

## Appendix A and B

APPENDIX A. NOTES ON ECOLOGY AND DISTRIBUTION OF SELECTED TAXA FROM THE FOX PERMAFROST TUNNEL.

Snails

Succinea strigata. This amphibious snail lives on mosses and grasses at pond margins and other damp places (Raymond Rye, U.S. National Museum, written commun., 1982).

Ground Beetles

Bembidion. Most of these beetles are extremely hygrophilous and occur near running water (Lindroth, 1963).

Harpalus. This genus is most abundant in dry, open country, usually on sandy soil. Adults are vegetarian and non-riparian (Lindroth, 1968; J.V. Matthews, Jr., Geological Survey of Canada, oral commun., 1983).

Notiophilus. These beetles occur on dry, sunny substrates (Lindroth, 1961).

Pterostichus (Cryobius) brevicornis. This Holarctic form is widely distributed in the tundra and tundra-forest transition zones. It inhabits dry, open areas with a vegetative cover of grasses or low shrubs and also occurs in leaf litter (Lindroth, 1966).

Pterostichus (Cryobius) ventricosus. This Holarctic species occurs on tundra, where it is found in or near heath-type vegetation, and in forested areas, where it occurs in moderately moist soil, in leaf litter, and along streams (Ball, 1966; Lindroth, 1966).

Other Beetles

Helophorus. An aquatic beetle associated with stagnant or slow-moving water (Arnett, 1963).

Tachinus apertus group (rove beetles). These insects generally are restricted to coastal and alpine tundra, but some specimens of T. instabilis have been taken just below timberline (Campbell, 1973; Ullrich and Campbell, 1974).

Byrrhidae (pill beetles). This group is totally herbivorous as adults and as larvae. They live on moist soil, dry sand, in moss or under stones and logs (Arnett, 1963).

Chrysomelidae (leaf beetles). Both adults and larvae feed on herbaceous plants and leaves of woody plants. They occur in terrestrial and aquatic habitats, and most species are reported to be fairly specific in their food preferences (Arnett, 1963).

#### Weevils

Lepidophorus lineaticollis. This insect occurs in open habitats of dry, sparsely vegetated tundra and forest openings (Matthews, 1974a,b). It is ubiquitous in present-day and in Pleistocene fossil assemblages through Alaska and the Yukon Territory (Matthews, 1974b, 1980, 1982; Morgan and others, 1983). The entire family is herbivorous.

#### Flies

Xylophagus. Larvae of this genus, which occur under the bark of rotten trees where they feed on other insects (Chu, 1949), are represented by diagnostic caudal plates. X. abdominalis is the only species of the genus with a far northern distribution (Leonard, 1930).

#### Wasps

Empria. Most species of this genus are associated with rosaceous plants,

but some feed on Betula, Alnus, Corylus, and Salix. Empria is Holarctic in distribution, extending into Mexico (H. R. Wong, Canadian Forestry Service, written commun., 1982).

#### Flora

Hierochloë odorata or pauciflora. The grass H. odorata grows along river banks up to 300 m altitude in McKinley Park. H. pauciflora, in contrast, grows along the margins of freshwater pools on tundra and does not occur in interior Alaska (Hultén, 1968).

Carex spp. (at least 3 taxa). This genus is represented by abundant seeds with perigynia and achenes. Some seeds resemble C. aquatilis, which occurs in wet meadow or marshy sites (Hultén, 1968).

Kobresia. Three species of Kobresia occur in present-day Alaska on dry and wet substrates within both tundra and forest (Hultén, 1968).

Other plants. Many species of Polygonum, Chenopodium, Ranunculus, Potentilla, and Plantago are associated with wet places (Hultén, 1968).

Fungal sclerotia. Black to dark brown spheres of about 1 mm diameter are thought to be fungal sclerotia based on their morphology. They have also been reported from other fossil assemblages (Matthews, 1974a).

APPENDIX B. TAXA IDENTIFIED FROM ISABELLA BASIN (MATTHEWS, 1974a)  
AND FOX PERMAFROST TUNNEL FOR INTERVAL 35-30 ka. (A = AQUATIC; M =  
MESIC SUBSTRATES; X = XEROC SUBSTRATES.)

POLLEN			
Taxa	Isabella Basin	Permafrost Tunnel	Habitat (if known)
Trees and Shrubs			
<u>Betula</u>	+	+	
<u>Picea</u>	+	+	
<u>Alnus</u>	+	+	
<u>Salix</u>	+	+	
<u>Larix</u>	+		
<u>Ericaceae</u>	+	+	M
<u>Sanguisorba</u>		+	M
Herbs			
<u>Caryophyllaceae</u>	+	+	
<u>Chenopodiaceae</u>	+	+	
<u>Compositae</u>			
<u>Tubuliflorae</u>		+	
<u>Artemisia</u>	+	+	X
<u>Cyperaceae</u>	+	+	
<u>Gramineae</u>	+	+	
<u>Umbelliferae</u>		+	
<u>Ranunculaceae</u>	+		
<u>Epilobium</u>	+		
<u>Potentilla palustris</u>	+	?	M
<u>Cruciferae</u>	+		
Spores			
<u>Polypodiaceae</u>	+		
<u>Selaginella</u>	+		
<u>Equisetum</u>	+		
<u>Sphagnum</u>	+	+	M
<u>Monolete fern</u>	+	+	
<u>Lycopodium</u>	+	+	M/X

## Appendix B (cont.)

## ANIMAL MACROFOSSILS

Taxa		Isabella Basin	Permafrost Tunnel	Habitat (if known)
Bryozoa (moss animicules) +			A	
Mollusca (snails)				
<u>Discus</u>	+		M	
<u>Lymnaea</u>	+		M	
<u>Succinea</u>	+		M	
<u>Vertigo</u>	+		M	
<u>Columella</u>		+	M	
Cladocera (waterfleas)				
<u>Daphnia</u>	+		A	
Aranea (spiders)	+			
Acarí (mites)	+	+		
Coleoptera (beetles)				
<u>Dyschirus</u>	+			
<u>Bembidion</u>	+	+	M	
<u>Aleocharinae</u>		+	M	
<u>Dytiscidae</u>	+		A	
<u>Helophorus</u>		+	A	
<u>Hydroporus</u>	+		A	
<u>Hydrobius</u>	+		A	
<u>Cercyon</u>				
<u>Pseudopsis</u>	+			
<u>Olophorum</u>	+		M	
<u>Borcaphilus</u>	+			
<u>Stenus</u>	+		M	
<u>Silpha</u>	+			
<u>Aphodius</u>	+			
<u>Morychus</u>	+		M/X	
<u>Lathriidae</u>	+			
<u>Donacia</u>	+			
<u>Chrysomelidae</u>		+		
<u>Lepidophorus lineaticollis</u>		+	+	X
<u>Amara</u>		+	X	
<u>Harpalus</u>		+	X	
<u>Pterostichus (Cryobius)</u>		+	M/X	
c.f. <u>Lathrobium</u>		+		
<u>Tachinus</u>		+	M	
<u>Tachyporus</u>		+	M	
<u>Byrrhidae</u>		+	M/X	
Hymenoptera (bees, wasps, ants)	+	+		
Lepidoptera (moths, butterflies)		+		
Diptera (flies)		+		
Hemiptera (true bugs)	+	+		

Appendix B (cont.)

PLANT MACROFOSSILS

Taxa		Isabella Basin	Permafrost Tunnel	Habitat (if known)
Trees and Shrubs				
<u>Betula papyrifera</u>	+			
<u>Betula nana</u> or <u>glandulosa</u>		+		
<u>Salix</u>		+		
<u>Picea</u>	+			
Ericaceae				
<u>Chamaedaphne</u>	+		M	
<u>Arctostaphylos uva-ursi</u>		+		M
<u>Oxycoccus microcarpus</u>	+		M	
<u>Vaccinium</u>	+		M	
Herbs				
Gramineae				
<u>Hierochloë</u>		+	X/M	
<u>Glyceria</u>	+		X/M	
Sedges				
<u>Carex</u>	+	+		
<u>Eriophorum</u>		+	M	
<u>Kobresia</u>		+	X/M	
<u>Scirpus</u>	+		A/M	
<u>Eleocharis</u>	+		A/M	
<u>Polygonum</u>	+	+		
<u>Ranunculus</u>	+	+		
<u>Rubus</u>	+			
<u>Potentilla</u>	+	+		
<u>Chenopodium</u>		+		
<u>Plantago</u>		+		
<u>Mentha</u>	+			
Aquatics or semi-aquatics				
<u>Sparganium</u>	+		A	
<u>Potamogeton</u>	+		A	
<u>Alisma</u>	+		A	
<u>Calla palustris</u>	+		A	
Others				
Fungal sclerotia	+	+		
Bryoid fragments	+			
<u>Equisetum</u>	+	+		

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