INTRODUCTION

The valley of Revenue Creek (elevation approximately 610 m) is filled with up to 12.5 m of interstratified gravel, peat, and woody detritus above its bedrock floor. The fill was well exposed in the walls of a placer mine when it was sampled in 1989. The mine has been a productive source of late Pleistocene megafaunal remains (Harington, 1973) but the paleoenvironmental context of these fossils had not been established. Samples were taken midway along the placer mine exposure (downstream section) and at the upstream end of the mine exposure (upstream section) locations (about 500 m apart). This figure summarizes results for both sampling sites.

DOWNSTREAM SECTION

Three zones were recognized based upon pollen and macrofossil data.

Zone 1: samples P1, P2, P3, and P4

The pollen assemblage of this zone is characterized mainly by 30 – 50% spruce (*Picea* sp.); from 10 to 20% birch (*Betula*); from 5 to 10% alder (*Alnus* sp.); 5% willow (*Salix*), about 5% of Ericaceae (heath family), grasses (Gramineae); sedges (Cyperaceae); and by 15 – 60% S*phagnum*.

The pollen assemblages and the macrofossils indicate that two environments are present: forested areas and open areas (tundra). This is corroborated by the plant macrofossils indicating coexisting forest and open sites (heath, dry sedge, raspberry). Insects are dominated by forest dwellers but open affinities increase toward the top of the zone. As the site is located in a valley, one possible scenario to explain the presence of the two different environments would be a forested valley with tundra at higher elevations. Other scenarios would be an open forest or patches of forest within tundra.

Zone 2: samples P5 and P6

The pollen assemblage of this zone is characterized by 25 – 50% sedges, from 20 to 10% sage (*Artemisia*), 10% grasses and small amounts of herbs such as Tubuliflorae, Liguliflorae, Caryophyllaceae, and Onagraceae. Spruce, birch, alder, and sphagnum are not present in the sediment. The assemblage is a herb tundra, dominated by sedge and sage, indicative of cold and dry climate. Spruce, birch, and alder completely disappeared from the landscape. Plant and insect remains corroborate the pollen spectra. As the contemporary treeline position roughly corresponds to the mean July temperature isotherm of 10°C, the absence of spruce in P5 and P6 assemblages indicates colder summer temperatures, similar to the ones found today in Banks Island (6 to 8°C) more than 9° of latitude north of Revenue Creek.

Zone 3: samples P7, P8, and P9

The pollen assemblage of this zone is characterized by 60 – 65% spruce, and by some 5 – 10% of birch, alder, and grasses. *Sphagnum* reaches 65%. Pollen concentration is similar to zone 1. Macrofossils are dominated by spruce remains and forest floor insects. A component of wetland-dwelling insects and plants is present probably indicating floodplain margin environments. The environment was disturbed by forest fires. The pollen assemblage of sample P7 is peculiar in the sense that there is no *Sphagnum*, this indicating that the surrounding environment was not a peat bog, as opposed to zone 1 and to most of zone 3. In addition, there is a peak of Chenopodiaceae–Amaranthaceae at level P7, indicative of dry conditions. The climate is certainly warmer than previously (zone 2) but still dry (as in zone 2). The environment (sample P8) is a dense forest of spruce and birch. Peat, indicative of wetter conditions, developed later (samples 8 and 9). Trees were probably found at a higher elevation than for zones 1 and 2.

UPSTREAM SECTION

Three zones are recognized in the upstream section. All reflect a tundra environment. The entire sequence is tentatively correlated to zone 2 of the downstream section.

Zone 1: samples P14 and P15

The pollen assemblage is characterized by 40% grasses, 5% Tubuliflorae, 10 – 5% sages (*Artemisia*), 5% Caryophyllaceae, and 20 – 60% sedges. Plant and insect remains corroborate the pollen data. The data indicate an herb tundra environment quite similar to the one which characterizes zone 3.

Zone 2: sample P13

The pollen assemblage is characterized by 15% willow (*Salix*), more than 30% grasses, and 15% sages and sedges. Plant macrofossils are dominated by terrestrial sedge and insects are dominated by tundra dwellers.

Zone 3: samples P11 and P12

The pollen assemblage is characterized by 10 – 30% grasses, 15% sages (*Artemisia*), 5 – 10% Caryophyllaceae, and 20 – 40% sedges. The environment is a herb tundra and the climate is cold and dry. Plant macrofossils corroborate the pollen data as do insect remains which contain only tundra and wetland taxa.

Data and drawings by L.E. Jackson, Jr., A.M. Telka, and H. Jetté, 1996.

a) Downstream section

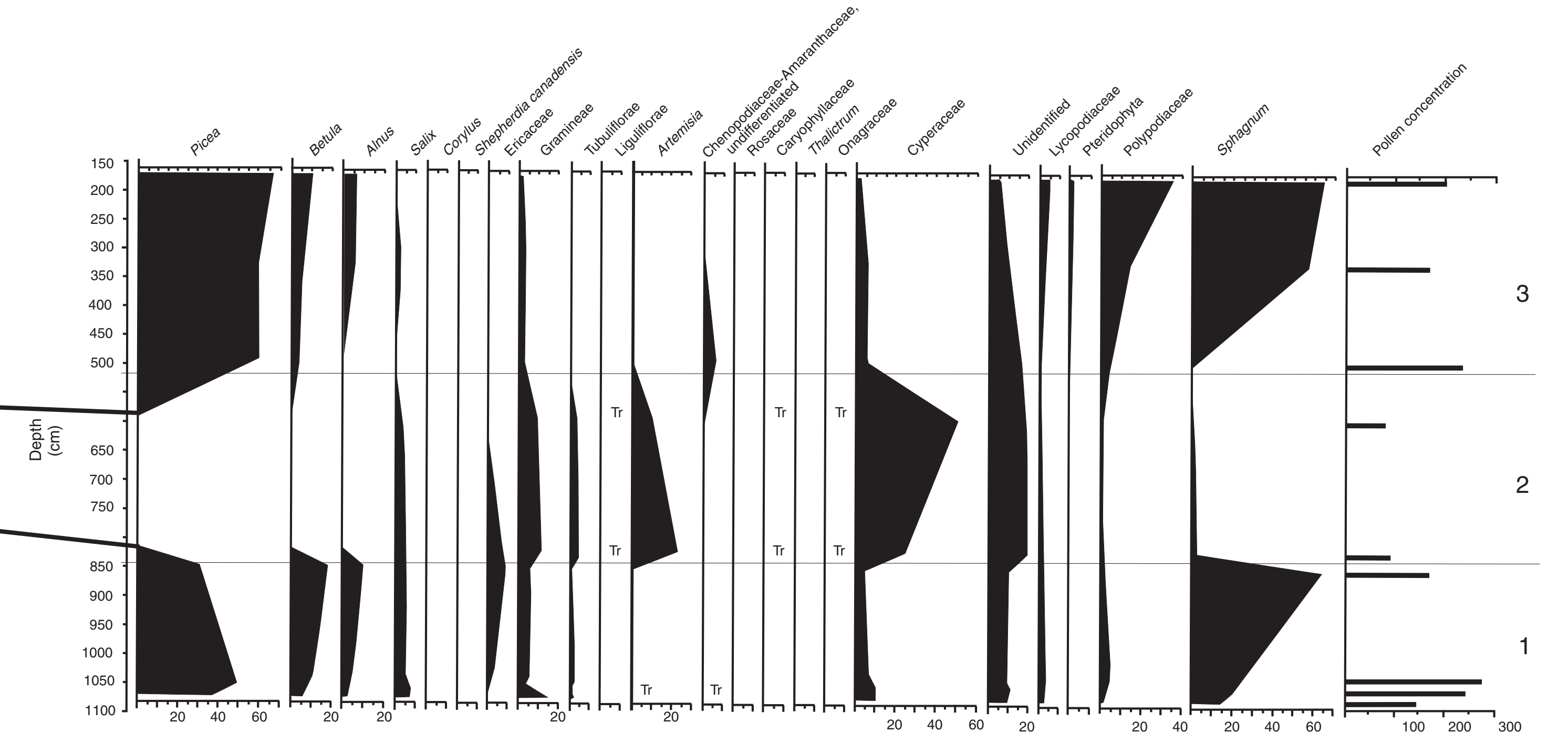
BRYOPHYTES AND VASCULAR PLANT MACROFOSSILS—REVENUE CREEK DOWNSTREAM

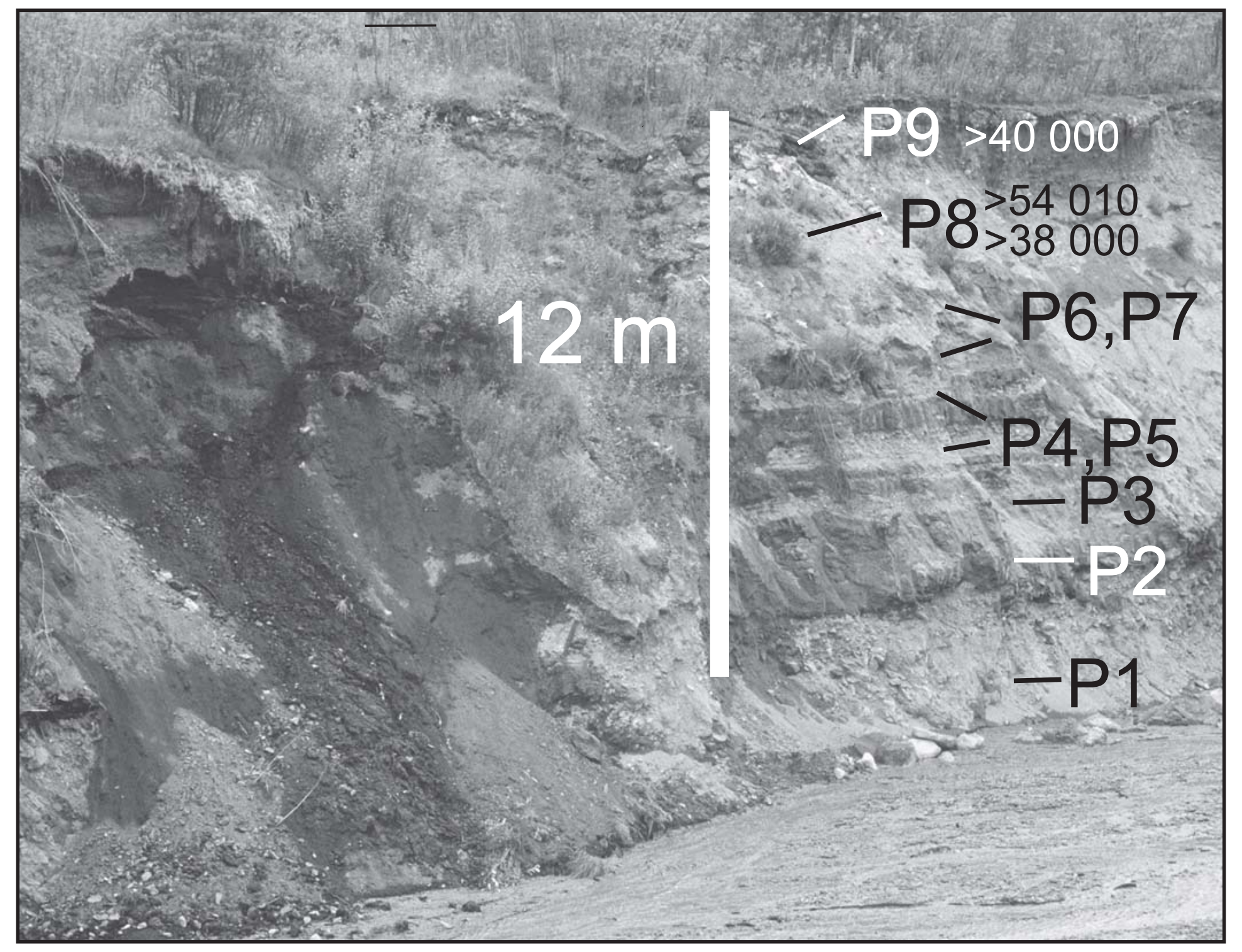
Zone	Sample	Spruce	Birch	Alder	Willow	Sedges (terrestrial)	Goosefoot	Rushes	Heath family	Crowberry	Moss	Burned and unburned wood fragments	Other
3	P9	+	*	Tr	Tr	Tr			Tr		Tr	Tr	Raspberry Tr
	P8	*	+	Tr	Tr	Tr		Tr	+		+	+	Raspberry + *Potentilla* sp. Tr *Viola* sp. Tr
	P7	*	Tr	Tr	Tr	+		Tr	+			*	
2	P6					+	+				Tr		*Potentilla* sp. Tr
	P5					+							Buttercup Tr
1	P4	+			Tr	+						*	Raspberry +
	P3	*				+			+			+	Raspberry Tr
	P2	*				+		*	+			*	
	P1	*				+		+	*			*	Bearberry Tr

INSECT REMAINS—REVENUE CREEK DOWNSTREAM

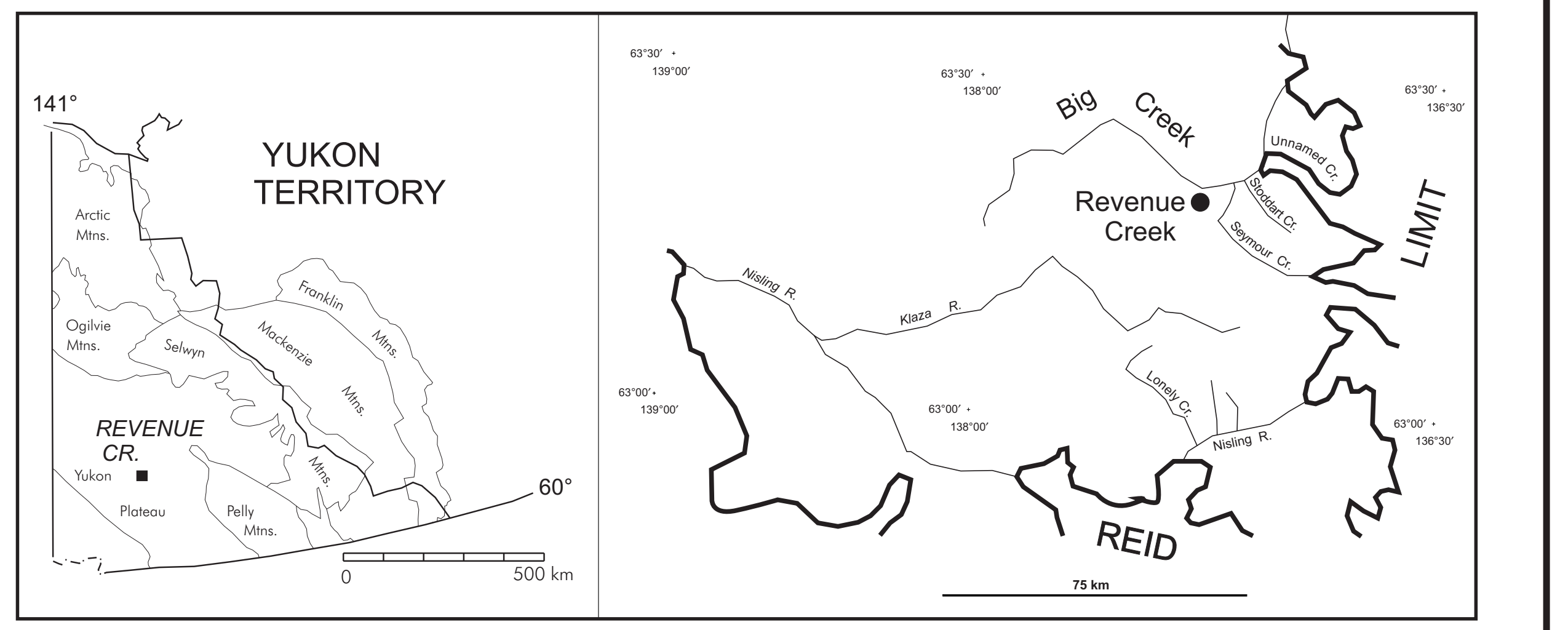
Sample	Abundance	Preservation	Forest affinity	Wetland affinity	Tundra (open) affinity	Diagnostic taxa
P9	*	G	*	+	A	Ptiliidae sp.(F), Leiodidae (F), *Simplocaria* sp.(W), *Acrotrichus* sp. (W) *Aegialia* sp. (W), *Lepidophorus lineaticollis* (W)
P8	*	G	*	+	A	*Cepheus* sp.(F), Scolytidae (F)., *Lepyrus* sp. (F)., Chironomidae (W), *Curimopsis* sp.(W), *Trechus apicalis* (W)
P7	*	G	*	A	A	Scolytidae (F) Leiodidae (F) *Cepheus* sp. (F)
P6	*	G	A	+	+	*Bembidion morulum* (T) *B.(Trepanedoris)* (W)
P5	*	P	A	A	*	Carabidae
P4	*	G	+	A	+	*Notiophilus sylvaticus* (O) *Trichocellus sp.* (O), Scolytidae (F)
P3	*	G	*	A	Tr	Scolytidae (F) Bostrichidae (F) *Cepheus* sp. (F) *Pterostichus (Cryobius) hudsonicus* (F) *P. (Cryobius) brevicornis* (F) *P.(Cryobus) nivalis* (T)
P2	*	G	*	+	A	
P1	*	G	*	A	Tr	Scolytidae (F) Bostrichidae (F) *Cepheus* sp.(F) *Camponotus* sp. (F) *Pterostichus (Cryobius) caribou* (W) *Cepheus sp.* (F) *Pterostichus (Cryobius) hudsonicus, P. (Cryobius) brevicornis Olophrum latum.*

Abundance: * - very abundant. + - common, Tr - trace amounts, A - absent
Environmental affinity: F - closed canopy forest, O - mixed tundra-forest, T - open or tundra, W - wetland
Preservation: G - good, P - poor





b) Stratified organic and colluvial sediments, sample locations and radiocarbon ages at downstream section. Photograph by L.E. Jackson, Jr. GSC 1999-012J



c) Location map

d) Upstream section

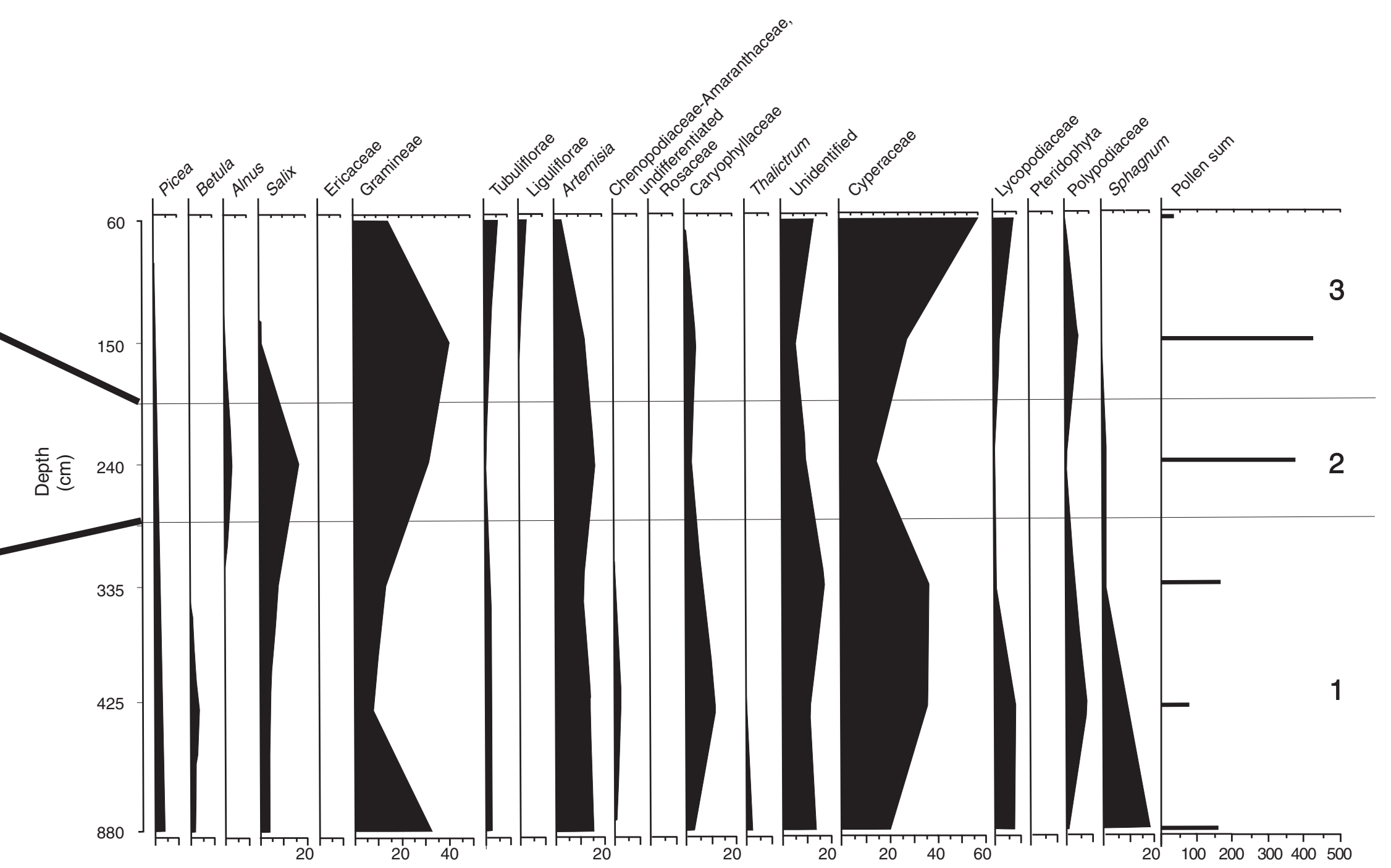
BRYOPHYTES AND VASCULAR PLANT MACROFOSSILS—REVENUE CREEK UPSTREAM

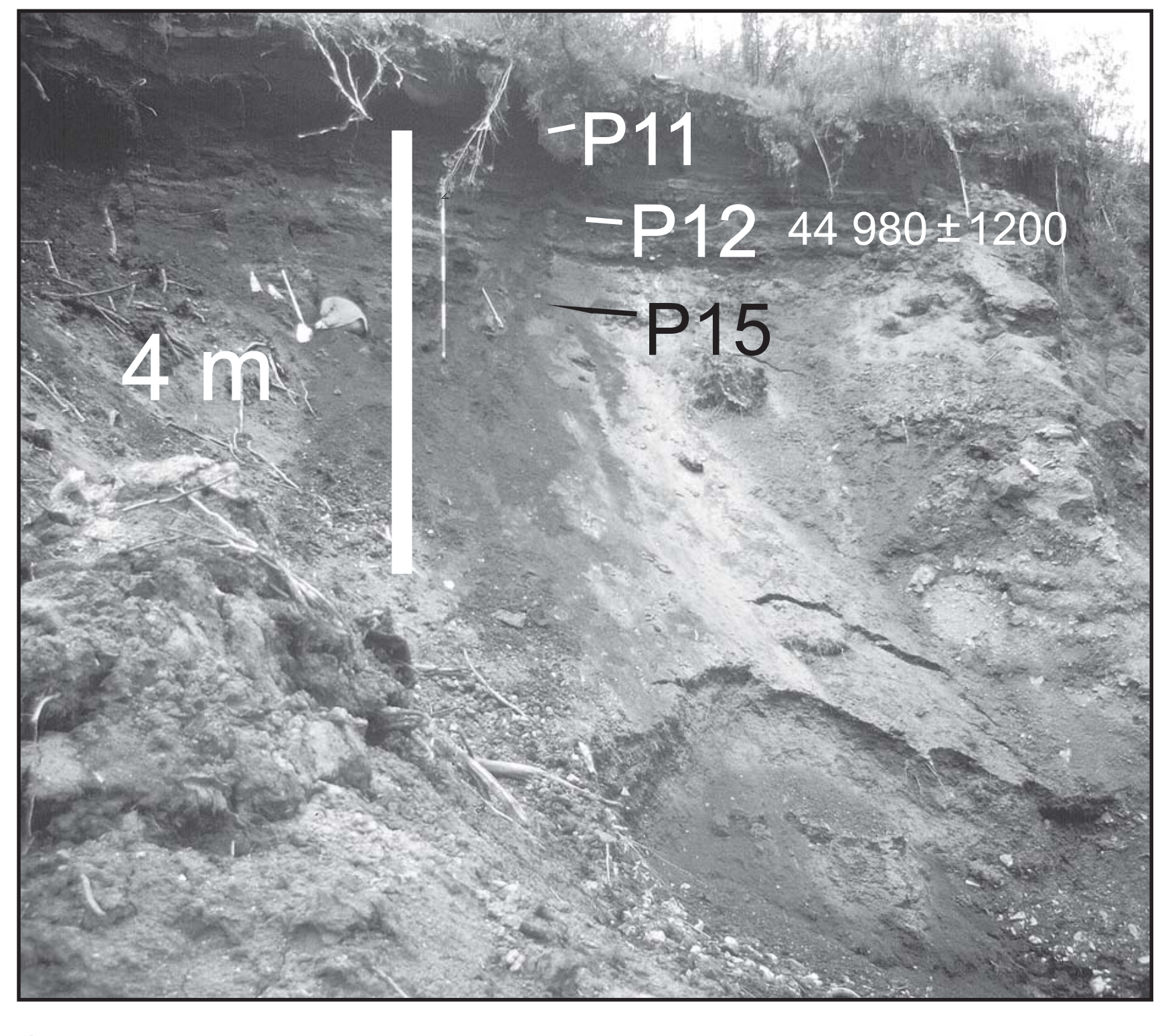
Zone	Sample	Spruce	Birch	Alder	Willow	Sedges (terrestrial)	Goosefoot	Rushes	Heath family	Crowberry	Moss	Burned and unburned wood fragments	Other
3	P11					+						Tr	*Allium* sp. Tr *Androsace septentrionalis* Tr
	P12				Tr	*	Tr	Tr				Tr	Grasses * (5 genera) *Artemisia* sp. + *Dryas* sp. Tr *Potentilla* (2 species) + *Allium* sp. Tr *Androsace septentrionalis* Tr
2	P13				Tr	*	Tr	Tr	Tr				Grasses * (2 genera) *Artemisia* sp. + *Potentilla* (2 species) + *Allium* sp. Tr *Androsace septentrionalis* Tr
1	P14		Tr			*	Tr				Tr	Tr	Grasses *(Poa?* sp.*)* Tr *Potentilla* sp. Tr Tr *Chenopodium spp.* Tr *Androsace Septentrionalis* Tr
	P15	+	Tr			+		Tr	Tr		Tr	Tr	Grasses + *Potentilla* sp. Tr

INSECT REMAINS—REVENUE CREEK UPSTREAM

Sample	Abundance	Preservation	Forest affinity	Wetland affinity	Tundra affinity	Diagnostic taxa
P11	+	P	A	*	*	*Lepidophorous lineaticollis* (O), *Pterostichus (Cryobius): hudsonicus, ventricosus, brevicornis* (O), *Olophrum latum* (W)
P12	+	G	A	*	*	*Trichocellis mannerheimi* (T) *Morychus* sp. (T)
P13	*	G	A	*	*	*Helophorus splendidus* (T) *Olophrum latrum* (T), *Trichocellus mannerheimi* (T), *Elaphrus parviceps* (T) *Erigone* sp. (W), Saldidae (W)
P14	+	G	A	+	O	*Lepidophorus lineaticollis* (O), *Morychus* sp. (O), *Notiophilus* sp. (T), *Aphodius* sp. (T)
P15	Tr	P	Tr	A	A	*Curimposis* sp. (O)

Abundance: * - very abundant. + - common, Tr - trace amounts, A - absent
Environmental affinity: F - closed canopy forest, O - mixed tundra-forest, T - open or tundra, W - wetland
Preservation: G - good, P - poor





e) Sample locations and radiocarbon ages at upstream section. Photograph by L.E. Jackson, Jr. GSC 1999-012K

Figure 28. A pre-Wisconsinan glacial–interglacial record at Revenue Creek placer mine