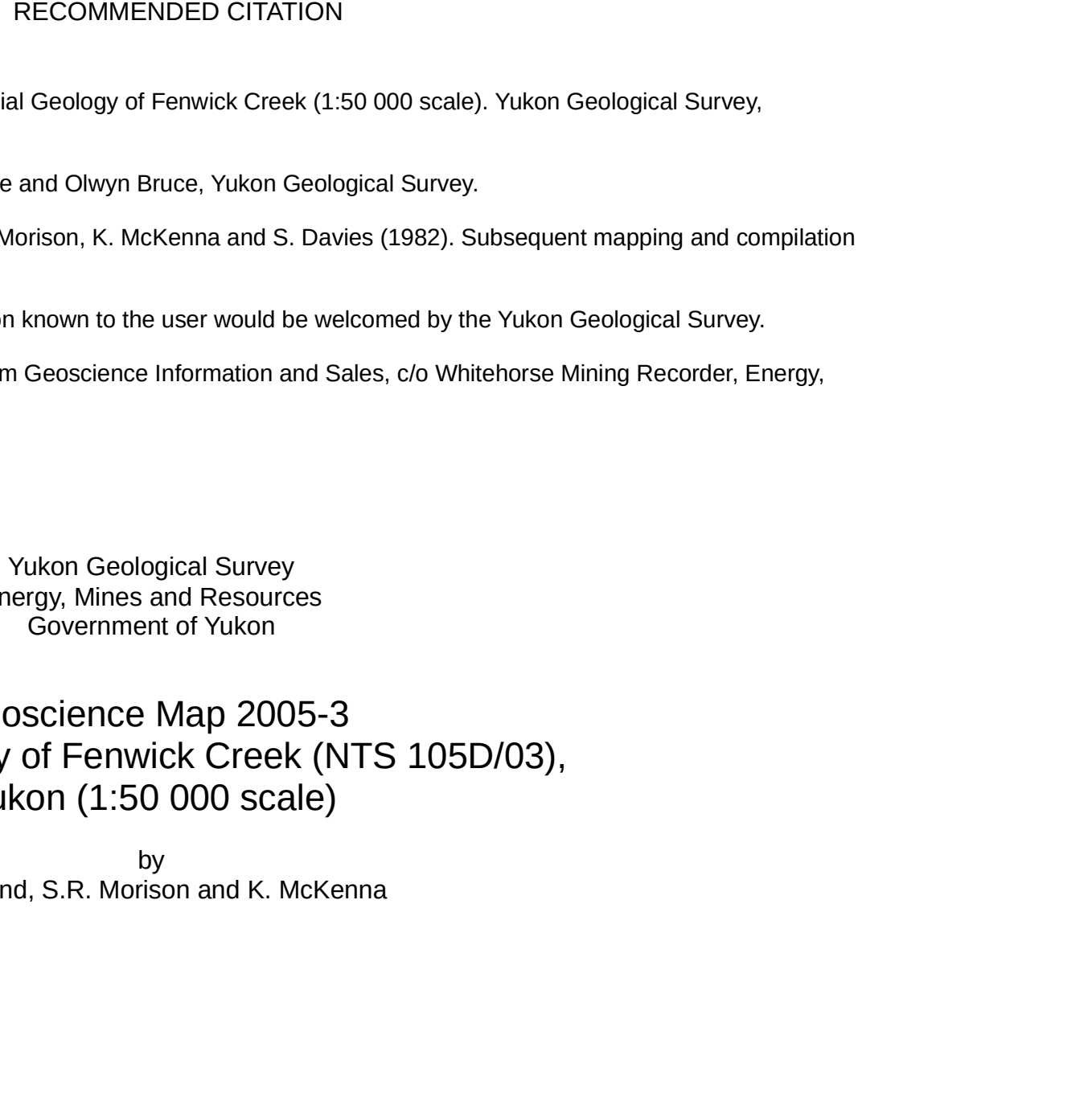
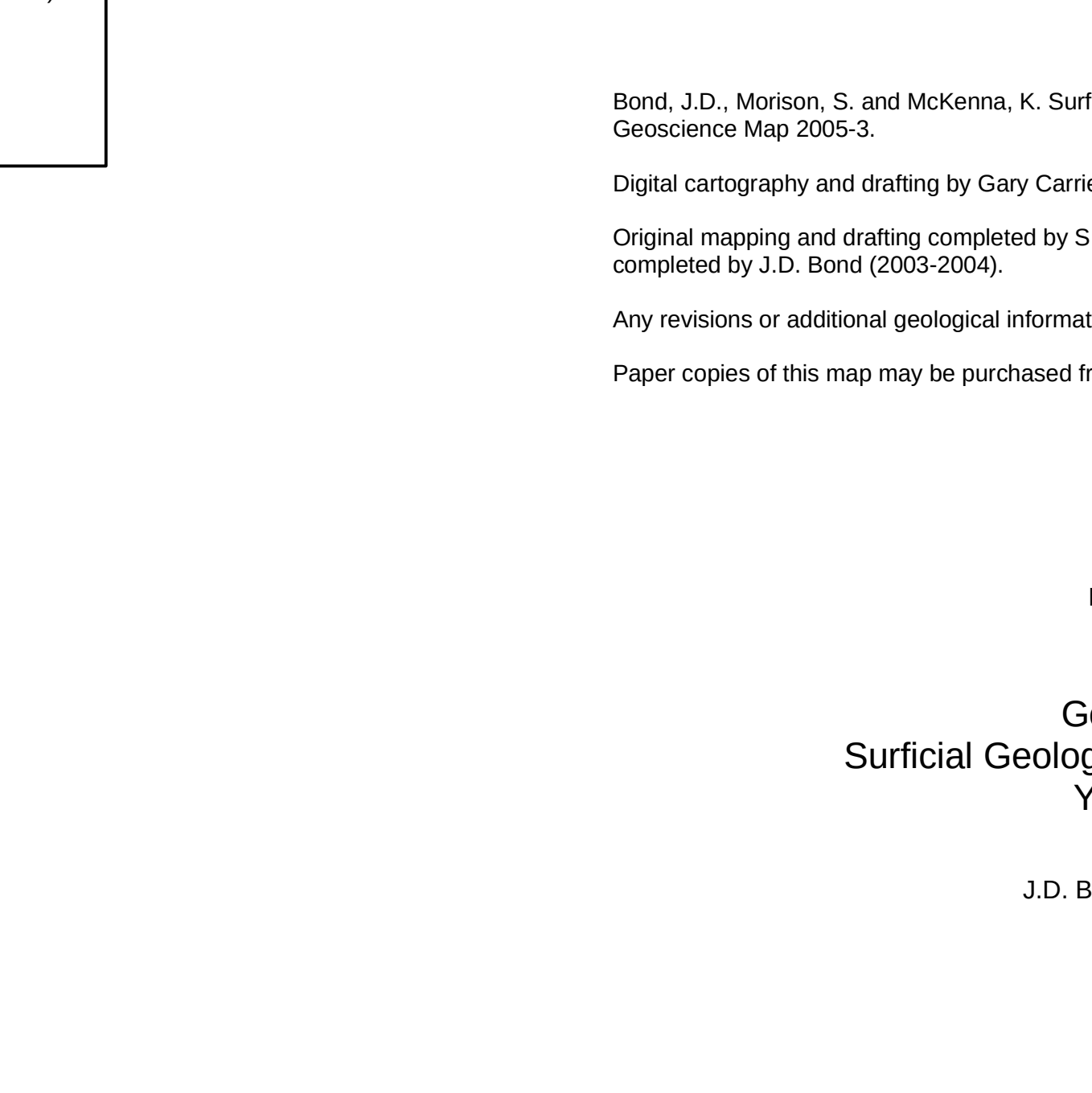
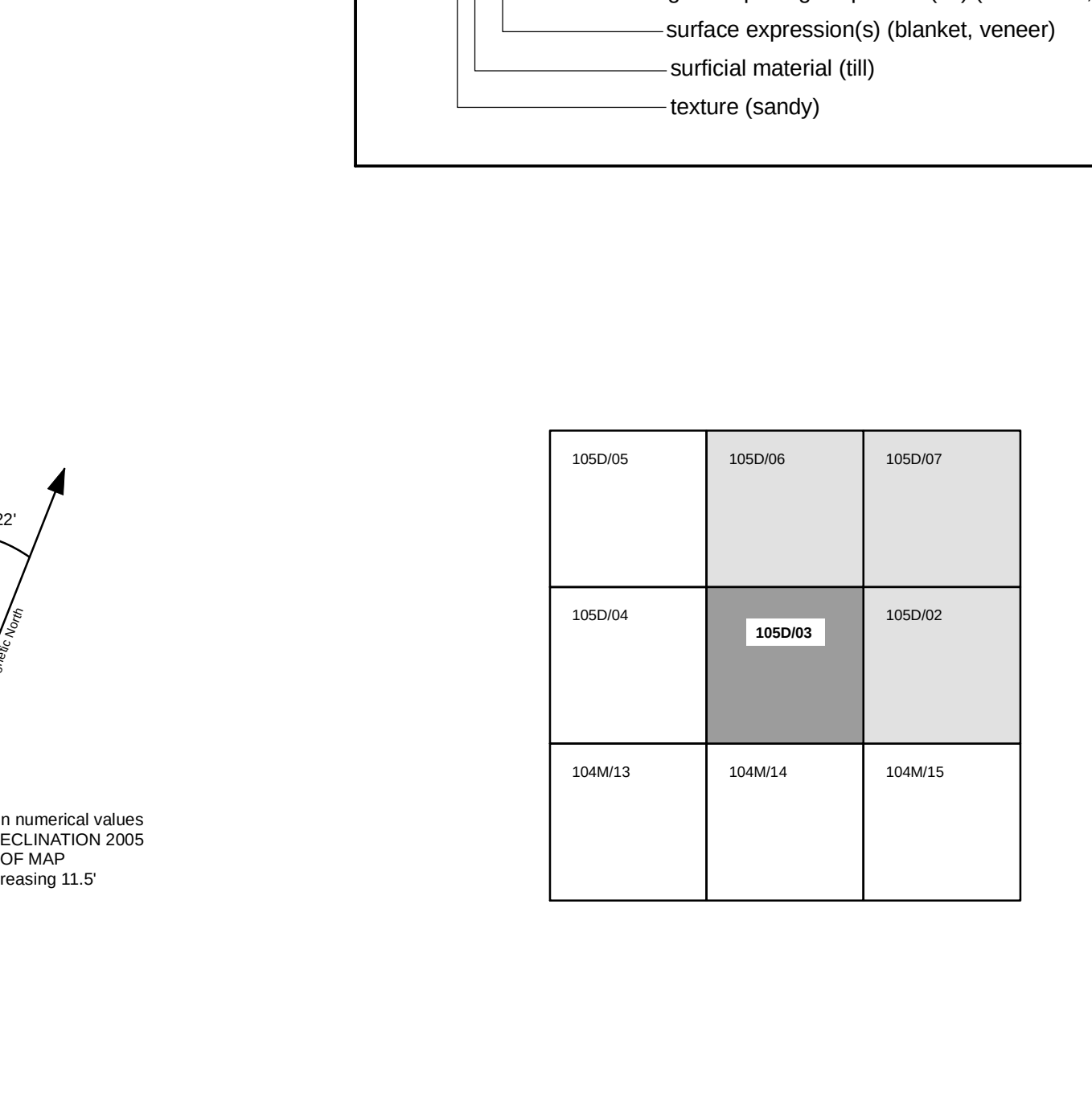
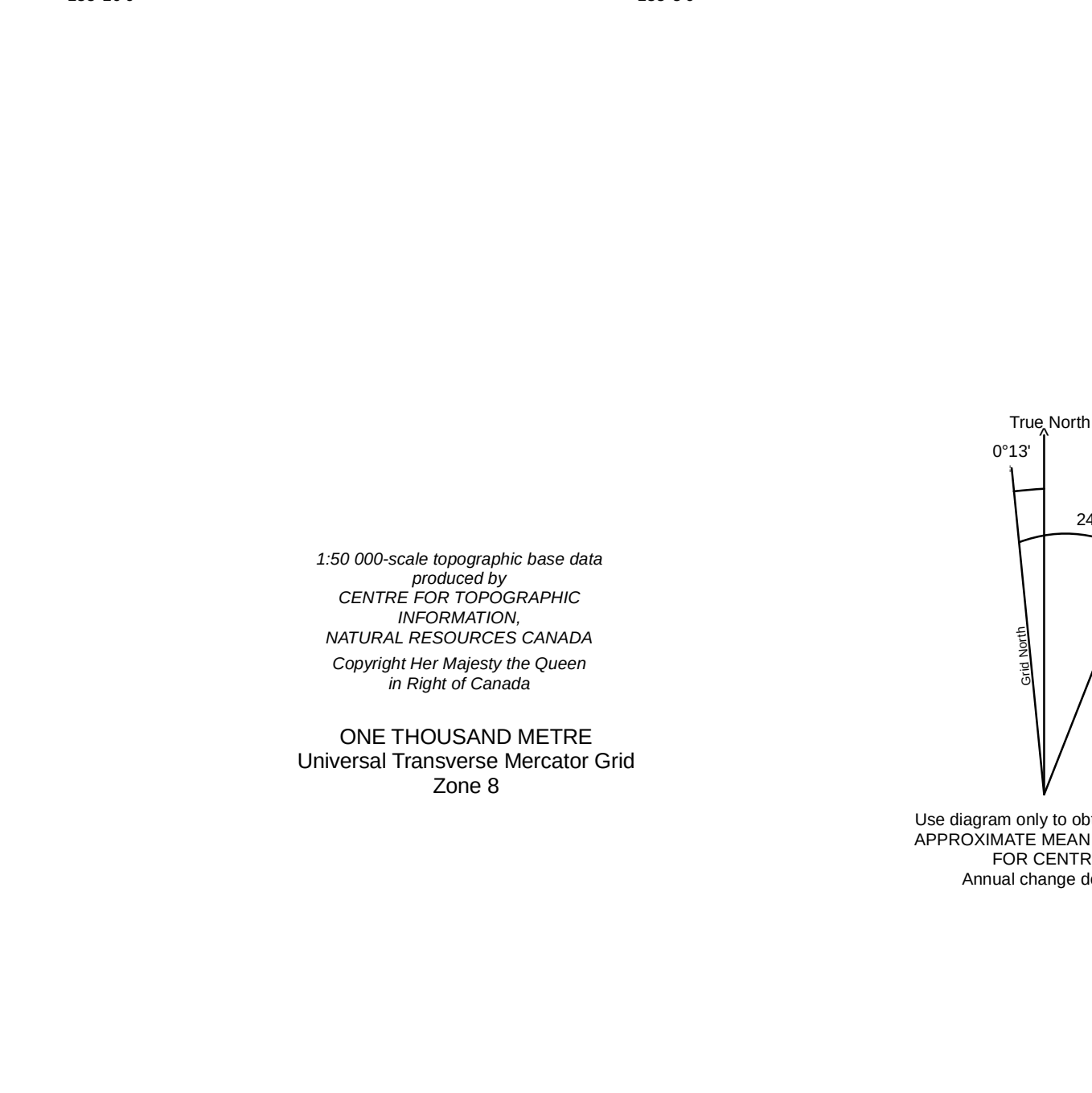
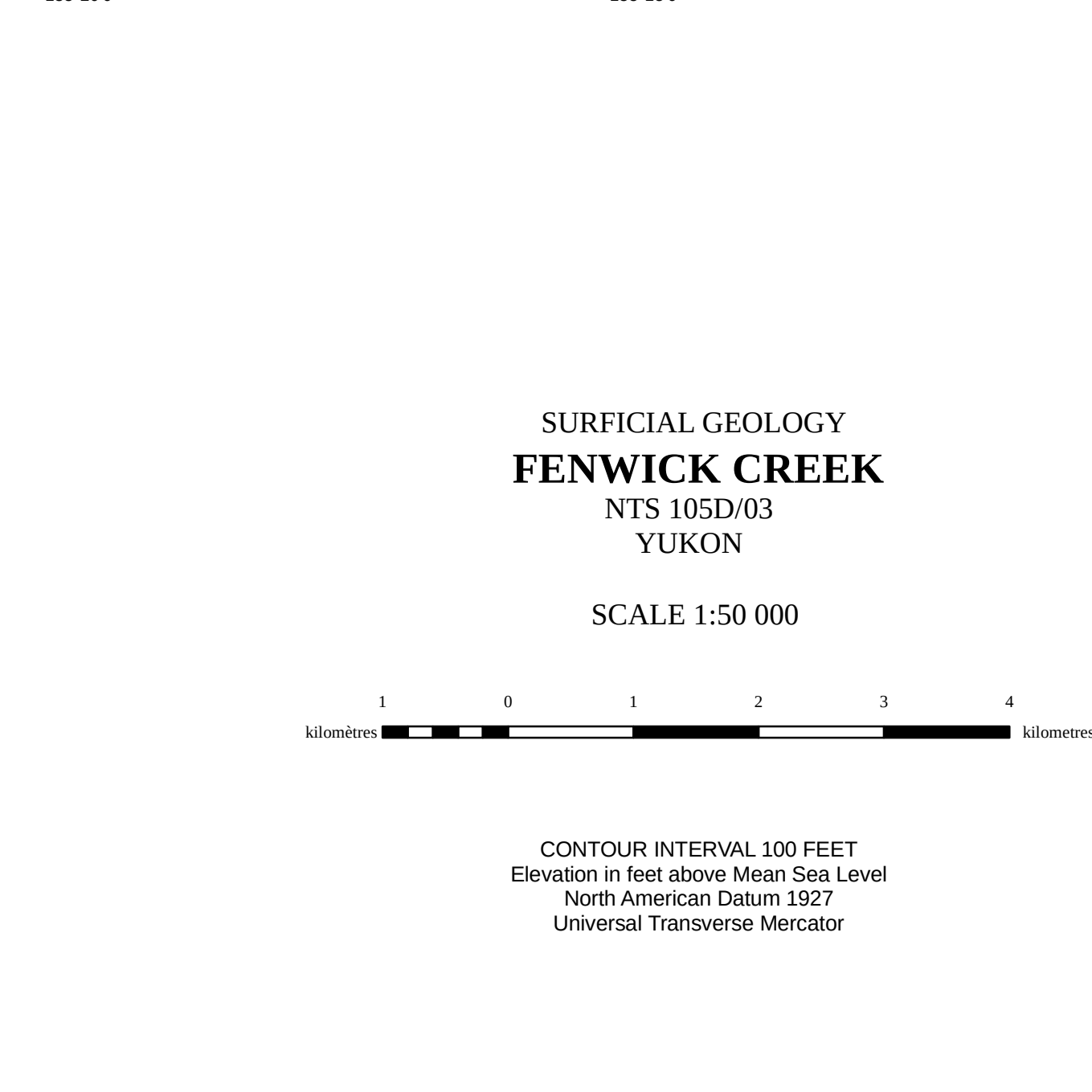
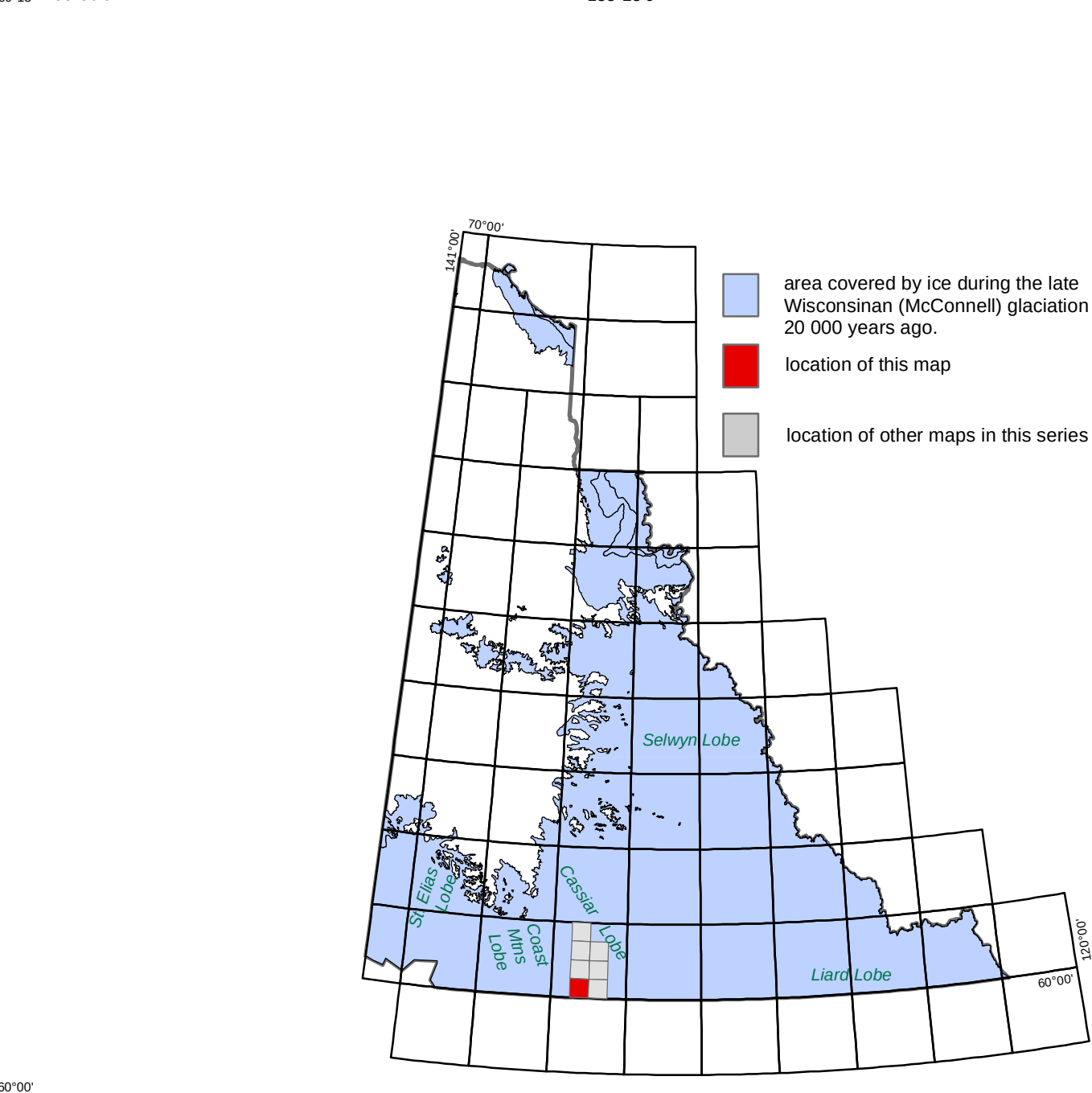
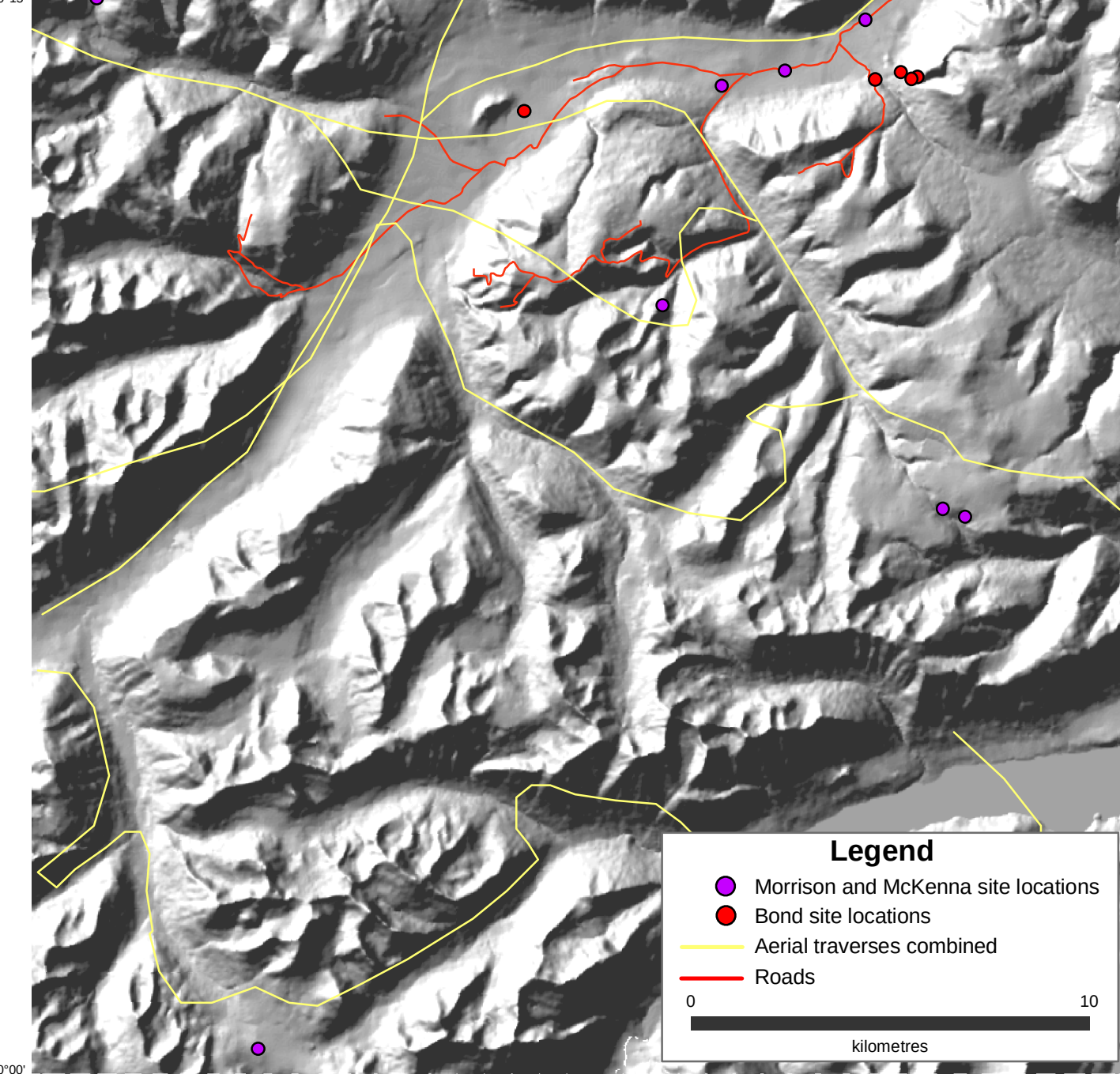


Figure 10. A reach of the Wheaton River below Berner Creek showing the active and inactive portions of the floodplain.



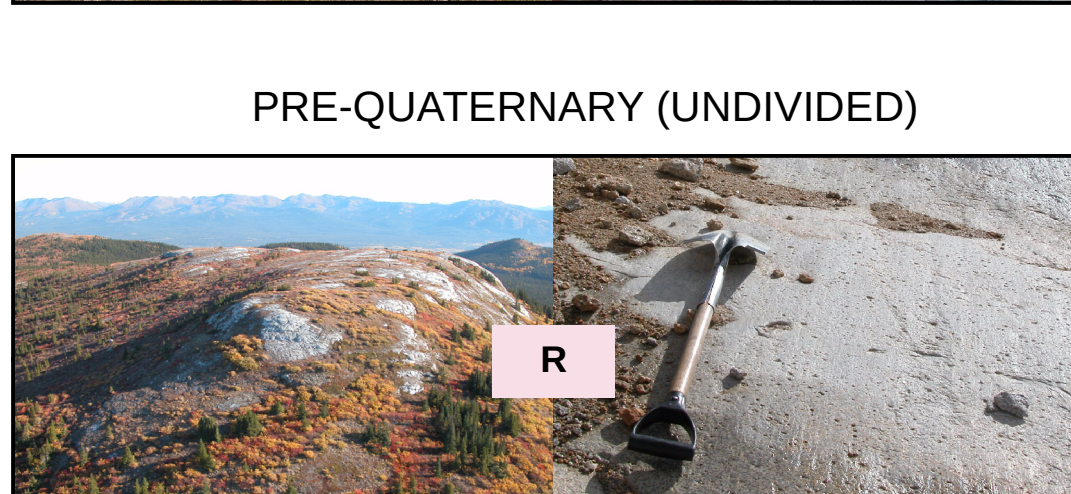
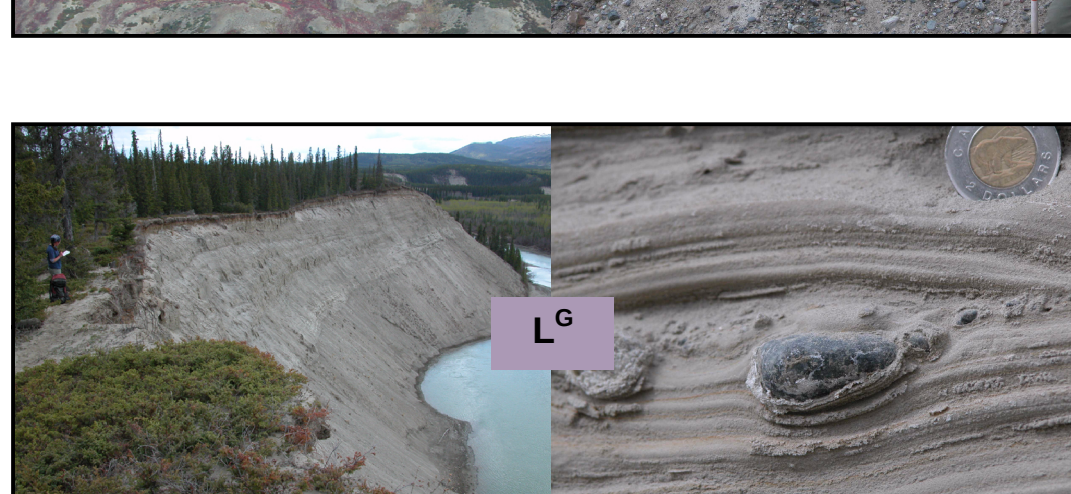
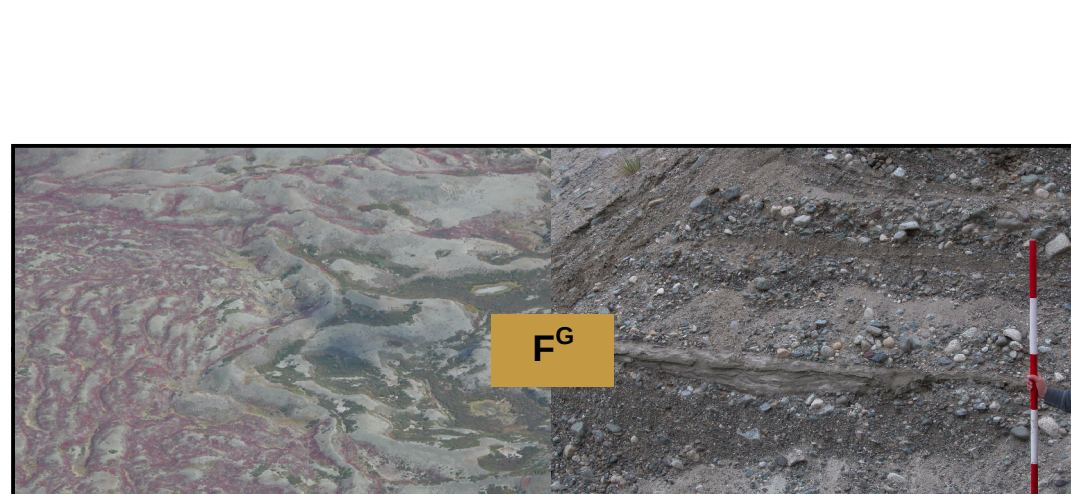
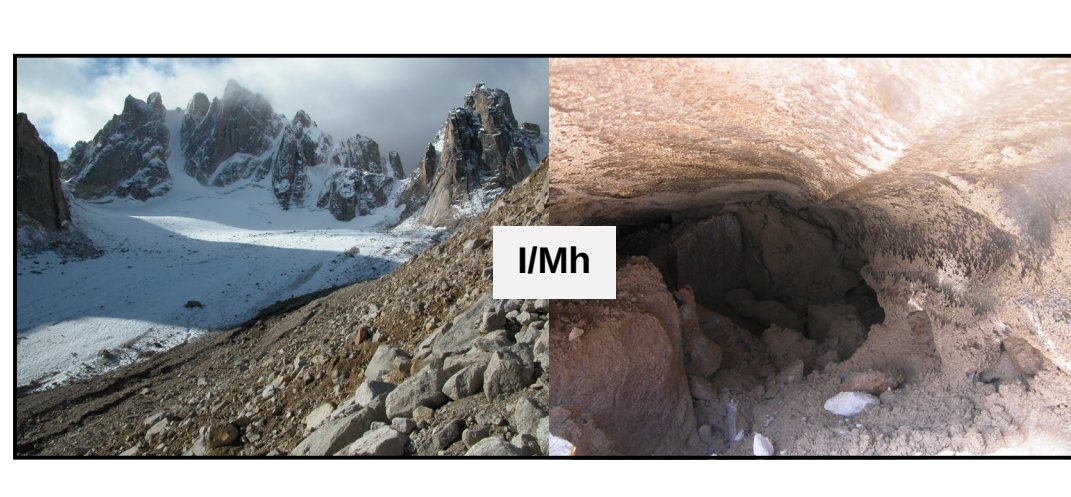
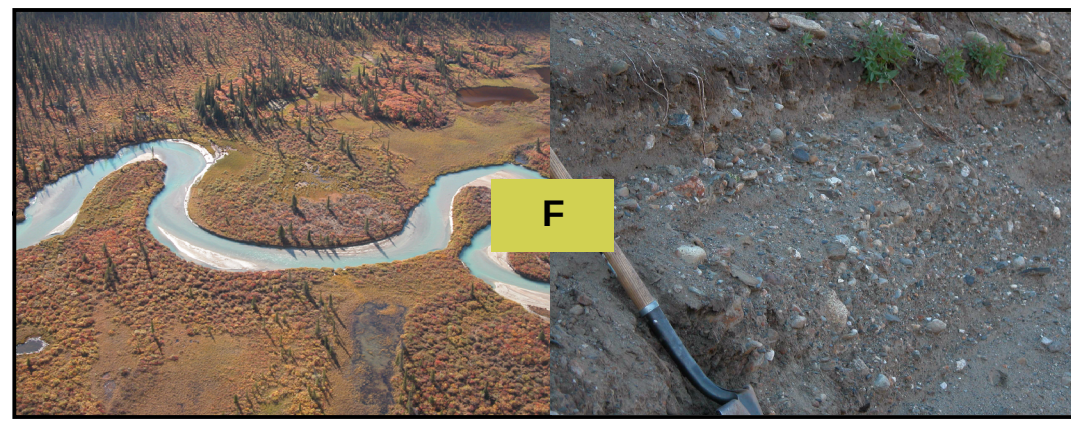
Figure 11. A reach of the Wheaton River below Berner Creek showing the active and inactive portions of the floodplain.

Aerial Traverses and Site Locations

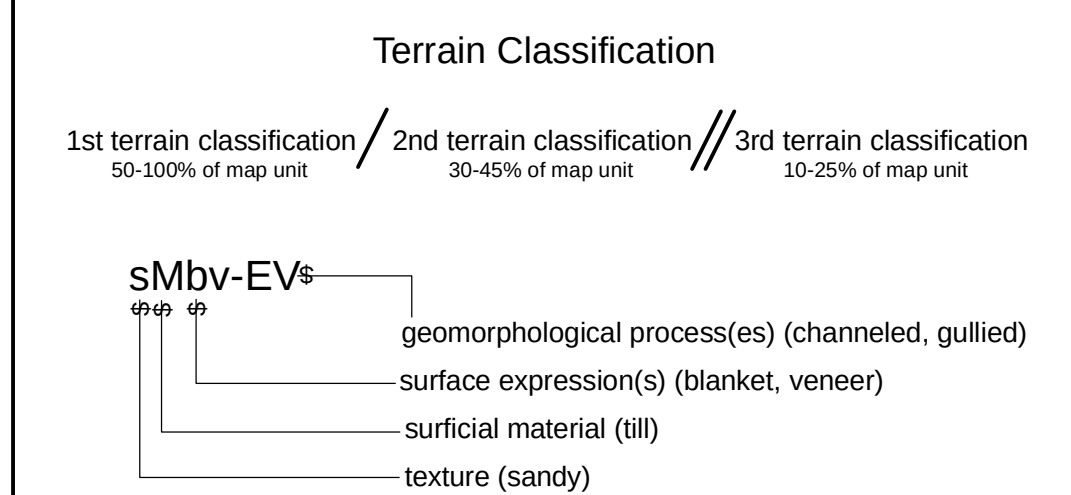


Legend

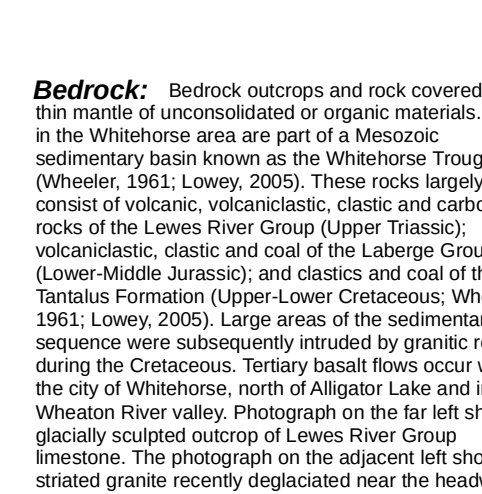
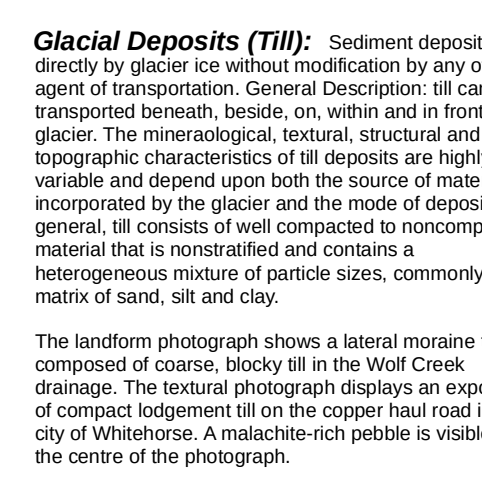
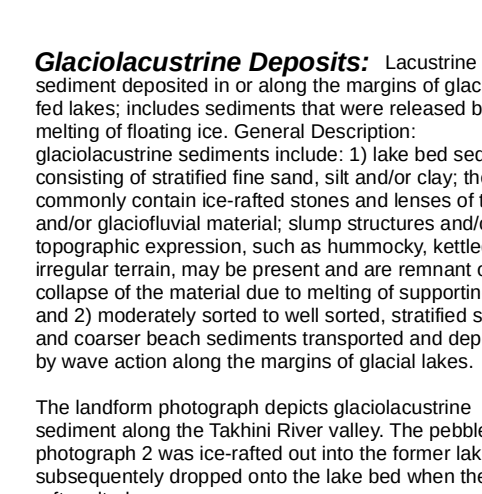
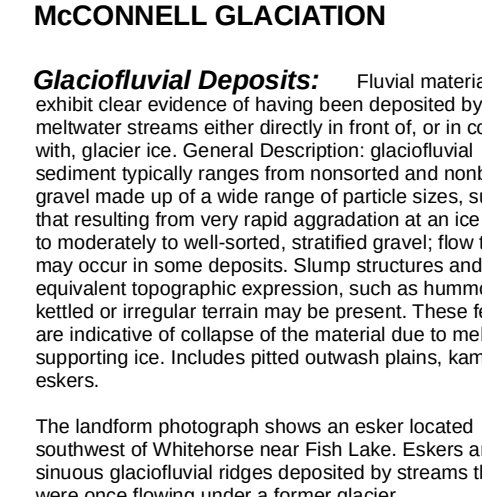
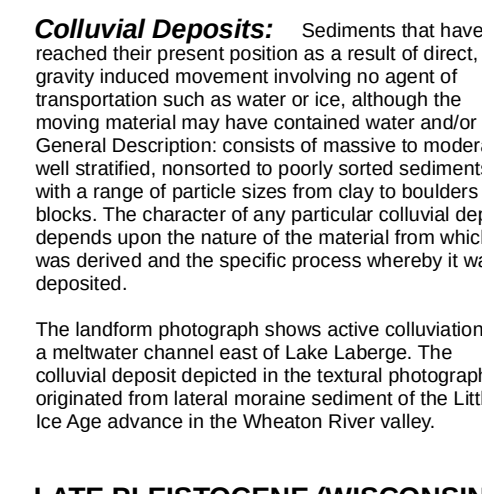
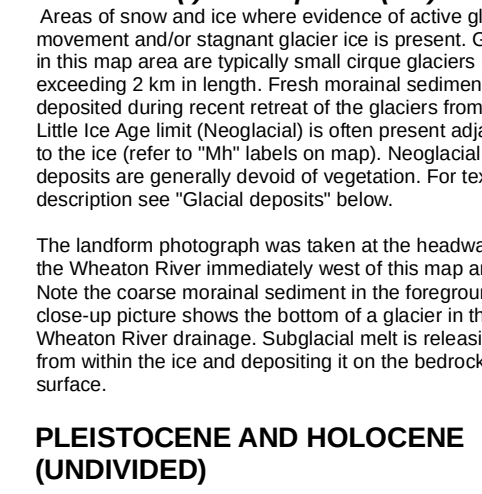
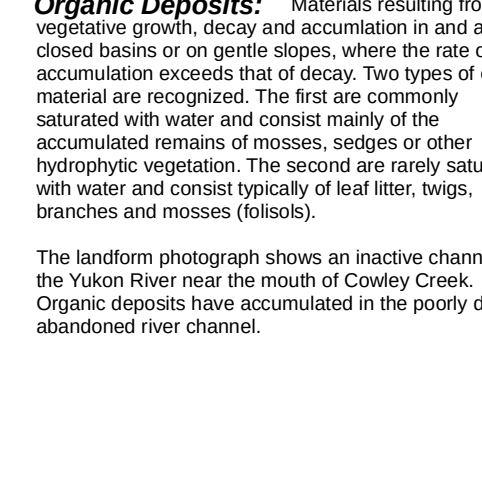
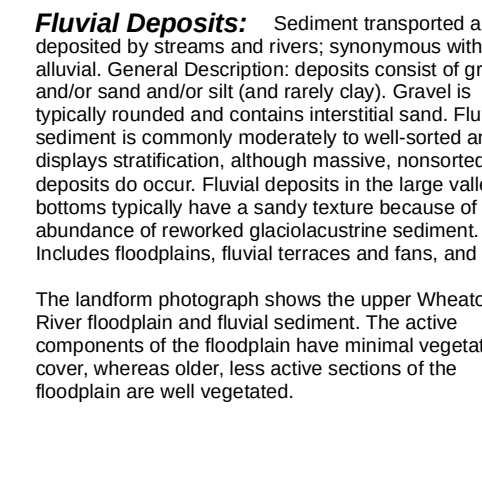
QUATERNARY



PRE-QUATERNARY (UNDIVIDED)



HOLOCENE



SURFACE EXPRESSION

Surface expression refers to the form (assemblage of slopes) and pattern of forms expressed by a surficial material at the land surface. This three dimensional shape of the material is determined by landform, surficial material, and surficial processes. Surface expression is indicated by up to three lower case letters, placed immediately following the surficial material designator, listed in order of decreasing extent.

Label	Name	Description
a	apron	Material that has been transported down a slope and deposited in accumulations at the base of the slope.
b	barrier	Characterized by a continuous and convex slope of the underlying material, but still conforms to the general underlying topography. A barrier is greater than 1 m thick and possesses no constructional forms typical of the material's genesis; outcrops of the underlying unit are rare.
d	delta	Flat to gently sloping surface deposited at the mouth of a river in a body of water. Channel scars on the delta surface are commonly visible.
f	fertile	A fan is a relatively smooth sector of a cone with a slope gradient from apex to toe to not including 15° (20%), and a longitudinal profile that is either straight, or slightly concave or convex. Commonly applies to fluvial fans.
h	hummocky	Steep-sided (steep) and (shallow) with undulating slopes dominantly between 15 and 35° (20 to 30°) if composed of unconsolidated materials; bedrock slopes may be steeper. Local relief is greater than 1 m. In place, an assemblage of non-linear, generally chaotic forms that are rounded or irregular in cross-profile. Commonly applied to loess and kettle glaciolacustrine terrain.
m	rolling	Elongate (ridge(s) and hollow(s) with undulating slopes dominantly between 3 and 35° (5 to 20%) with local relief greater than 1 m. In place, an assemblage of parallel or sub-parallel linear forms with subdued relief. Commonly applied to bedrock ridges and fans or streambed alluvium.
p	plain	A level or very gently sloping, unconsolidated (glacial) surface with gradients 0.5 to 2° (0.5 to 1%) and local surface irregularities generally have a relief of less than 1 m. Applied to glaciolacustrine floodplains, organic deposits, lacustrine deposits and alluvium.
r	ridge(s)	Elongate (ridge(s) with slopes dominantly between 15 and 35° (20 to 30%) if composed of unconsolidated materials; bedrock slopes may be steeper. Local relief is greater than 1 m. In place, an assemblage of parallel or sub-parallel linear forms. Commonly applied to streamlined (glacial) fans, ridges, and ridges.
s	steep slope	A unconsolidated (glacial) surface with gradients greater than 35° (70%), and a smooth longitudinal profile that is either straight, or slightly concave or convex. Local surface irregularities generally have a relief of less than 1 m; bedrock slopes may be more irregular. Commonly applied to terrace scarp(s), gently sloping and bedrock scarp(s).
t	terraced	A single or assemblage of step-like forms where each step-like form consists of a steep face and a horizontal or gently inclined surface (broad) above it. Applied to fluvial and lacustrine terraces and stepped bedrock topography.
v	veneer	A layer of unconsolidated materials too thin to mask the minor irregularities of the surface of the underlying material. It is between about 10 cm and 1 m in thickness, and possesses no constructional forms typical of the material's genesis. Commonly applied to colluvial loess and colluvial veneers.
x	complex	A combination of several surface expressions.

GEOMORPHOLOGICAL PROCESSES

Geomorphological processes are natural mechanisms of weathering, erosion and deposition that result in the modification of the surficial materials and landforms at the earth's surface. Processes are indicated by up to three upper case letters, listed in order of decreasing importance, placed after the surface expression symbol, and separated from the surface expression by a dash (-).

Group	Process	Label	Description
Erosional Processes	deflation	D	The removal of sand and silt particles from unconsolidated materials by wind.
	glacial erosion	G	Characterized by subsidence and carving due to melting or grinding ice in periglacial areas.
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Mass Movement Processes	avalanche	A	Flowing mass, mass movement and/or snow avalanching, including in lag deposits formed by the removal of fines from a mixture of coarse and fine particles.
	landslide	L	Cut or slided by running water but not underlain by fluvial deposits.
	snow avalanches	A	Rapid downslope movement of snow and ice, as well as incorporated rock, surficial material and vegetation debris, by flowing or sliding.
Periglacial Processes	creep	C	Downslope movement of masses of cohesive or non-cohesive surficial material and/or bedrock by creeping, flowing or slumping.
	crystallization	C	Movement of surficial materials by heating and/or churning due to frost action (expansion freezing and thawing).
	erosion	E	Erosion of bedrock or surficial materials beneath and along the margin of snow patches by freeze-thaw processes (frost heaving and heaving), meltwater action and snow creep.
Periglacial Processes	solifluction	S	Slow gravitational downslope movement of saturated non-frozen overburden across a frozen or otherwise impermeable substrate.
	periglacial processes	X	Processes controlled by the presence of permafrost and permafrost degradation or degradation. Applied to areas with colluvial deposits, thermal features, talus and debris.
Glacial Processes	channeled by meltwater	C	Erosion and channel formation by meltwater alongside, beneath, or in front of a glacier.
	channeled	C	Depositions in surficial materials resulting from the melting of buried glacial ice.
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TEXTURE

Describes the dominant size of particles in mineral sediments and the fiber content of organic materials. Texture is indicated by up to three lower case letters.

Label	Name	Description
a	angular	Angular particles greater than 256 mm in size.
b	blocky	Blocky particles greater than 256 mm in size, but may include interstitial sand.
c	coarse	Two or more size ranges of rounded particles greater than 2 mm, but may include interstitial sand.
d	clayey	Fines of silt and clay may also contain fraction of fine sand.
e	clayey	Flattened particles greater than 256 mm in size.
f	clayey	Flattened particles greater than 256 mm in size.
g	clayey	Flattened particles having a diameter of 2-24 mm.
h	clayey	Particles of which the fine earth fraction contains more than 70% by weight of fine sand or coarse particles and less than 25% clay particles.
i	clayey	Particles where the fine earth fraction contains 25% or more clay (less than 0.002 mm) by weight and particles greater than 2 mm occupy less than 20% by volume.
j	clayey	Particles where the fine earth fraction contains 25% or more clay (less than 0.002 mm) by weight and particles greater than 2 mm occupy less than 20% by volume.
k	clayey	Particles where the fine earth fraction contains 25% or more clay (less than 0.002 mm) by weight and particles greater than 2 mm occupy less than 20% by volume.
l	clayey	The best developed of all organic materials; there is a large amount of well preserved fiber that is readily identifiable as to botanical origin. Fibers retain their character upon rubbing.
m	clayey	Organic material in an intermediate stage of decomposition; there is an intermediate amount of fiber that can be identified as to botanical origin. Fibers retain their character upon rubbing.
n	clayey	Organic material in an intermediate stage of decomposition; there is an intermediate amount of fiber that can be identified as to botanical origin. Fibers retain their character upon rubbing.
o	clayey	Organic material containing more than 50% of woody fibers.

SYMBOLS

	glacially aligned landform; includes: drumlins, crag and tails, rockies, mounds, ridges, grooves and striae. These landforms indicate past ice flow direction.
	esker; known direction
	esker; unknown direction
	moraine ridge
	glacial meltwater channel - minor
	glacial meltwater channel - major
	glacial lake strand lines
	cirque
	escarpment
	escarpment - falling
	landslide
	recessional glacial limit

Bond site locations

Bond site locations

roads

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Any revisions or additional geological information known to the user would be welcomed by the Yukon Geological Survey.

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Geoscience Map 2005-3
Surficial Geology of Fenwick Creek (NTS 105D/03),
Yukon (1:50 000 scale)

by
J.D. Bond, S.R. Morison and K. McKenna