

Appendix I

Wildlife

Appendix I1

***Species Known or With Potential to
Occur in the Pike 2 Project Area***

Appendix I1: Species Known or With Potential to Occur in the Pike 2 Project Area

Common Name	Scientific Name	Status	Abundance	At Risk Designation				Species at Risk Observed (Yes or No)	FWMIS Observation (Yes or No)
				Alberta	COSEWIC	SARA			
						Designation	Schedule		
Birds									
Ducks, Geese and Swans									
Greater White-fronted Goose	<i>Anser albifrons</i>	M	S	-	-	-	-	-	-
Snow Goose	<i>Anser caerulescens</i>	M	U	-	-	-	-	-	-
Ross' Goose	<i>Anser rossii</i>	M	S	-	-	-	-	-	-
Cackling Goose	<i>Branta hutchinsii</i>	M	S	-	-	-	-	-	-
Canada Goose	<i>Branta canadensis</i>	S	C	-	-	-	-	-	-
Trumpeter Swan	<i>Cygnus buccinator</i>	S	-	Sensitive	Not at Risk	-	-	-	-
Tundra Swan	<i>Cygnus columbianus</i>	M	C	-	-	-	-	-	-
Gadwall	<i>Mareca strepera</i>	S	U	-	-	-	-	-	-
Eurasian Wigeon	<i>Mareca penelope</i>	M	-	-	-	-	-	-	-
American Widgeon	<i>Mareca americana</i>	S	U	-	-	-	-	-	-
Mallard	<i>Anas platyrhynchos</i>	S	C	-	-	-	-	-	-
Blue-winged Teal	<i>Spatula discors</i>	S	C	-	-	-	-	-	-
Cinnamon Teal	<i>Spatula cyanoptera</i>	S	U	-	-	-	-	-	-
Northern Shoveler	<i>Spatula clypeata</i>	S	U	-	-	-	-	-	-
Northern Pintail	<i>Anas acuta</i>	S	U	-	-	-	-	-	-
Green-winged Teal	<i>Anas crecca</i>	S	C	-	-	-	-	-	-
Canvasback	<i>Aythya valisineria</i>	S	U	-	-	-	-	-	-
Redhead	<i>Aythya americana</i>	S	U	-	-	-	-	-	-
Ring-necked Duck	<i>Aythya collaris</i>	S	U	-	-	-	-	-	-
Greater Scaup	<i>Aythya marila</i>	M	S	-	-	-	-	-	-
Lesser Scaup	<i>Aythya affinis</i>	S	C	-	-	-	-	-	-
Surf Scoter	<i>Melanitta perspicillata</i>	M	U	-	-	-	-	-	-
White-winged Scoter	<i>Melanitta fusca</i>	S	U	Sensitive	-	-	-	-	-
Long-tailed Duck	<i>Clangula hyemalis</i>	M	-	-	-	-	-	-	-
Bufflehead	<i>Bucephala albeola</i>	S	C	-	-	-	-	-	-
Common Goldeneye	<i>Bucephala clangula</i>	S	C	-	-	-	-	-	-
Hooded Merganser	<i>Lophodytes culatus</i>	S	S	-	-	-	-	-	-
Common Merganser	<i>Mergus merganser</i>	S	U	-	-	-	-	-	-
Red-breasted Merganser	<i>Mergus serrator</i>	S	U	-	-	-	-	-	-
Ruddy Duck	<i>Oxyura jamaicensis</i>	S	S	-	-	-	-	-	-
Gray Partridge	<i>Perdix perdix</i>	R	-	-	-	-	-	-	-
Partridges, Grouse and Turkeys									
Ruffed Grouse	<i>Bonasa umbellus</i>	R	C	-	-	-	-	-	-
Spruce Grouse	<i>Falcapennis canadensis</i>	R	C	-	-	-	-	-	-
Willow Ptarmigan'	<i>Lagopus lagopus</i>	R	S	-	-	-	-	-	-
Sharp-tailed Grouse	<i>Tympanuchus phasianellus</i>	R	U	Sensitive	-	-	-	-	-
Loons									
Common Loon	<i>Gavia immer</i>	S	S	-	Not at Risk	-	-	-	-
Grebes									
Pied-billed Grebe	<i>Podilymbus podiceps</i>	S	U	Sensitive	-	-	-	-	-
Horned Grebe	<i>Podiceps auritus</i>	S	U	Sensitive	Special Concern	Special Concern	Schedule 1	No	No
Red-necked Grebe	<i>Podiceps grisegena</i>	S	S	-	Not at Risk	-	-	-	-
Eared Grebe	<i>Podiceps nicricollis</i>	S	S	-	-	-	-	-	-
Western Grebe	<i>Aechmophorus occidentalis</i>	S	S	At Risk	Special Concern	Special Concern	Schedule 1	Yes	No
Pelicans									
American White Pelican	<i>Pelecanus erythrorhynchos</i>	S	U	Sensitive	Not at Risk	-	-	-	-
Cormorants									
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	S	U	-	Not at Risk	-	-	-	-
Bitterns and Herons									
American Bittern	<i>Botaurus lentiginosus</i>	S	S	Sensitive	-	-	-	-	-
Great Blue Heron	<i>Ardea herodias</i>	S	U	Sensitive	-	-	-	-	-
Black-crowned Night-	<i>Nycticorax nycticorax</i>	S	-	Sensitive	-	-	-	-	-
Osprey									
Osprey	<i>Pandion haliaetus</i>	S	U	Sensitive	-	-	-	-	-
Kites, Eagles and Hawks									
Bald Eagle	<i>Haliaeetus</i>	S	U	Sensitive	Not at Risk	-	-	-	-
Northern Harrier	<i>Circus hudsonius</i>	S	U	-	Not at Risk	-	-	-	-
Sharp-shinned Hawk	<i>Accipiter striatus</i>	S	U	-	Not at Risk	-	-	-	-
Cooper's Hawk	<i>Accipiter cooperii</i>	S	S	-	Not at Risk	-	-	-	-
Northern Goshawk	<i>Accipiter gentilis</i>	R	U	Sensitive	Not at Risk	-	-	-	-
Broad-winged Hawk	<i>Buteo platypterus</i>	S	S	Sensitive	-	-	-	-	-
Red-tailed Hawk	<i>Buteo jamaicensis</i>	S	C	-	Not at Risk	-	-	-	-
Rough-legged Hawk	<i>Buteo lagopus</i>	M	U	-	Not at Risk	-	-	-	-
Golden Eagle	<i>Aquila chrysaetos</i>	M	S	Sensitive	Not at Risk	-	-	-	-
Swainson's Hawk	<i>Buteo swainsoni</i>	S	-	-	-	-	-	-	-

Common Name	Scientific Name	Status	Abundance	At Risk Designation				Species at Risk Observed (Yes or No)	FWMIS Observation (Yes or No)
				Alberta	COSEWIC	SARA			
						Designation	Schedule		
Caracaras and Falcons									
American Kestrel	<i>Falco sparverius</i>	S	C	Sensitive	-	-	-	-	-
Merlin	<i>Falco columbarius</i>	S	U	-	Not at Risk	-	-	-	-
Gyrfalcon	<i>Falco rusticolus</i>	W	S	-	Not at Risk	-	-	-	-
Peregrine Falcon	<i>Falco peregrinus</i>	M	S	At Risk	-	-	-	No	No
Rails, Gallinules and Coots									
Yellow Rail	<i>Coturnicops noveboracensis</i>	S	S	Undetermined	Special Concern	Special Concern	Schedule 1	No	No
Virginia Rail	<i>Rallus limicola</i>	S	S	Undetermined	-	-	-	-	-
Sora	<i>Porzana carolina</i>	S	C	Sensitive	-	-	-	-	-
American Coot	<i>Fulica americana</i>	S	C	-	Not at Risk	-	-	-	-
Cranes									
Sandhill Crane	<i>Antigone canadensis</i>	S	U	Sensitive	-	-	-	-	-
Whooping Crane	<i>Grus americana</i>	M	S	At Risk	Endangered	Endangered	Schedule 1	No	No
Avocets and stilts									
American Avocet	<i>Recurvirostra americana</i>	S	-	-	-	-	-	-	-
Lapwings and Plovers									
Black-bellied Plover	<i>Pluvialis squatarola</i>	M	U	-	-	-	-	-	-
American Golden-Plover	<i>Pluvialis dominica</i>	M	U	-	-	-	-	-	-
Semipalmated Plover	<i>Charadrius</i>	M	U	-	-	-	-	-	-
Killdeer	<i>Charadrius vociferus</i>	S	C	-	-	-	-	-	-
Sandpipers, Phalaropes and Allies									
Greater Yellowlegs	<i>Tringa melanoleuca</i>	S	U	-	-	-	-	-	-
Lesser Yellowlegs	<i>Tringa flavipes</i>	S	U	-	-	-	-	-	-
Solitary Sandpiper	<i>Tringa solitaria</i>	S	C	-	-	-	-	-	-
Spotted Sandpiper	<i>Actitis macularia</i>	S	C	-	-	-	-	-	-
Hudsonian Godwit	<i>Limosa haemastica</i>	M	S	-	-	-	-	-	-
Marbled Godwit	<i>Limosa fedoa</i>	S	S	-	-	-	-	-	-
Ruddy Turnstone	<i>Arenaria interpres</i>	M	S	-	-	-	-	-	-
Red Knot	<i>Calidris canutus</i>	M	S	May Be at Risk	-	-	-	No	No
Sanderling	<i>Calidris alba</i>	M	U	-	-	-	-	-	-
Semipalmated Sandpiper	<i>Calidris pusilla</i>	M	U	-	-	-	-	-	-
Least Sandpiper	<i>Calidris minutilla</i>	M	U	-	-	-	-	-	-
White-rumped Sandpiper	<i>Calidris fuscicollis</i>	M	S	-	-	-	-	-	-
Baird's Sandpiper	<i>Calidris bairdii</i>	M	U	-	-	-	-	-	-
Pectoral Sandpiper	<i>Calidris melanotos</i>	M	U	-	-	-	-	-	-
Stilt Sandpiper	<i>Calidris himantopus</i>	M	S	-	-	-	-	-	-
Buff-breasted Sandpiper	<i>Calidris subrifcollis</i>	M	R	-	Special Concern	Special Concern	Schedule 1	No	No
Short-billed Dowitcher	<i>Limnodromus griseus</i>	S	R	Undetermined	-	-	-	-	-
Long-billed Dowitcher	<i>Limnodramus scolopaceus</i>	M	U	-	-	-	-	-	-
Wilson's Snipe	<i>Gallinago delicata</i>	S	C	-	-	-	-	-	-
Wilson's Phalarope	<i>Phalaropus tricolor</i>	S	U	-	-	-	-	-	-
Red-necked Phalarope	<i>Phalaropus lobatus</i>	M	S	-	Special Concern	No Status	No Schedule	No	No
Dunlin	<i>Calidris alpina</i>	M	-	-	-	-	-	-	-
Upland Sandpiper	<i>Bartramia longicauda</i>	S	-	Sensitive	-	-	-	-	-
Gulls, Terns and Skimmers									
Franklin's Gull	<i>Leucophaeus pipixcan</i>	S	U	-	-	-	-	-	-
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>	S	U	-	-	-	-	-	-
Mew Gull	<i>Larus canus</i>	M	S	-	-	-	-	-	-
Ring-billed Gull	<i>Larus delawarensis</i>	S	U	-	-	-	-	-	-
California Gull	<i>Larus californicus</i>	S	U	-	-	-	-	-	-
Herring Gull	<i>Larus argentatus</i>	S	U	-	-	-	-	-	-
Thayer's Gull	<i>Larus thayeri</i>	M	S	-	-	-	-	-	-
Glaucus Gull	<i>Larus hyperboreus</i>	M	S	-	-	-	-	-	-
Caspain Tern	<i>Hydroprogne caspia</i>	M	S	Sensitive	Not at Risk	-	-	-	-
Common Tern	<i>Sterna hirundo</i>	S	U	-	Not at Risk	-	-	-	-
Forster's Tern	<i>Sterna forsteri</i>	S	U	Sensitive	-	-	-	-	-
Black Tern	<i>Chlidonias niger</i>	S	U	Sensitive	Not at Risk	-	-	-	-
Pigeons and Doves									
Rock Dove	<i>Columba livia</i>	S	S	-	-	-	-	-	-
Mourning Dove	<i>Zenaidura macroura</i>	S	S	-	-	-	-	-	-
Owls									
Great Horned Owl	<i>Bubo virginianus</i>	R	U	-	-	-	-	-	-
Snowy Owl	<i>Bubo scandiaca</i>	R	S	-	Not at Risk	-	-	-	-
Northern Hawk Owl	<i>Surnia ulula</i>	R	S	-	Not at Risk	-	-	-	-
Barred Owl	<i>Strix varia</i>	R	U	Sensitive	-	-	-	-	-
Great Gray Owl	<i>Strix nebulosa</i>	R	U	Sensitive	Not at Risk	-	-	-	-
Long-eared Owl	<i>Asio otus</i>	S	S	-	-	-	-	-	-
Short-eared Owl	<i>Asio flammeus</i>	S	S	May Be at Risk	Special Concern	Special Concern	Schedule 1	Yes	No
Boreal Owl	<i>Aegolius funereus</i>	R	C	-	Not at Risk	-	-	-	-
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	R	S	-	-	-	-	-	-

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				Alberta	COSEWIC	SARA			
						Designation	Schedule		
Goatsuckers									
Common Nighthawk	<i>Chordeiles minor</i>	S	U	Sensitive	Special Concern	Threatened	Schedule 1	Yes	No
Hummingbirds									
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	S	U	-	-	-	-	-	-
Kingfishers									
Belted Kingfisher	<i>Megaceryle alcyon</i>	S	U	-	-	-	-	-	-
Woodpeckers									
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	S	C	-	-	-	-	-	-
Downy Woodpecker	<i>Picoides pubescens</i>	R	C	-	-	-	-	-	-
Hairy Woodpecker	<i>Picoides villosus</i>	R	C	-	-	-	-	-	-
American Three-toed Woodpecker	<i>Picoides dorsalis</i>	R	U	-	-	-	-	-	-
Black-backed Woodpecker	<i>Picoides arcticus</i>	R	U	Sensitive	-	-	-	-	-
Northern Flicker	<i>Colaptes auratus</i>	R	C	-	-	-	-	-	-
Pileated Woodpecker	<i>Dryocopus pileatus</i>	R	U	Sensitive	-	-	-	-	-
Tyrant Flycatchers									
Olive-sided Flycatcher	<i>Contopus cooperi</i>	S	U	May Be at Risk	Special Concern	Threatened	Schedule 1	Yes	No
Western Wood-Pee-wee	<i>Contopus sordidulus</i>	S	U	May Be at Risk	-	-	-	Yes	No
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	S	C	Undetermined	-	-	-	-	-
Alder Flycatcher	<i>Empidonax alnorum</i>	S	C	Sensitive	-	-	-	-	-
Least Flycatcher	<i>Empidonax minimus</i>	S	U	Sensitive	-	-	-	-	-
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	S	-	Sensitive	-	-	-	-	-
Eastern Phoebe	<i>Sayornis phoebe</i>	S	S	Sensitive	-	-	-	-	-
Say's Phoebe	<i>Sayornis says</i>	S	S	-	-	-	-	-	-
Eastern Kingbird	<i>Tyrannus tyrannus</i>	S	S	Sensitive	-	-	-	-	-
Shrikes									
Northern Shrike	<i>Lanius borealis</i>	M	S	-	-	-	-	-	-
Vireos									
Blue-headed Vireo	<i>Vireo solitarius</i>	S	U	-	-	-	-	-	-
Warbling Vireo	<i>Vireo gilvus</i>	S	U	-	-	-	-	-	-
Philadelphia Vireo	<i>Vireo philadelphicus</i>	S	U	-	-	-	-	-	-
Red-eyed Vireo	<i>Vireo olivaceus</i>	S	C	-	-	-	-	-	-
Crows and Jays									
Gray Jay	<i>Perisoreus canadensis</i>	R	C	-	-	-	-	-	-
Blue Jay	<i>Cyanocitta cristata</i>	S	S	-	-	-	-	-	-
Black-billed Magpie	<i>Pica hudsonia</i>	R	S	-	-	-	-	-	-
American Crow	<i>Corvus brachyrhynchos</i>	S	U	-	-	-	-	-	-
Common Raven	<i>Corvus corax</i>	R	C	-	-	-	-	-	-
Larks									
Horned Lark	<i>Eremophila alpestris</i>	M	U	-	-	-	-	-	-
Swallows									
Purple Martin	<i>Progne subis</i>	S	S	Sensitive	-	-	-	-	-
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	S	-	-	-	-	-	-	-
Tree Swallow	<i>Tachycineta bicolor</i>	S	C	-	-	-	-	-	-
Bank Swallow	<i>Riparia riparia</i>	S	U	Sensitive	Threatened	Threatened	Schedule 1	No	No
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	S	C	-	-	-	-	-	-
Barn Swallow	<i>Hirundo rustica</i>	S	C	Sensitive	Threatened	Threatened	Schedule 1	Yes	Yes
Titmice and Chickadees									
Black-capped Chickadee	<i>Poecile atricapillus</i>	R	C	-	-	-	-	-	-
Boreal Chickadee	<i>Poecile hudsonicus</i>	R	C	-	-	-	-	-	-
Nuthatches									
Red-breasted Nuthatch	<i>Sitta canadensis</i>	R	C	-	-	-	-	-	-
White-breasted Nuthatch	<i>Sitta carolinensis</i>	R	S	-	-	-	-	-	-
Creepers									
Brown Creeper	<i>Certhia americana</i>	R	S	Sensitive	-	-	-	-	-
Wrens									
House Wren	<i>Troglodytes aedon</i>	S	C	-	-	-	-	-	-
Winter Wren	<i>Troglodytes hiemalis</i>	S	U	-	-	-	-	-	-
Sedge Wren	<i>Cistothorus platensis</i>	S	S	Sensitive	Not at Risk	-	-	-	-
Marsh Wren	<i>Cistothorus palustris</i>	S	U	-	-	-	-	-	-
Kinglets									
Golden-crowned Kinglet	<i>Regulus satrapa</i>	R	U	-	-	-	-	-	-
Ruby-crowned Kinglet	<i>Regulus calendula</i>	S	C	-	-	-	-	-	-
Thrushes									
Mountain Bluebird	<i>Sialia currucoides</i>	M	S	-	-	-	-	-	-
Veery	<i>Catharus fuscescens</i>	M	S	-	-	-	-	-	-
Gray-cheeked Thrush	<i>Catharus minimus</i>	M	S	Undetermined	-	-	-	-	-
Swainson's Thrush	<i>Catharus ustulatus</i>	S	C	-	-	-	-	-	-
Hermit Thrush	<i>Catharus guttatus</i>	S	C	-	-	-	-	-	-
Townsend's Solitaire	<i>Myadestes townsendi</i>	W	-	-	-	-	-	-	-
American Robin	<i>Turdus migratorius</i>	S	U	-	-	-	-	-	-

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				Alberta	COSEWIC	SARA			
						Designation	Schedule		
Mockingbirds, Catbirds and Thrashers									
Gray Catbird	<i>Dumetella carolinensis</i>	S	S	-	-	-	-	-	-
Starlings									
European Starling	<i>Sturnus vulgaris</i>	S	S	-	-	-	-	-	-
Wagtails and Pipits									
American Pipit	<i>Anthus rubescens</i>	M	C	-	-	-	-	-	-
Waxwings									
Bohemian Waxwing	<i>Bombycilla garrulus</i>	R	U	-	-	-	-	-	-
Cedar Waxwing	<i>Bombycilla cedrorum</i>	S	U	-	-	-	-	-	-
Wood Warblers									
Tennessee Warbler	<i>Oreothlypis peregrina</i>	S	C	-	-	-	-	-	-
Orange-crowned Warbler	<i>Oreothlypis celata</i>	S	U	-	-	-	-	-	-
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	S	S	-	-	-	-	-	-
Yellow Warbler	<i>Setophaga petechia</i>	S	U	-	-	-	-	-	-
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	S	S	-	-	-	-	-	-
Magnolia Warbler	<i>Dendroica magnolia</i>	S	U	-	-	-	-	-	-
Cape May Warbler	<i>Setophaga tigrina</i>	S	S	Sensitive	-	-	-	-	-
Yellow-rumped Warbler	<i>Setophaga coronata</i>	S	C	-	-	-	-	-	-
Black-throated Green Warbler	<i>Setophaga virens</i>	S	S	Sensitive	-	-	-	-	-
Blackburnian Warbler	<i>Setophaga fusca</i>	S	S	Sensitive	-	-	-	-	-
Palm Warbler	<i>Setophaga palmarum</i>	S	U	-	-	-	-	-	-
Bay-breasted Warbler	<i>Setophaga castanea</i>	S	U	Sensitive	-	-	-	-	-
Blackpoll Warbler	<i>Setophaga striata</i>	S	U	-	-	-	-	-	-
Black and White Warbler	<i>Mniotilta varia</i>	S	U	-	-	-	-	-	-
American Redstart	<i>Setophaga ruticilla</i>	S	U	-	-	-	-	-	-
Ovenbird	<i>Seiurus aurocapillus</i>	S	C	-	-	-	-	-	-
Northern Waterthrush	<i>Parkesia noveboracensis</i>	S	U	-	-	-	-	-	-
Connecticut Warbler	<i>Oporornis agilis</i>	S	U	-	-	-	-	-	-
Mourning Warbler	<i>Geothlypis philadelphia</i>	S	U	-	-	-	-	-	-
Common Yellowthroat	<i>Geothlypis trichas</i>	S	U	Sensitive	-	-	-	-	-
Wilson's Warbler	<i>Cardellina pusilla</i>	S	U	-	-	-	-	-	-
Canada Warbler	<i>Cardellina canadensis</i>	S	S	At Risk	Threatened	Threatened	Schedule 1	No	No
Tanagers									
Western Tanager	<i>Piranga ludoviciana</i>	S	U	Sensitive	-	-	-	-	-
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	S	U	-	-	-	-	-	-
Indigo Bunting	<i>Passerina cyanea</i>	M	-	-	-	-	-	-	-
Emberizids									
American Tree Sparrow	<i>Spizelloides arborea</i>	W	S	-	-	-	-	-	-
Chipping Sparrow	<i>Spizella passerina</i>	S	C	-	-	-	-	-	-
Clay-colored Sparrow	<i>Spizella pallida</i>	S	U	-	-	-	-	-	-
Vesper Sparrow	<i>Pooecetes gramineus</i>	S	S	-	-	-	-	-	-
Savannah Sparrow	<i>Passerculus sandwichensis</i>	S	U	-	-	-	-	-	-
LeConte's Sparrow	<i>Ammodramus leconteii</i>	S	U	-	-	-	-	-	-
Nelson's Sharp-tailed Sparrow	<i>Ammodramus nelsoni</i>	S	S	-	Not at Risk	-	-	-	-
Fox Sparrow	<i>Passerella iliaca</i>	S	S	-	-	-	-	-	-
Song Sparrow	<i>Melospiza melodia</i>	S	U	-	-	-	-	-	-
Lincoln's Sparrow	<i>Melospiza lincolni</i>	S	C	-	-	-	-	-	-
Lark Sparrow	<i>Chondestes grammacus</i>	S	-	-	-	-	-	-	-
Swamp Sparrow	<i>Melospiza georgiana</i>	S	U	-	-	-	-	-	-
White-throated Sparrow	<i>Zonotrichia albicollis</i>	S	C	-	-	-	-	-	-
Harris' Sparrow	<i>Zonotrichia querula</i>	M	U	-	Special Concern	No Status	No Schedule	No	No
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	M	C	-	-	-	-	-	-
Dark-eyed Junco	<i>Junco hyemalis</i>	S	C	-	-	-	-	-	-
Longspurs and Snow Buntings									
Lapland Longspur	<i>Calcarius lapponicus</i>	M	U	-	-	-	-	-	-
Smith's Longspur	<i>Calcarius pictus</i>	M	-	-	-	-	-	-	-
Snow Bunting	<i>Plectrophenax nivalis</i>	W	C	-	-	-	-	-	-
Blackbirds									
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	S	U	-	-	-	-	-	-
Western Meadowlark	<i>Sturnella neglecta</i>	S	-	-	-	-	-	-	-
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	S	U	-	-	-	-	-	-
Rusty Blackbird	<i>Euphagus carolinus</i>	S	U	Sensitive	Special Concern	Special Concern	Schedule 1	Yes	No
Brewer's Blackbird	<i>Euphagus</i>	S	U	-	-	-	-	-	-
Common Grackle	<i>Quiscalus quiscula</i>	S	U	-	-	-	-	-	-
Brown-headed Cowbird	<i>Molothrus ater</i>	S	U	-	-	-	-	-	-
Baltimore Oriole	<i>Icterus galbula</i>	S	S	Sensitive	-	-	-	-	-

Common Name	Scientific Name	Status	Abundance	At Risk Designation				Species at Risk Observed (Yes or No)	FWMIS Observation (Yes or No)
				Alberta	COSEWIC	SARA			
						Designation	Schedule		
Fringilline and Cardueline Finches									
Pine Grosbeak	<i>Pinicola enucleator</i>	W	S	-	-	-	-	-	-
Gray-crowned Rosy-Finch	<i>Leucosticte tephrocotis</i>	W	-	-	-	-	-	-	-
Purple Finch	<i>Haemorhous pupureus</i>	S	U	-	-	-	-	-	-
House Finch	<i>Haemorhous mexicanus</i>	R	-	-	-	-	-	-	-
Red Crossbill	<i>Loxia curvirostra</i>	R	S	-	-	-	-	-	-
White-winged Crossbill	<i>Loxia leucoptera</i>	R	U	-	-	-	-	-	-
Common Redpoll	<i>Acanthis flammea</i>	W	U	-	-	-	-	-	-
Hoary Redpoll	<i>Acanthis hornemmani</i>	W	S	-	-	-	-	-	-
Pine Siskin	<i>Spinus pinus</i>	S	C	-	-	-	-	-	-
American Goldfinch	<i>Spinus tristis</i>	S	U	-	-	-	-	-	-
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	R	U	-	Special Concern	No Status	No Schedule	No	No
Old World Sparrows									
House Sparrow	<i>Passer domesticus</i>	R	U	-	-	-	-	-	-
Mammals									
Shrews									
Masked Shrew	<i>Sorex cinereus</i>	R	C	-	-	-	-	-	-
Dusky Shrew	<i>Sorex monticolus</i>	R	C	-	-	-	-	-	-
Common Water Shrew	<i>Sorex palustris</i>	R	U	-	-	-	-	-	-
Arctic Shrew	<i>Sorex arcticus</i>	R	C	-	-	-	-	-	-
Pygmy Shrew	<i>Sorex hoyi</i>	R	U	-	-	-	-	-	-
Bats									
Little Brown Bat	<i>Myotis lucifugus</i>	R	C	May Be at Risk	Endangered	Endangered	Schedule 1	Yes	No
Northern Bat	<i>Myotis septentrionalis</i>	R	U	May Be at Risk	Endangered	Endangered	Schedule 1	Yes	No
Silver-haired Bat	<i>Lasiorycteris noctivagans</i>	S	C	Sensitive	-	-	-	-	-
Big Brown Bat	<i>Eptesicus fuscus</i>	R	U	-	-	-	-	-	-
Hoary Bat	<i>Lasiurus cinereus</i>	R	U	-	-	-	-	-	-
Red Bat	<i>Lasiurus borealis</i>	R	S	Sensitive	-	-	-	-	-
Hares									
Snowshoe Hare	<i>Lepus americanus</i>	R	C	-	-	-	-	-	-
Rodents									
Least Chipmunk	<i>Neotamias minimus</i>	R	C	-	-	-	-	-	-
Woodchuck	<i>Marmota monax</i>	R	U	-	-	-	-	-	-
Red Squirrel	<i>Tamiasciurus</i>	R	C	-	-	-	-	-	-
Northern Flying Squirrel	<i>Glaucomys sabrinus</i>	R	C	-	-	-	-	-	-
American Beaver	<i>Castor canadensis</i>	R	C	-	-	-	-	-	-
Deer Mouse	<i>Peromyscus maniculatus</i>	R	C	-	-	-	-	-	-
Southern Red-backed Vole	<i>Myodes gapperi</i>	R	C	-	-	-	-	-	-
Heather Vole	<i>Phenacomys</i>	R	U	-	-	-	-	-	-
Meadow Vole	<i>Microtus pennsylvanicus</i>	R	C	-	-	-	-	-	-
Muskrat	<i>Ondatra zibethicus</i>	R	C	-	-	-	-	-	-
Northern Bog Lemming	<i>Synaptomys borealis</i>	R	U	-	-	-	-	-	-
Meadow Jumping Mouse	<i>Zapus hudsonius</i>	R	C	-	-	-	-	-	-
Common Porcupine	<i>Erethizon dorsatum</i>	R	C	-	-	-	-	-	-
Canid Family									
Coyote	<i>Canis latrans</i>	R	C	-	-	-	-	-	-
Gray Wolf	<i>Canis lupus</i>	R	U	-	-	-	-	-	-
Red Fox	<i>Vulpes vulpes</i>	R	U	-	-	-	-	-	-
Bears									
Black Bear	<i>Ursus americanus</i>	R	C	-	Not at Risk	-	-	-	-
Weasel Family									
American Marten	<i>Martes americana</i>	R	C	-	-	-	-	-	-
Fisher	<i>Martes pennanti</i>	R	U	Sensitive	-	-	-	-	-
Short-tailed Weasel	<i>Mustela erminea</i>	R	C	-	-	-	-	-	-
Least Weasel	<i>Mustela nivalis</i>	R	C	-	-	-	-	-	-
American Mink	<i>Neovison vison</i>	R	C	-	-	-	-	-	-
Wolverine	<i>Gulo gulo</i>	R	S	May Be at Risk	Special Concern	Special Concern	Schedule 1	No	No
Striped Skunk	<i>Mephitis mephitis</i>	R	U	-	-	-	-	-	-
Northern River Otter	<i>Lutra canadensis</i>	R	U	-	-	-	-	-	-
Feline Family									
Canada Lynx	<i>Lynx canadensis</i>	R	U	Sensitive	Not at Risk	-	-	-	-
Ungulates									
Elk	<i>Cervus elaphus</i>	R	S	-	-	-	-	-	-
Mule Deer	<i>Odocoileus hemionus</i>	R	U	-	-	-	-	-	-
White-tailed Deer	<i>Odocoileus virginianus</i>	R	C	-	-	-	-	-	-
Moose	<i>Alces alces</i>	R	U	-	-	-	-	-	-
Caribou	<i>Rangifer tarandus caribou</i>	R	S	At Risk	Threatened	Threatened	Schedule 1	Yes	Yes

Common Name	Scientific Name	Status	Abundance	At Risk Designation				Species at Risk Observed (Yes or No)	FWMIS Observation (Yes or No)
				Alberta	COSEWIC	SARA			
						Designation	Schedule		
Amphibians and Reptiles									
Amphibians									
Western Toad	<i>Anaxyrus boreas</i>	R	U	Sensitive	Special Concern	Special Concern	Schedule 1	Yes	Yes
Canadian Toad	<i>Bufo hemiophrys</i>	R	S	May Be at Risk	Not at Risk	-	-	-	-
Northern Leopard Frog	<i>Lithobates pipiens</i>	R	S	Threatened	Special Concern	Special Concern	Schedule 1	No	No
Boreal Chorus Frog	<i>Pseudacris maculata</i>	R	C	-	-	-	-	-	-
Wood Frog	<i>Lithobates sylvatica</i>	R	C	-	-	-	-	-	-
Reptiles									
Red-sided Gatersnake	<i>Thamnophis sirtalis</i>	R	S	Sensitive	-	-	-	No	No

Notes:

^a Status Definitions

- S** - Summer resident, migrates out of study area for the winter.
- W** - Winter resident, present only during late fall, winter and early spring.
- R** - Permanent resident, present year-round although not necessarily active during winter.
- M** - Migrant, passes through area during spring and/or fall, not normally resident at any time of the year.
- T** - Transient, expected to occur only in passing, not normally resident at any time of the year.

^b Abundance Definitions

- C** - Common, detected whenever suitable habitat is investigated during an appropriate season.
- U** - Uncommon, detected often, but not always, whenever suitable habitat is investigated during an appropriate season.
- S** - Scarce, detected occasionally, but not usually, even when suitable habitat is investigated during an appropriate season.
- R** - Rare, unexpected but could occur in any given year, would not generally be considered a regular component of the study area fauna.

Appendix 12

Detailed Baseline Survey Methods

DETAILED SURVEY METHODS

1.0 WINTER TRACKING

Triangle transects measured 9 km in length (3 km per side). Data were collected at 50 m intervals (termed a 'sub-transect') along each transect. The tracking triangle approach was adopted from long-term monitoring techniques originating in Finland (Linden et al. 1996) and adopted by the Alberta Biodiversity Monitoring Program (Shank and Farr 1999). Ecosite phase maps at a scale of 1:20,000 and hand-held global positioning systems (GPS) were used for navigation and orientation purposes and to measure transect and sub-transect lengths.

The number of fresh animal trails crossing the transect path since the last snowfall event were recorded by species. Animal tracks were identified to species by print, stride and straddle. Multiple-pass hare and red squirrel trails were enumerated as five animals. Fresh bed sites (since the last snowfall event) and ungulate foraging events (current winter browse associated with fresh trails) were recorded within a 3 m band on either side of the transect path. Detailed information on anthropogenic features (i.e., pipelines, cut lines, roads, etc.) was also recorded including occurrence, human use and wildlife use at the end of each 50 m sub-transect. Wildlife tracking data were collected a minimum of 24 hours after a snowfall event and continued until the track record was obliterated by wind, snow melt, or new snowfall. Tracking data and snow depth measurements were completed at the end of each 50 m sub-transect. A universal transverse mercator (UTM) coordinate marking the start and end of each 50 m sub-transect was recorded.

The number of kilometre-days (length of transect multiplied by the days since last snowfall) was calculated for each transect and sub-transect. The number of animal trails per km-day by species was calculated by study area, habitat type and transect.

2.0 UNGULATE AERIAL SURVEY

Ungulate aerial surveys were conducted at two different scales including regional (WMU 517) and local (Jackfish and Pike mineral surface lease areas). Specific methods were outlined by Devon in support of their Pike application (Devon 2012).

3.0 SPRING UNGULATE PELLET GROUP/BROWSE AVAILABILITY SURVEY

Pellet group/browse availability transects replicated the established winter tracking triangle transects throughout the terrestrial local study area (TLSA). The objectives of these surveys were to:

- provide data on the presence/non-absence and relative abundance of ungulates (moose, deer spp. and woodland caribou) in the TLSA and by ecosite phase;
- provide data on browse availability and use of woody forage species for moose and deer spp.; and
- describe the frequency of occurrence and abundance of terrestrial and arboreal lichen for woodland caribou.

Ecosite phase and topographic maps at a scale of 1:20,000 were used to identify transect locations and for orientation purposes.

Observers searched for ungulate pellet groups and carnivore scats one metre on either side of the transect line. Each transect was broken into 50 m sub-transects. A UTM coordinate for the start and end point of each 50 m sub-transect was recorded. Winter (non-growing season) pellet groups were recorded separately from summer (growing season) pellet groups based on shape and texture.

At the end of each 50 m sub-transect, a detailed browse availability/use plot was completed using a 5.6 m radius (100 m²) plot. The percent cover class of each woody shrub species available within the plot was recorded. Cover classes included nil (0 to 5%), low (6 to 25%), moderate (26 to 50%), high (51 to 75%), and very high (>75%) (Daubenmire 1959). An estimate of the percent of available twigs browsed was also completed using the same classes. The browse use classes measured forage use of woody plants by all ungulates and did not make a distinction as to the actual ungulate species using these plants. Terrestrial lichen cover was estimated using a representative 1 m x 1 m plot nested within the larger 5.6 m radius plot. Arboreal lichen cover was estimated using five relative abundance cover classes as per the methods of Armleder et al. (1992).

Pellet group/browse survey transects were overlain onto ecosite phase mapping within a geographic information system (GIS). Each sub-transect was assigned an ecosite phase type using field notes and GIS query data. A count was made of the number of pellet groups or scats per total sub-transect sampling area (50 m x 2 m or 100 m²) for all segments. The resultant measure of ungulate use was the number of pellet groups/ha per animal species and ecosite phase type. Frequency of occurrence (constancy) and mean percent canopy coverage (midpoints of canopy closure classes) of each available woody browse plant was calculated for sub-transects by vegetation cover type. These two values were multiplied to provide an availability index value for each browse species and vegetation type. The frequency of use and mean percent browsing (midpoints of vegetation cover classes) of woody browse species was calculated for each species and vegetation cover type. These two values were multiplied to determine a browse use index value for each woody browse species and ecosite phase type.

4.0 AMPHIBIAN CALL SURVEY

The primary objective of this survey was to detect species occurrence and relative abundance; establishing a baseline for comparison with past and future replicates. Western toad (*Bufo boreas*), Canadian toad (*Bufo hemiophrys*) and northern leopard frog (*Rana pipens*) were the targeted species due to their listings provincially and federally. Western toad is listed as Sensitive in Alberta (AEP 2015) and Special Concern Schedule 1 federally (COSEWIC 2018). Canadian toad is listed as May Be At Risk in Alberta (AEP 2015). Northern leopard frog is listed as At Risk in Alberta (AEP 2015) and Special Concern Schedule 1 federally (COSEWIC 2018).

Nocturnal survey sites for amphibians were established within and immediately adjacent to the TLSA at 1,000 m intervals along linear features where safe night time access was possible. Sites were surveyed beginning 30 minutes after sunset. Surveying was not carried out at temperatures below 5°C as amphibian calling declines markedly below this temperature.

At each survey site, a one minute “quiet down” was honoured to allow amphibians disturbed by vehicular noise to resume calling, followed by a two minute listening period. Calls were identified to species and a qualitative assessment made as to the number present – one or two, several (3 to 5) and many (>5). Weather conditions – temperature, wind speed (Beaufort scale – AEP 2013), and percentage cloud cover – were recorded at the start of each night’s survey. The survey site UTM coordinates were also recorded using a hand-held GPS unit.

5.0 BREEDING SONGBIRD CALL SURVEY

Breeding songbird point count surveys were undertaken within the TLSA to document the diversity and abundance of breeding songbirds. Point counts were established within representative habitat types. Efforts were made to establish point counts at a minimal distance of 100 m from any anthropogenic feature. However, close proximity to linear features was occasionally unavoidable, specifically within low impact seismic areas, where line spacing was <100 m.

Point counts were completed between approximately 04:00 and 09:00 hours. Each point count consisted of a two minute calming period followed by a five minute detection period. Surveys were completed under low wind conditions with no significant precipitation. All birds observed visual or acoustically within the 100 m radius plot were recorded to species. Species detected outside the survey plot were also recorded and included as incidentals. Descriptive weather data (temperature, sky condition, wind – Beaufort wind scale (AEP 2013) were recorded at the beginning and end of each transect (sampling window).

Analysis of breeding songbird data included species richness and diversity, species presence, relative abundance (by species and habitat), habitat use, and detection of species at risk. Replicate sample plots enabled back-casting/retrospective analysis through temporal comparison. The Shannon-Wiener Diversity Index (H) was used to quantify diversity for a given area or habitat. Species evenness (E) was calculated using (H) and the natural logarithm of (S).

Evenness refers to how close in numbers each species in an environment are. Evenness values will range from 0-1, where variation in species richness decreases as values approach 1 (complete evenness). These calculations are detailed below:

$$H = -\sum (Pi \ln(Pi))$$
$$E = H/\ln(S)$$

where: S = total number species in a habitat;
Pi = proportion of S made up of the ith species; and
E= equability of species distribution.

6.0 OWL CALL PLAYBACK

Owl call playback surveys were completed within the TLSA to solicit behavioural or vocal response from owls. Baseline owl data were collected to understand local abundance and diversity as well as for the detection of owl species at risk (e.g., barred owl, great gray owl). Call playback surveys were not carried

out under adverse weather conditions (e.g., precipitation or high winds). Descriptive weather data (temperature, sky conditions, wind (Beaufort scale), and precipitation) were recorded at the beginning of each survey session. Typically, these surveys began 30 minutes after sunset and continued until midnight. However, to increase detection rates of Northern Saw-whet Owls, some surveys sites were sampled before sunset.

Call playbacks were discontinued in areas where predators were suspected to be in the vicinity. Survey sites were typically established along roads and trails that enabled safe and suitable night time access. Call playback locations were spaced at roughly 1,600 m intervals to eliminate “double counting” of calling owls. Upon arriving at site, a two minute quiet down period was honoured to counteract the effects of vehicular disturbance. Recordings of boreal owl, great gray owl, long-eared owl and barred owl calls were broadcast to maximize the potential of soliciting responses. Broadcast procedures included playing a one minute recording of the selected owl species followed by an additional one minute listening period. Calls were broadcast using a digital CD recording played over a portable CD/stereo player. Total survey time per site was 10 minutes including the two minute quiet down period. All responses were recorded to species. An approximate distance (m) and compass bearing was noted and a UTM coordinate was recorded for each survey site.

7.0 RAPTOR AND WOODPECKER CALL PLAYBACK

Survey methods for the raptor call playback were similar to those described for the owl call playback. Raptor call playback sites replicated locations surveyed for the owl call playback survey. Notable differences for this survey included time of day and target species. The raptor call playback surveys were completed between sunrise and approximately 14:00 hours.

Broadcast calling was achieved using the same system used for the owl call playback. Target species for this survey included northern goshawk, broad-winged hawk and pileated woodpecker. Mapping of suitable owl and raptor nesting habitat (i.e., old growth upland forest) was used to ensure proximity of sampling locations to areas with greatest likelihood of species at risk occurrence.

8.0 ACOUSTIC BAT SURVEY

Acoustic bat surveys were completed to determine the presence/non-absence, diversity and relative abundance of bat species in the TLSA. Acoustic surveys measure bat passes and feeding buzzes. Surveys commenced one half hour after sunset and ended one half hour before sunrise. Survey stations were established 500 m apart along linear features where safe night travel was possible. Surveys were only completed during appropriate weather conditions, with weather attributes (temperature, sky condition and wind (Beaufort scale)) recorded throughout the survey.

Each survey site consisted of a five-minute listening period using an Anabat SD2 detector. The detector was held with the microphone at a 45 degree angle and slowly rotated 360 degrees for the duration of the sampling period. If a bat was detected, the detector was held stationary for 15 seconds to avoid duplicate counts.

Total detector hours were calculated for the TLSA and by ecosite phase.

8.1 Acoustic Bat Call Analysis

Data were analyzed using AnalookW, version 4.1 by Chris Corben. Echolocation call characteristics were used to identify bat species. Call characteristics used to establish species included:

- minimum frequency;
- maximum frequency;
- call duration;
- call slope; and
- call shape

Call characteristics were compared to reference calls in literature and call libraries (Adams 2003; Keinath 2011; WDNR 2016; WDNN 2016). In addition, local reference calls within Omnia's call library were used where possible.

9.0 BAT MIST NET SURVEY

Passive capture mist nets were used to trap bats within the TLSA and terrestrial local study area (TRSA). Trapping occurred between sunset and sunrise each night. Trapping was not completed during times of inclement weather including precipitation, when wind was greater than 3 on the Beaufort scale (AEP 2013) or when the temperature was below 5°C. When possible, nets were set at each trapping site for at least three hours inclusive of either a dusk or dawn period. Trapping locations focused on areas of expected high activity (roost and foraging corridors) including narrow seismic lines with overhanging trees and areas near water (Vonhof 2000). Capture rates tend to be higher near dawn or dusk when trapping locations are near roosts or along flyways between roosts and hunting locations.

Nets were monitored for captures at a minimum of every 15 minutes. Detailed information was recorded for all captures including species, capture time, sex, reproductive condition, age class, forearm length (measures taken three times), ear length and tragus length. Bats were not banded. Torpid bats were carefully handled and were re-warmed in hands prior to release. Descriptive weather data (cloud cover, precipitation, temperature) were recorded at the start and end of each trapping session.

10.0 SEMI-AQUATIC FURBEARER SHORELINE SURVEY

Semi-aquatic furbearer shoreline surveys were completed to provide quantitative data on the occurrence, relative abundance and spatial distribution of semi-aquatic furbearer sign (muskrat, mink, beaver and otter) within and adjacent to the TLSA. These surveys were completed along the shorelines of selected creeks, lakes and ponds. Two observers paddled the shorelines of pre-selected sites and detailed notes were recorded to document the location and type of semi-aquatic furbearer sign; including:

- scent stations;
- feeding platforms and/or sign of feeding;
- resting platforms;

- scat; and
- houses/lodges and runs.

The perimeters of selected waterbodies and the survey routes were mapped using the track-log function in a hand held GPS unit. The locations of all observations, including incidental sightings were recorded (UTM). Track-log point data were recorded at five second intervals. All observations were summarized by species and waterbody. The resultant measure was the number of observations per km of shoreline.

11.0 YELLOW RAIL CALL PLAYBACK SURVEY

Yellow rail call playback surveys were conducted within the Pike 2 TLSA and TRSA. The objective of these surveys was to determine the presence of yellow rail in suitable breeding habitat in the Pike 2 Project Area. Sample sites were located such that mapped high quality yellow rail habitat was targeted. This included areas with elements of emergent vegetation bordering wetlands and/or moderately sized ponds. Surveys were completed where suitable habitat encompassed an area of at least 1 ha in size. Survey protocols followed those outlined by Bazin and Baldwin (2007).

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Appendix I3

***Trails per km/day by Species and Ecosite
for the Pike 2 Terrestrial Local Study Area 2013-2018***

Appendix I3: Trails per km/day by Species and Ecosite for the Pike 2 TLSA 2013-2018

Species	Year	a1	b1	b2	b3	b4	c1	d1	d2	d3	e1	g1	i1	i2	j1	j2	k1	k2	k3	LA / OW/ NWL / NWF	RFS/ NRC	SH	SS	NOM	Anthro 1	Anthro 2	
Microtine Rodents	2018	0.28	0	0	0	NA	0.22	0	NA	NA	NA	0.234	0.306	0.27	0.18	0.074	0.28	0	0	0	0	0	0	NA	0	0.3	
	2017	0.23	0.82	0	0	2.564	0.4	1.108	0.36	0	0	0.887	1.074	0.27	0.319	0.75	1.836	0.36	0	0	0	0.1	0	NA	0	1.8	
	2014	0.08	0	0.52	0	0	0.1	0.549	1.79	0.39	0	0.221	0.175	0.47	0.397	0.077	0.056	0.95	0	0	0	0.3	0.6	0	0	0	
	2013	0.09	0	0	0	0	0.16	0	0	7.1	0	0.253	0	0.15	1.105	0.139	1.3	0.21	0	0	0	0.266	0	0	NA	0	0.3
Mean		0.17	0.2	0.13	0	0.85	0.22	0.41	0.71	2.51	0	0.4	0.39	0.29	0.5	0.26	0.86	0.38	0	0	0.07	0.103	0.15	0	0	0.6	
Red Squirrel	2018	0.55	1.28	0	0	NA	1.42	1.319	NA	NA	NA	2.0	1.529	0.14	0	0.368	1.119	0	0	0	0	0.515	1.3	0	NA	0	0
	2017	5.74	5.71	0	2.38	2.564	7.35	1.188	5.0	6.74	0	5.534	4.448	3.0	5.502	3.21	2.155	3.28	2.25	0	0.392	9.3	0	NA	1.7	1.3	
	2014	1.0	0.91	0	0	20.0	1.4	2.095	0	7.8	0	3.644	0.526	0.47	1.113	0.696	1.401	0.38	0	0.6	0	1.0	4.52	0	0	0.8	
	2013	4.37	2.13	0.63	4.6	0	3.1	1.551	0	4.08	0	1.74	2.706	2.63	1.4	1.0	1.637	1.48	0	0	0	2.66	1.3	4.07	NA	0	0.8
Mean		2.91	2.5	0.16	1.7	7.52	3.32	1.54	1.66	6.2	0	3.2	2.3	1.56	2	1.32	1.58	1.29	0.56	0.2	0.89	3.2	2.15	0	0.4	0.7	
Snowshoe Hare	2018	6.9	0	0	0	NA	17.9	5.714	NA	NA	NA	19.9	36.5	16.8	15.3	8.843	23.6	7.65	14.3	0	20.6	38.46	0	NA	1.6	2.5	
	2017	12.2	3.27	0	4.76	5.128	29.5	5.463	2.85	3.37	7.407	22.9	21.6	17.1	27.6	10.0	14.0	1.82	1.35	0	26.1	27.19	4.62	NA	1.1	8.4	
	2014	5.75	7.27	6.7	0	2.5	10.5	3.142	4.76	9.34	0	9.753	4.0	7.45	5.644	4.0	4.762	3.8	1.9	0	9.7	2.467	4.8	0	2.4	3.6	
	2013	9.28	6.82	23.1	6.9	18.8	29.9	18.1	1.13	12.2	16.7	18.2	30.3	31.2	19.9	9.0	13.5	9.3	0.85	0	46.3	12.53	13.8	NA	5.7	21.0	
Mean		8.52	4.3	7.47	2.9	8.79	22.0	8.1	2.91	8.32	8.02	17.7	23.1	18.1	17.1	8.0	14.0	5.65	4.6	0	25.7	20.16	5.81	0	2.7	8.9	
Grouse/ Ptarm	2018	0	0	0	0	NA	0.11	0.22	NA	NA	NA	0.117	0	0.27	0	0.074	0	0	0	0	0	0	0	NA	1.5	0.1	
	2017	1.0	0	0	2.38	0	0.7	0.792	0.36	3.37	0	0.338	0.613	0.27	0.558	0.375	0.399	0	0	0	0.196	2.395	3.08	NA	1.1	1.2	
	2014	0.41	0	0	0	0	0.1	0.249	0	1.17	0	0	0.175	0.19	0	0.258	0.168	0	0	0	0.168	0	1.51	0	0	0.2	
	2013	0	0	0	0	0	0.06	0.222	1.13	0	0	0.095	0.123	0.3	0.074	0	0	0	0	0	0	0	0	0	NA	0	0
Mean		0.36	0	0	0.6	0	0.24	0.37	0.5	1.51	0	0.14	0.23	0.26	0.16	0.18	0.14	0	0	0	0.09	0.599	1.15	0	0.7	0.4	
Ermine	2018	0.14	0	0	0	NA	0.05	0	NA	NA	NA	0	0.076	0.41	0	0.147	0.559	0.51	0	0	0	0.6	0	NA	0	0.4	
	2017	0.9	0.41	0	0	0	0.4	0.396	0.36	0	0	1.394	1.61	0.95	1.276	2.376	2.314	1.46	2.25	0	0.392	4.0	0	NA	0.6	0.8	
	2014	0.08	0	0	0	0	0.19	0.499	1.19	0	0	0.368	0.526	1.13	0.477	1.2	1.2	4.0	0	0	0.504	0	0.9	0	0.8	1.8	
	2013	0	0	0	0	0	0.06	0	0	0	0	0.095	0.123	0.15	0.147	0.306	0.356	1.06	0	0	0	0	0	NA	0	1.2	
Mean		0.28	0.1	0	0	0.18	0.22	0.52	0	0	0.46	0.58	0.66	0.48	1.0	1.1	1.75	0.56	0	0.22	1.1	0.23	0	0.3	1.1		
Least Weasel	2018	0	0	0	0	NA	0	0	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	0	0	NA	0	0	
	2017	0	0	0	0	0	0	0.079	0	0	0	0	0	0	0	0	0.08	0	0	0	0	0	0	NA	0.3	0	
	2014	0	0	0	0	0	0	0	0	0	0	0	0.11	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	0	0	
Mean		0	0	0	0	0	0.02	0	0	0	0	0.03	0	0	0	0	0.02	0	0	0	0	0	0	0	0.1	0	
Mink	2018	0	0	0	0	NA	0	0	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	0	0	NA	0	0	
	2017	0	0	0	0	0	0	0	0	0	0	0.04	0	0	0	0	0	0	0	0	0.2	0	0	0.38	NA	0	0
	2014	0	0	0	0	0	0	0	0	0.39	0	0.074	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0.071	0	0	0	0	0	0	0	NA	0	0
Mean		0	0	0	0	0	0	0	0.1	0	0.03	0	0	0	0.01	0.02	0	0	0	0.1	0	0	0.1	0	0	0	
Fisher	2018	0	0	0	0	NA	0.05	0	NA	NA	NA	0	0	0	0	0	0.14	0	0	0	0	1.2	0	NA	0	0	
	2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	0	0	
	2014	0.49	0	0	2.47	0	0.34	0.2	0	1.17	0	0.81	0	0.19	0.238	0.155	0.672	1.52	0	0	0.504	0	0	0	0	0	
	2013	0	0	0	0	6.25	0.28	0.369	0.38	1.0	0	0.19	0	0	0.221	0	0.071	0	0	0	0	0.2	0	NA	0	0	
Mean		0.12	0	0	0.6	2.08	0.17	0.14	0.13	0.73	0	0.25	0	0.05	0.11	0.04	0.22	0.38	0	0	0.13	0.3	0	0	0	0	



Species	Year	a1	b1	b2	b3	b4	c1	d1	d2	d3	e1	g1	i1	i2	j1	j2	k1	k2	k3	LA / OW/ NWL / NWF	RFS/ NRC	SH	SS	NOM	Anthro 1	Anthro 2
Marten	2018	0	0	0	0	NA	0	0	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2017	0	0	0	0	0	0	0.079	0	0	0	0.084	0	0	0.08	0.083	0	0	0	0	0	0.1	0	0	0	0
	2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2013	0	0	0	0	0	0	0	0	0	0	0	0	0.123	0	0	0	0	0	0	0	0	0	0	0	0
Mean		0	0	0	0	0	0	0.02	0	0	0	0.02	0.03	0	0.02	0.02	0	0	0	0	0	0.03	0	0	0	0
Otter	2018	0	0	0	0	NA	0	0	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2014	0.16	0	0	0	0	0	0	0	0	0	0.037	0	0	0.238	0.129	0	0	0	0	0	0.336	0	0	0	0
	2013	0	0	0	0	0	0	0	0	0	0	0.063	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean		0.04	0	0	0	0	0	0	0	0	0	0.03	0	0	0.1	0.03	0	0	0	0	0.1	0.08	0	0	0	
Lynx	2018	0	0	0	0	NA	0.22	0	NA	NA	NA	0	0.382	0	0	0	0.14	0	0	0	0	2.1	0	0	0	0.2
	2017	0.11	0	0	0	0	0.79	0	0	0	0	0.422	0	0.14	0.159	0.04	0.08	0	0	0	0	0.588	0	0	0	0.1
	2014	0.16	0	0.52	1.23	0	0.29	0.15	0	1.17	0	0.331	0	0	0.079	0.03	0.28	0	0	0	0	0.168	0.3	0.6	0	0.4
	2013	0.27	0.64	0	1.15	0	0.38	1.0	0.38	0	0	0.443	1.107	1.65	0.59	0.25	0.427	0.42	0	0	0	1.33	0.2	0.81	0	0.9
Mean		0.1	0.2	0.1	0.6	0.0	0.4	0.3	0.1	0.4	0.0	0.3	0.4	0.4	0.2	0.1	0.2	0.1	0.0	0.0	0.5	0.7	0.4	0.0	0.4	
Fox	2018	0	0	0	0	NA	0	0	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2017	0	0	0	0	0	0	0	0	0	0	0	0.077	0	0	0	0	0	0	0	0	0	0	0	0	0
	2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2013	0.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Mean		0.02	0	0	0	0	0	0	0	0	0	0	0.02	0	0	0	0	0	0	0	0	0	0	0	0.1	
Coyote	2018	0	0	0	0	NA	0	0	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
	2017	0	0	0	0	0	0.13	0.238	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
	2014	0.08	0	0	0	0	0.24	0.1	0.6	2.33	0	0.221	0.175	0.75	0.874	0.052	0.336	0.19	0.48	0	0	0.3	0	0	0.4	0.7
	2013	0	0	1.25	0	0	0.25	0	0	0	0	0.127	0.123	0.08	0.59	0.083	0	0	0.85	1.2	0	0	0	0	0	0.4
Mean		0.02	0	0.31	0	0	0.16	0.08	0.2	0.78	0	0.09	0.07	0.21	0.37	0.03	0.08	0.05	0.33	0.3	0	0.1	0	0	0.1	0.4
Wolf	2018	0	0	0	0	NA	0	0	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2017	0	0	0	0	0	0	0	0	0	0	0.507	0.153	0	0	0	0	0	0	0	0	0	0	0	0	0.2
	2014	0	0	0	0	3.75	0.19	0.648	7.7	6.23	0	0.258	0	0	0.318	0.232	0	0	0	0	0	0	2.11	0	0	1.1
	2013	0.18	0	0	0	0	0.22	0.812	0	0	0	0.253	0.123	0	0.074	0.139	1.352	0	0	0	0	0	16.3	0	0	0.9
Mean		0.05	0	0	0	1.25	0.1	0.37	2.58	2.08	0	0.25	0.07	0	0.1	0.09	0.34	0	0	0	0	0	4.59	0	0	0.6
Deer	2018	0.55	0	23.1	0	NA	1.2	3.297	NA	NA	NA	0.351	0.153	0	0.898	0	0.699	0	0	0	0	0	0	0	0	0
	2017	0.0	0	0	31	0	0.09	0	0	0	0	0	0	1.36	0.319	0.333	1.117	0	0.45	0	0	0	0	0	0	0
	2014	0.41	0	0	0	0	0.48	0.299	1.79	0	0	0.626	0	0	0.079	0.052	0.336	0	0	0	0	0	0	0	0.4	0.8
	2013	0	0	1.88	1.15	0	0.16	0.443	0.38	3.06	16.7	0.38	1.23	0	0	0.03	0.356	0	0	0	0	0	0	0	0	0.3
Mean		0.24	0	6.2	8.0	0	0.48	1.0	0.72	1.0	5.56	0.34	0.35	0.34	0.32	0.1	0.63	0	0.11	0	0	0	0	0	0.1	0.3
Moose	2018	0	0	0	0	NA	0.1	0	NA	NA	NA	0	0	0	0	0.147	0	0	0	0	0	0	0	0	0	0
	2017	0.1	0	0	2.38	0	0.04	0	0.71	0	0	0.296	0	0	0.239	0	0	2.55	0	0	0	0	0	0	0	0.2
	2014	0.08	0	0	0	0	0	0.599	0	0	0	0.074	0	0	0	0.129	0	0	0	0	0	0	0	0	0	0.1
	2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean		0.05	0	0	0.6	0	0.0	0.15	0.24	0	0	0.09	0	0	0.06	0.07	0	0.6	0	0	0	0	0	0	0.1	
Caribou	2018	0	0	0	0	NA	0	0	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2017	0.45	0	0	0	0	1.94	0	0	0	0	0	0.613	0	0	0.208	0.479	0	1.8	0	0	0	0	0	0	0
	2014	0.25	0	0	0	0	0.1	0.05	0	0	0	0.074	0.351	0.75	0	0	0	0	0	0	0	0	0	0	0	1.7
	2013	0.18	0	0	0	0	0.13	0.369	0	0	0	0.095	0.492	0.75	0.442	0.03	0.142	0	0	0	0	0.6	0	0	0	5.6
Mean		0.22	0	0	0	0	0.54	0.1	0	0	0	0.04	0.36	0.38	0.11	0.06	0.16	0	0.45	0	0	0.2	0	0	1.8	
Total All Species		12.9	7.3	14.4	15	20.5	27.7	12.8	10.3	23.7	13.6	23.4	27.9	22.3	21.6	11.3	19.3	10.2	7	1	27.7	26	14.5	0	4	15
% of Species		76.5	29	35.3	41	29.4	64.7	82.4	64.7	58.8	11.8	88.2	64.7	58.8	82.4	88.2	76.5	47.1	35.3	24	47.1	59	47.1	0	47	71

Appendix I4

***Browse Availability and Use Summary by
Ecosite Phase in the Pike 2 Terrestrial Local Study Area***

Appendix I4: Browse Availability and Use Summary by Ecosite Phase in the Pike 2 TLSA

Ecosite Phase	n	Trembling Aspen (<i>Populus tremuloides</i>)					Balsam Poplar (<i>Populus balsamifera</i>)				
		Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value	Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value
A1	56	25.00	6.21	155.25	0.00	0.00	1.79	2.50	4.46	0.00	0.00
B1	25	56.00	20.64	1155.84	0.00	0.00	4.00	37.50	150.00	0.00	0.00
B2	3	33.33	2.50	83.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B3	4	50.00	2.50	125.00	0.00	0.00	25.00	2.50	62.50	0.00	0.00
C1	145	20.69	6.27	129.72	1.77	36.62	3.45	5.10	17.59	0.00	0.00
D1	117	49.57	6.10	302.39	0.00	0.00	11.97	5.29	63.30	0.00	0.00
D2	21	85.71	10.00	857.14	0.00	0.00	4.76	2.50	11.90	0.00	0.00
D3	16	12.50	2.50	31.25	0.00	0.00	18.75	2.50	46.88	0.00	0.00
E1	3	33.33	2.50	83.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G1	138	19.57	13.30	260.22	0.00	0.00	7.25	6.40	46.38	0.00	0.00
H1	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I1	64	7.81	5.10	39.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2	46	10.87	2.50	27.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J1	73	4.11	2.50	10.27	0.00	0.00	1.37	2.50	3.42	0.00	0.00
J2	160	18.75	9.28	174.00	0.00	0.00	2.50	2.50	6.25	0.00	0.00
K1	82	2.44	2.50	6.10	0.00	0.00	2.44	2.50	6.10	0.00	0.00
K2	29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K3	17	35.29	2.50	88.24	0.00	0.00	11.76	2.50	29.41	0.00	0.00
LA/OW	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RFS	31	6.45	2.50	16.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SH	65	40.00	9.98	399.20	2.88	115.20	10.77	13.07	140.75	0.00	0.00
SS	16	6.25	2.50	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anthro 1	18	61.11	20.77	1269.28	0.00	0.00	27.78	17.30	480.56	0.00	0.00
Anthro 2	60	28.33	5.56	157.53	0.00	0.00	15.00	5.39	80.85	0.00	0.00
Total	1193	23.05	8.75	201.70	0.47	10.83	5.53	7.05	39.00	0.00	0.00

¹ = Calculated using percent cover/browse only where species/browse is present
 Anthropogenic 1 = Polygonal disturbance; Anthropogenic 2 = linear disturbance

Ecosite Phase	n	Prickly Rose (<i>Rosa acicularis</i>)					Low-Bush Cranberry (<i>Viburnum edule</i>)				
		Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value	Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value
A1	56	51.79	4.29	222.16	0.00	0.00	3.57	2.50	8.93	0.00	0.00
B1	25	32.00	7.38	236.16	0.00	0.00	8.00	9.00	72.00	0.00	0.00
B2	3	100.00	15.50	1550.00	0.00	0.00	100.00	18.50	1850.00	0.00	0.00
B3	4	50.00	9.00	450.00	0.00	0.00	25.00	15.50	387.50	0.00	0.00
C1	145	46.90	3.65	171.17	0.00	0.00	11.72	3.26	38.22	0.00	0.00
D1	117	85.47	13.74	1174.36	0.00	0.00	67.52	13.61	918.97	0.00	0.00
D2	21	71.43	8.03	573.57	0.00	0.00	0.00	20.29	0.07	0.00	0.00
D3	16	50.00	4.13	206.50	0.00	0.00	31.25	5.10	159.38	0.00	0.00
E1	3	33.33	2.50	83.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G1	138	35.51	3.30	117.17	0.00	0.00	1.45	9.00	13.04	0.00	0.00
H1	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I1	64	21.88	3.43	75.03	0.00	0.00	4.69	6.83	32.02	0.00	0.00
I2	46	6.52	2.50	16.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J1	73	17.81	3.50	62.33	0.00	0.00	1.37	2.50	3.42	0.00	0.00
J2	160	17.50	4.36	76.30	0.00	0.00	3.75	4.67	17.51	0.00	0.00
K1	82	4.88	2.50	12.20	0.00	0.00	1.22	2.50	3.05	0.00	0.00
K2	29	6.90	2.50	17.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K3	17	11.76	2.50	29.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LA/OW	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RFS	31	35.48	3.68	130.58	0.00	0.00	3.23	2.50	8.06	0.00	0.00
SH	65	35.38	7.41	262.20	0.00	0.00	6.15	2.50	15.38	0.00	0.00
SS	16	56.25	9.72	546.75	0.00	0.00	6.25	15.50	96.88	0.00	0.00
Anthro 1	18	55.56	16.00	888.89	0.00	0.00	33.33	19.17	639.00	0.00	0.00
Anthro 2	60	25.00	4.23	105.75	0.00	0.00	5.00	6.83	34.15	0.00	0.00
Total	1193	35.04	7.07	247.72	0.00	0.00	12.07	11.30	136.40	0.00	0.00

¹ = Calculated using percent cover/browse only where species/browse is present
Anthropogenic 1 = Polygonal disturbance; Anthropogenic 2 = linear disturbance

Ecosite Phase	n	Willow Spp. (<i>Salix spp.</i>)					Alder Spp. (<i>Alnus spp.</i>)				
		Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value	Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value
A1	56	28.57	10.28	293.71	0.00	0.00	3.57	2.50	8.93	0.00	0.00
B1	25	48.00	12.67	608.16	0.00	0.00	12.00	31.00	372.00	0.00	0.00
B2	3	100.00	2.50	250.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B3	4	25.00	75.00	1875.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
C1	145	42.76	7.94	339.50	1.21	51.74	3.45	7.70	26.55	0.00	0.00
D1	117	22.22	7.85	174.44	0.00	0.00	44.44	30.74	1366.22	0.00	0.00
D2	21	19.05	12.25	233.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D3	16	37.50	6.83	256.13	0.00	0.00	43.75	31.93	1396.94	0.00	0.00
E1	3	33.33	2.50	83.33	0.00	0.00	33.33	75.00	2500.00	0.00	0.00
G1	138	58.70	12.12	711.39	3.00	176.09	4.35	17.00	73.91	0.00	0.00
H1	2	50.00	15.50	775.00	0.00	0.00	50.00	2.50	125.00	0.00	0.00
I1	64	56.25	8.56	481.50	1.47	82.69	3.13	9.00	28.13	0.00	0.00
I2	46	71.74	16.65	1194.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J1	73	56.16	7.91	444.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J2	160	70.63	17.38	1227.46	0.27	19.07	5.00	13.38	66.90	0.00	0.00
K1	82	74.39	6.74	501.39	0.00	0.00	2.44	15.50	37.80	0.00	0.00
K2	29	65.52	6.61	433.07	0.00	0.00	3.45	75.00	258.62	0.00	0.00
K3	17	82.35	10.57	870.47	0.18	14.82	0.00	0.00	0.00	0.00	0.00
LA/OW	2	50.00	75.00	3750.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RFS	31	74.19	12.48	925.94	3.93	291.58	6.45	45.25	291.94	0.00	0.00
SH	65	58.46	13.29	776.95	1.97	115.17	12.31	37.31	459.20	0.00	0.00
SS	16	81.25	18.15	1474.69	5.77	468.81	25.00	41.38	1034.50	0.00	0.00
Anthro 1	18	38.89	20.29	789.06	0.00	0.00	5.56	15.50	86.11	0.00	0.00
Anthro 2	60	61.67	14.55	897.25	2.45	151.08	3.33	9.00	30.00	0.00	0.00
Total	1193	54.32	12.03	653.43	1.14	61.92	8.97	27.64	247.90	0.00	0.00

¹ = Calculated using percent cover/browse only where species/browse is present
 Anthropogenic 1 = Polygonal disturbance; Anthropogenic 2 = linear disturbance

Ecosite Phase	n	Paper Birch (<i>Betula papyrifera</i>)					Bog Birch (<i>Betula glandulosa</i>)				
		Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value	Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value
A1	56	5.36	2.50	13.39	0.00	0.00	8.93	67.50	602.68	0.00	0.00
B1	25	36.00	13.44	483.84	0.00	0.00	4.00	2.50	10.00	0.00	0.00
B2	3	33.33	2.50	83.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B3	4	50.00	9.00	450.00	0.00	0.00	25.00	2.50	62.50	0.00	0.00
C1	145	9.66	13.61	131.41	0.00	0.00	15.17	22.00	333.79	0.00	0.00
D1	117	13.68	11.66	159.45	0.00	0.00	25.64	15.50	397.44	0.00	0.00
D2	21	47.62	14.95	711.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D3	16	6.25	15.50	96.88	0.00	0.00	6.25	2.50	15.63	0.00	0.00
E1	3	33.33	2.50	83.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G1	138	11.59	14.66	169.97	0.00	0.00	26.09	26.97	703.57	0.07	1.83
H1	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I1	64	4.69	2.50	11.72	0.00	0.00	37.50	26.42	990.75	0.00	0.00
I2	46	6.52	2.50	16.30	0.00	0.00	0.50	20.24	10.12	0.00	0.00
J1	73	9.59	22.86	219.21	0.00	0.00	52.05	24.03	1250.88	0.00	0.00
J2	160	7.50	2.50	18.75	0.00	0.00	55.00	33.24	1828.20	0.03	1.65
K1	82	3.66	26.67	97.57	0.00	0.00	79.27	43.19	3423.60	0.00	0.00
K2	29	20.69	16.75	346.55	0.00	0.00	79.31	47.61	3775.97	6.52	517.10
K3	17	35.29	11.17	394.24	0.00	0.00	52.94	28.28	1497.18	0.00	0.00
LA/OW	2	0.00	0.00	0.00	0.00	0.00	100.00	20.00	2000.00	0.00	0.00
RFS	31	6.45	56.25	362.90	0.00	0.00	29.03	10.72	311.23	0.00	0.00
SH	65	21.54	14.82	319.20	0.00	0.00	18.46	20.88	385.48	0.00	0.00
SS	16	31.25	5.10	159.38	0.00	0.00	25.00	60.13	1503.25	0.63	15.75
Anthro 1	18	22.22	5.75	127.78	0.00	0.00	11.11	2.50	27.78	0.00	0.00
Anthro 2	60	10.00	8.33	83.30	0.00	0.00	43.33	21.19	918.23	0.00	0.00
Total	1193	12.07	12.49	150.76	0.00	0.00	32.94	30.85	1016.27	0.40	13.18

¹ = Calculated using percent cover/browse only where species/browse is present
Anthropogenic 1 = Polygonal disturbance; Anthropogenic 2 = linear disturbance

Ecosite Phase	n	Bracted Honeysuckle (<i>Lonicera involucrata</i>)					Red-Osier Dogwood (<i>Cornus stolonifera</i>)				
		Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value	Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value
A1	56	5.36	6.83	36.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B1	25	16.00	2.50	40.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B2	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B3	4	25.00	2.50	62.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1	145	2.07	6.83	14.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D1	117	8.55	7.70	65.81	0.00	0.00	1.71	2.50	4.27	0.00	0.00
D2	21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D3	16	43.75	14.71	643.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E1	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G1	138	4.35	2.50	10.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H1	2	0.00	0.00	0.00	0.00	0.00	50.00	15.50	775.00	75.00	3750.00
I1	64	4.69	6.83	32.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2	46	2.17	2.50	5.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J1	73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J2	160	7.50	4.67	35.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K1	82	1.22	2.50	3.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K2	29	3.45	2.50	8.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K3	17	5.88	2.50	14.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LA/OW	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RFS	31	3.23	2.50	8.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SH	65	3.08	2.50	7.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SS	16	31.25	5.10	159.38	0.00	0.00	12.50	2.50	31.25	0.00	0.00
Anthro 1	18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anthro 2	60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1193	5.20	5.98	31.08	0.00	0.00	0.42	5.10	2.14	15.00	6.29

¹ = Calculated using percent cover/browse only where species/browse is present
Anthropogenic 1 = Polygonal disturbance; Anthropogenic 2 = linear disturbance

Ecosite Phase	n	Cherry Spp. (<i>Prunus spp.</i>)					Raspberry (<i>Rubus idaeus</i>)				
		Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value	Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value
A1	56	3.57	2.50	8.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B1	25	0.00	0.00	0.00	0.00	0.00	16.00	20.63	330.08	0.00	0.00
B2	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B3	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1	145	0.69	2.50	1.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D1	117	3.42	23.88	81.64	0.00	0.00	17.09	3.80	64.96	0.00	0.00
D2	21	0.00	0.00	0.00	0.00	0.00	4.76	75.00	357.14	0.00	0.00
D3	16	0.00	0.00	0.00	0.00	0.00	12.50	20.00	250.00	0.00	0.00
E1	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G1	138	0.00	0.00	0.00	0.00	0.00	4.35	2.50	10.87	0.00	0.00
H1	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I1	64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2	46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J1	73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J2	160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K1	82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K2	29	0.00	0.00	0.00	0.00	0.00	3.45	2.50	8.62	0.00	0.00
K3	17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LA/OW	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RFS	31	0.00	0.00	0.00	0.00	0.00	9.68	14.17	137.13	0.00	0.00
SH	65	0.00	0.00	0.00	0.00	0.00	3.08	2.50	7.69	0.00	0.00
SS	16	0.00	0.00	0.00	0.00	0.00	18.75	2.50	46.88	0.00	0.00
Anthro 1	18	0.00	0.00	0.00	0.00	0.00	16.67	6.83	113.83	0.00	0.00
Anthro 2	60	0.00	0.00	0.00	0.00	0.00	5.00	2.50	12.50	0.00	0.00
Total	1193	0.59	14.71	8.63	0.00	0.00	4.02	7.79	31.34	0.00	0.00

¹ = Calculated using percent cover/browse only where species/browse is present
Anthropogenic 1 = Polygonal disturbance; Anthropogenic 2 = linear disturbance

Ecosite Phase	n	Saskatoon (<i>Amekanchier alnifolia</i>)					Currant Spp. (<i>Ribes spp.</i>)				
		Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value	Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value
A1	56	3.57	9.00	32.14	0.00	0.00	1.79	2.50	4.46	0.00	0.00
B1	25	0.00	0.00	0.00	0.00	0.00	8.00	2.50	20.00	0.00	0.00
B2	3	33.33	2.50	83.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B3	4	0.00	0.00	0.00	0.00	0.00	25.00	2.50	62.50	0.00	0.00
C1	145	1.38	2.50	3.45	0.00	0.00	1.38	2.50	3.45	0.00	0.00
D1	117	1.71	9.00	15.38	0.00	0.00	18.80	3.68	69.20	0.00	0.00
D2	21	0.00	0.00	0.00	0.00	0.00	4.76	2.50	11.90	0.00	0.00
D3	16	6.25	2.50	15.63	37.50	234.38	50.00	4.13	206.50	0.00	0.00
E1	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G1	138	0.72	2.50	1.81	0.00	0.00	8.70	2.50	21.74	0.00	0.00
H1	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I1	64	0.00	0.00	0.00	0.00	0.00	1.56	2.50	3.91	0.00	0.00
I2	46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J1	73	1.37	2.50	3.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00
J2	160	0.63	15.50	9.69	0.00	0.00	4.38	2.50	10.94	0.00	0.00
K1	82	0.00	0.00	0.00	0.00	0.00	1.22	2.50	3.05	0.00	0.00
K2	29	0.00	0.00	0.00	0.00	0.00	6.90	2.50	17.24	0.00	0.00
K3	17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LA/OW	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RFS	31	0.00	0.00	0.00	0.00	0.00	3.23	2.50	8.06	0.00	0.00
SH	65	0.00	0.00	0.00	0.00	0.00	4.62	2.50	11.54	0.00	0.00
SS	16	0.00	0.00	0.00	0.00	0.00	62.50	3.80	237.50	0.25	15.63
Anthro 1	18	16.67	15.50	258.33	0.00	0.00	5.56	2.50	13.89	0.00	0.00
Anthro 2	60	3.33	2.50	8.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1193	1.42	7.09	10.10	2.21	3.15	6.37	3.18	20.26	0.03	0.19

¹ = Calculated using percent cover/browse only where species/browse is present
Anthropogenic 1 = Polygonal disturbance; Anthropogenic 2 = linear disturbance

Ecosite Phase	n	Twining Honeysuckle (<i>Loincera dioica</i>)					Alder-Leaved Buckthorn (<i>Rhamnus alnifolia</i>)				
		Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value	Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value
A1	56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B1	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B2	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B3	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1	145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D1	117	1.71	2.50	4.27	0.00	0.00	1.71	2.50	4.27	0.00	0.00
D2	21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D3	16	0.00	0.00	0.00	0.00	0.00	6.25	15.50	96.88	0.00	0.00
E1	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G1	138	0.00	0.00	0.00	0.00	0.00	1.45	2.50	3.62	0.00	0.00
H1	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I1	64	1.56	2.50	3.91	0.00	0.00	1.56	2.50	3.91	0.00	0.00
I2	46	0.00	0.00	0.00	0.00	0.00	4.35	2.50	10.87	0.00	0.00
J1	73	0.00	0.00	0.00	0.00	0.00	4.11	2.50	10.27	0.00	0.00
J2	160	0.63	2.50	1.56	0.00	0.00	2.50	2.50	6.25	0.00	0.00
K1	82	0.00	0.00	0.00	0.00	0.00	2.44	2.50	6.10	0.00	0.00
K2	29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K3	17	5.88	15.50	91.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LA/OW	2	50.00	2.50	125.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RFS	31	0.00	0.00	0.00	0.00	0.00	6.45	2.50	16.13	0.00	0.00
SH	65	1.54	2.50	3.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SS	16	6.25	2.50	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anthro 1	18	11.11	15.50	172.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anthro 2	60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1193	0.67	5.75	3.86	0.00	0.00	1.59	3.18	5.06	0.00	0.00

¹ = Calculated using percent cover/browse only where species/browse is present
Anthropogenic 1 = Polygonal disturbance; Anthropogenic 2 = linear disturbance

Ecosite Phase	n	Fly Honeysuckle (<i>Lonicera villosa</i>)				
		Frequency %	Mean PC ¹	Importance Value	% Browsed ¹	Importance Value
A1	56	1.79	2.50	4.46	0.00	0.00
B1	25	4.00	2.50	10.00	0.00	0.00
B2	3	0.00	0.00	0.00	0.00	0.00
B3	4	25.00	2.50	62.50	0.00	0.00
C1	145	3.45	2.50	8.62	0.00	0.00
D1	117	0.00	0.00	0.00	0.00	0.00
D2	21	0.00	0.00	0.00	0.00	0.00
D3	16	6.25	2.50	15.63	0.00	0.00
E1	3	0.00	0.00	0.00	0.00	0.00
G1	138	6.52	2.50	16.30	0.00	0.00
H1	2	0.00	0.00	0.00	0.00	0.00
I1	64	3.13	2.50	7.81	0.00	0.00
I2	46	17.39	2.50	43.48	0.00	0.00
J1	73	5.48	2.50	13.70	0.00	0.00
J2	160	8.75	5.29	46.29	0.00	0.00
K1	82	1.22	2.50	3.05	0.00	0.00
K2	29	3.45	2.50	8.62	0.00	0.00
K3	17	0.00	0.00	0.00	0.00	0.00
LA/OW	2	0.00	0.00	0.00	0.00	0.00
RFS	31	6.45	2.50	16.13	0.00	0.00
SH	65	7.69	2.50	19.23	0.00	0.00
SS	16	6.25	2.50	15.63	0.00	0.00
Anthro 1	18	0.00	0.00	0.00	0.00	0.00
Anthro 2	60	1.67	2.50	4.17	0.00	0.00
Total	1193	4.95	3.38	16.72	0.00	0.00

¹ = Calculated using percent cover/browse only where species/browse is present
 Anthropogenic 1 = Polygonal disturbance; Anthropogenic 2 = linear disturbance

Appendix 15

***Bat Acoustic Surveys In and Immediately Adjacent
to the Pike 2 Terrestrial Local Study Area – 2016***

Appendix I5: Bat Acoustic Surveys in and Immediately Adjacent to the Pike 2 TLSA - 2016

Plot #	Date	Time Start	Duration (min)	Easting NAD 83	Northing NAD 83	Study Area	Bat Species Group Detected							Number of Passes	Number of Feeding Buzzes
							Red Bat	Little Brown Bat	Myotis Spp.	Big Brown/Silver Bat	Silver-haired Bat	Hoary Bat	High Freq. Bat		
1	27-Jul-16	22:13	5	523552	6140704	TLSA	0	1	0	0	0	0	0	7	0
1	27-Jul-16	22:13	5	523552	6140704	TLSA	1	0	0	0	0	0	0	2	0
1	27-Jul-16	22:13	5	523552	6140704	TLSA	0	0	1	0	0	0	0	1	0
2	27-Jul-16	22:22	5	523560	6141227	TLSA	0	0	0	1	0	0	0	33	13
2	27-Jul-16	22:22	5	523560	6141227	TLSA	0	1	0	0	0	0	0	4	3
3	27-Jul-16	22:32	5	523525	6141741	TLSA	0	0	0	1	0	0	0	4	1
4	27-Jul-16	22:43	5	523054	6141543	TLSA	0	0	0	0	0	1	0	1	0
5	27-Jul-16	22:54	5	522551	6141455	TLSA	0	0	1	0	0	0	0	5	1
6	27-Jul-16	23:06	5	522049	6141357	TLSA	0	1	0	0	0	0	0	3	0
6	27-Jul-16	23:06	5	522049	6141357	TLSA	0	0	1	0	0	0	0	1	0
7	27-Jul-16	23:16	5	521554	6141260	TLSA	0	0	0	0	0	0	0	0	0
8	27-Jul-16	23:37	5	521093	6141021	TLSA	0	0	0	0	0	0	0	0	0
9	28-Jul-16	0:00	5	521027	6140450	TLSA	0	1	0	0	0	0	0	2	0
9	28-Jul-16	0:00	5	521027	6140450	TLSA	0	0	0	0	0	1	0	1	0
10	28-Jul-16	0:10	5	521533	6140454	TLSA	0	0	1	0	0	0	0	1	0
11	28-Jul-16	0:23	5	522040	6140452	TLSA	0	1	0	0	0	0	0	1	0
11	28-Jul-16	0:23	5	522040	6140452	TLSA	0	0	0	1	0	0	0	1	0
12	28-Jul-16	0:34	5	522470	6140741	TLSA	0	1	0	0	0	0	0	3	2
13	28-Jul-16	0:43	5	522992	6140784	TLSA	0	0	0	0	0	0	0	0	0
14	28-Jul-16	0:58	5	524009	6140964	TLSA	0	1	0	0	0	0	0	1	0
14	28-Jul-16	0:58	5	524009	6140964	TLSA	0	0	0	0	0	1	0	1	0
14	28-Jul-16	0:58	5	524009	6140964	TLSA	0	0	0	0	0	0	1	1	0
15	28-Jul-16	1:08	5	524434	6141265	TLSA	0	0	0	1	0	0	0	1	0
15	28-Jul-16	1:08	5	524434	6141265	TLSA	0	1	0	0	0	0	0	1	0
16	28-Jul-16	1:18	5	524889	6141510	TLSA	0	0	0	0	0	0	0	0	0
17	28-Jul-16	1:29	5	525281	6141847	TLSA	0	1	0	0	0	0	0	2	0
18	28-Jul-16	1:39	5	525794	6141952	TLSA	0	0	1	0	0	0	0	1	0
18	28-Jul-16	1:39	5	525794	6141952	TLSA	0	0	0	0	0	1	0	1	0
19	28-Jul-16	1:49	5	526311	6142117	TRSA	0	1	0	0	0	0	0	12	2
19	28-Jul-16	1:49	5	526311	6142117	TRSA	0	0	1	0	0	0	0	1	0
20	28-Jul-16	1:58	5	526818	6142098	TRSA	0	1	0	0	0	0	0	5	0
20	28-Jul-16	1:58	5	526818	6142098	TRSA	0	0	0	1	0	0	0	1	0
21	28-Jul-16	2:10	5	527338	6142021	TLSA	0	0	0	0	0	0	0	0	0
22	28-Jul-16	2:40	5	527645	6141617	TLSA	0	0	0	1	0	0	0	4	1
23	28-Jul-16	2:52	5	527985	6141216	TLSA	0	0	0	0	0	0	0	0	0
24	28-Jul-16	3:02	5	527984	6140572	TLSA	0	0	0	0	0	0	0	0	0
25	28-Jul-16	3:12	5	527991	6140055	TLSA	0	1	0	0	0	0	0	3	0
25	28-Jul-16	3:12	5	527991	6140055	TLSA	0	0	1	0	0	0	0	1	0
26	28-Jul-16	3:21	5	528003	6139523	TLSA	0	0	0	0	0	0	1	1	0
27	28-Jul-16	3:30	5	527573	6139216	TLSA	0	1	0	0	0	0	0	5	1
28	28-Jul-16	3:39	5	527036	6139166	TLSA	0	0	0	0	0	0	0	0	0
29	28-Jul-16	3:47	5	526548	6139058	TLSA	0	0	0	0	0	0	0	0	0
30	28-Jul-16	3:57	5	526355	6139531	TLSA	0	0	0	0	0	0	0	0	0
31	28-Jul-16	4:10	5	526107	6139980	TLSA	0	0	0	0	0	0	0	0	0
32	28-Jul-16	4:22	5	525661	6140308	TLSA	0	0	0	0	0	0	0	0	0
33	28-Jul-16	4:34	5	525175	6140255	TLSA	0	0	0	0	0	0	0	0	0
34	30-Jul-16	22:08	5	526354	6136206	TLSA	0	0	0	0	0	0	0	0	0
35	30-Jul-16	22:15	5	525959	6135842	TLSA	0	0	0	0	0	0	0	0	0
36	30-Jul-16	22:23	5	525425	6135685	TLSA	0	0	0	0	0	0	0	0	0
36	30-Jul-16	22:33	5	524916	6135541	TLSA	0	1	0	0	0	0	0	1	1
37	30-Jul-16	22:41	5	524403	6135399	TLSA	0	0	0	0	0	0	0	0	0
38	30-Jul-16	22:50	5	523970	6135095	TLSA	0	0	0	0	0	0	0	0	0
39	30-Jul-16	22:58	5	523741	6134641	TLSA	0	1	0	0	0	0	0	1	0
40	30-Jul-16	23:07	5	523725	6134109	TLSA	0	0	0	0	1	0	0	2	0
41	30-Jul-16	23:15	5	523258	6134326	TLSA	0	0	0	0	0	0	0	0	0
42	30-Jul-16	23:24	5	522670	6134386	TLSA	0	0	1	0	0	0	0	3	1
43	30-Jul-16	23:33	5	522142	6134439	TLSA	0	0	0	0	1	0	0	1	0
44	30-Jul-16	23:42	5	521847	6134852	TLSA	0	0	0	0	0	0	0	0	0
45	30-Jul-16	23:54	5	521849	6135355	TLSA	0	1	0	0	0	0	0	1	0
46	31-Jul-16	0:04	5	521434	6134518	TLSA	0	0	0	0	0	0	0	0	0
47	31-Jul-16	0:13	5	521028	6134180	TLSA	0	0	0	0	1	0	0	2	0
48	31-Jul-16	0:23	5	520774	6133736	TLSA	0	0	0	0	0	0	0	0	0
49	31-Jul-16	0:32	5	520193	6133715	TLSA	0	0	0	0	1	0	0	19	10
50	31-Jul-16	0:49	5	520735	6134635	TLSA	0	0	1	0	0	0	0	1	0
51	31-Jul-16	0:57	5	520266	6134903	TLSA	0	1	0	0	0	0	0	3	0
51	31-Jul-16	0:57	5	520266	6134903	TLSA	0	0	1	0	0	0	0	1	0
51	31-Jul-16	0:57	5	520266	6134903	TLSA	0	0	0	0	1	0	0	1	0
52	31-Jul-16	1:06	5	520457	6135377	TLSA	0	0	1	0	0	0	0	1	1
52	31-Jul-16	1:06	5	520457	6135377	TLSA	0	0	0	0	1	0	0	1	0
53	31-Jul-16	1:16	5	520460	6135875	TLSA	0	0	0	1	0	0	0	1	0
54	31-Jul-16	1:24	5	520207	6136318	TLSA	0	0	0	0	0	0	0	0	0
55	31-Jul-16	1:33	5	519949	6136772	TLSA	0	1	0	0	0	0	0	1	0
55	31-Jul-16	1:33	5	519949	6136772	TLSA	1	0	0	0	0	0	0	1	0
55	31-Jul-16	1:33	5	519949	6136772	TLSA	0	0	1	0	0	0	0	1	0
56	31-Jul-16	1:41	5	520218	6137216	TLSA	0	0	1	0	0	0	0	2	0
57	31-Jul-16	1:59	5	519796	6135173	TLSA	0	0	0	0	0	0	0	0	0
58	31-Jul-16	2:07	5	519339	6135438	TLSA	0	0	0	0	0	0	0	0	0



Plot #	Date	Time Start	Duration (min)	Easting NAD 83	Northing NAD 83	Study Area	Bat Species Group Detected								Number of Passes	Number of Feeding Buzzes	
							Red Bat	Little Brown Bat	Myotis Spp.	Big Brown/Silver Bat	Silver-haired Bat	Hoary Bat	High Freq. Bat	Low Freq. Bat			
59	31-Jul-16	2:16	5	518892	6135698	TLSA	0	0	0	1	0	0	0	0	0	1	0
59	31-Jul-16	2:16	5	518892	6135698	TLSA	0	0	0	0	0	1	0	0	0	1	0
60	31-Jul-16	2:24	5	518372	6135732	TLSA	0	1	0	0	0	0	0	0	0	1	0
60	31-Jul-16	2:24	5	518372	6135732	TLSA	0	0	1	0	0	0	0	0	0	1	0
61	31-Jul-16	2:31	5	517856	6135660	TLSA	0	0	0	0	1	0	0	0	0	1	0
62	31-Jul-16	2:40	5	517421	6135961	TLSA	0	0	0	0	0	0	0	0	0	0	0
63	31-Jul-16	2:59	5	517038	6136326	TLSA	0	0	0	0	0	0	0	0	0	0	0
64	31-Jul-16	3:11	5	516609	6135962	TLSA	0	0	0	0	0	0	0	0	0	0	0
65	31-Jul-16	3:22	5	516185	6135673	TLSA	0	0	0	0	0	0	0	0	0	0	0
66	31-Jul-16	3:34	5	515652	6135677	TLSA	0	0	0	0	0	0	0	0	0	0	0
67	31-Jul-16	3:48	5	516349	6135190	TLSA	0	0	0	0	0	0	0	0	0	0	0
68	31-Jul-16	4:00	5	516357	6134675	TLSA	0	0	0	0	0	0	0	0	0	0	0
69	31-Jul-16	4:10	5	516359	6134155	TLSA	0	0	0	0	0	0	0	0	0	0	0
70	31-Jul-16	4:19	5	516352	6133643	TLSA	0	0	0	0	0	0	0	0	0	0	0
71	31-Jul-16	4:28	5	516185	6133157	TLSA	0	0	0	0	0	0	0	0	0	0	0
72	31-Jul-16	4:37	5	515978	6132603	TLSA	0	0	0	0	0	0	0	0	0	0	0
73	31-Jul-16	22:15	5	520726	6137360	TLSA	0	0	0	0	0	0	0	0	0	0	0
74	31-Jul-16	22:26	5	521259	6137426	TLSA	0	0	0	0	0	0	0	0	0	0	0
75	31-Jul-16	22:36	5	521780	6137453	TLSA	0	1	0	0	0	0	0	0	4	1	1
76	31-Jul-16	22:45	5	522300	6137457	TLSA	0	0	0	0	0	0	0	0	0	0	0
77	31-Jul-16	22:54	5	522818	6137455	TLSA	0	0	0	0	0	0	0	0	0	0	0
78	31-Jul-16	23:03	5	523260	6137188	TLSA	0	1	0	0	0	0	0	0	1	0	0
79	31-Jul-16	23:11	5	523527	6136699	TLSA	0	0	0	0	0	0	0	0	0	0	0
80	31-Jul-16	23:19	5	523773	6136232	TLSA	0	0	0	0	0	0	0	0	0	0	0
81	31-Jul-16	23:27	5	524015	6135767	TLSA	0	0	0	1	0	0	0	0	0	1	0
82	31-Jul-16	23:58	5	523921	6133619	TLSA	0	0	0	0	0	0	0	0	0	0	0
83	01-Aug-16	0:09	5	523742	6133138	TLSA	0	0	0	0	0	0	0	0	0	0	0
84	01-Aug-16	0:19	5	523687	6132620	TLSA	0	0	0	0	0	0	0	0	0	0	0
85	01-Aug-16	0:24	5	524201	6132621	TLSA	0	0	0	0	0	0	0	0	0	0	0
86	01-Aug-16	0:39	5	524735	6132623	TLSA	0	0	0	0	0	0	0	0	0	0	0
87	01-Aug-16	0:52	5	524974	6132150	TLSA	0	0	0	0	0	0	0	0	0	0	0
88	01-Aug-16	1:02	5	525002	6131609	TLSA	0	0	0	0	0	0	0	0	0	0	0
89	01-Aug-16	1:11	5	524478	6131589	TLSA	0	0	0	1	0	0	0	0	1	0	0
90	01-Aug-16	1:20	5	523959	6131584	TLSA	0	0	0	0	0	0	0	0	0	0	0
91	01-Aug-16	1:30	5	523448	6131663	TLSA	0	0	0	0	0	0	0	0	0	0	0
92	01-Aug-16	1:41	5	522926	6131585	TLSA	0	1	0	0	0	0	0	0	3	1	0
92	01-Aug-16	1:41	5	522926	6131585	TLSA	0	0	0	1	0	0	0	0	1	0	0
93	01-Aug-16	1:52	5	522396	6131579	TLSA	0	0	0	0	0	0	0	0	0	0	0
94	01-Aug-16	2:03	5	521883	6131575	TLSA	0	0	0	0	0	0	0	0	0	0	0
95	01-Aug-16	2:15	5	521472	6131863	TLSA	0	1	0	0	0	0	0	0	1	0	0
96	02-Aug-16	3:15	5	521472	6131863	TLSA	0	0	0	1	0	0	0	0	1	0	0
97	01-Aug-16	2:25	5	520989	6132022	TLSA	0	0	0	0	0	0	0	0	0	0	0
98	01-Aug-16	2:36	5	520509	6132179	TLSA	0	0	0	0	1	0	0	0	1	0	0
99	01-Aug-16	2:46	5	520001	6132088	TLSA	0	0	0	0	0	0	0	0	0	0	0
100	01-Aug-16	3:23	5	519673	6137237	TLSA	0	0	0	0	0	0	0	0	0	0	0
101	01-Aug-16	3:33	5	519151	6137169	TLSA	0	0	0	0	0	0	0	0	0	0	0
102	01-Aug-16	3:43	5	518910	6137642	TLSA	0	0	0	0	0	0	0	0	0	0	0
103	01-Aug-16	3:52	5	518911	6138192	TLSA	0	0	0	0	0	0	0	0	0	0	0
104	01-Aug-16	4:01	5	518907	6138730	TLSA	0	0	0	0	0	0	0	0	0	0	0
105	01-Aug-16	4:04	5	518903	6139284	TLSA	0	0	0	0	0	0	0	0	0	0	0
106	01-Aug-16	22:08	5	515274	6133941	TLSA	0	0	0	0	0	0	1	0	2	0	0
107	01-Aug-16	22:20	5	514757	6133883	TLSA	0	0	0	0	0	0	0	0	0	0	0
108	01-Aug-16	22:32	5	514218	6133879	TLSA	0	0	0	0	0	0	0	0	0	0	0
109	01-Aug-16	22:42	5	513702	6133909	TLSA	0	0	0	0	0	0	0	0	0	0	0
110	01-Aug-16	22:54	5	513405	6134331	TLSA	0	0	0	0	0	0	0	0	0	0	0
111	01-Aug-16	23:04	5	513405	6134841	TLSA	0	0	0	0	0	0	0	0	0	0	0
112	01-Aug-16	23:13	5	513403	6135358	TLSA	0	0	0	1	0	0	0	0	2	0	0
113	01-Aug-16	23:23	5	513422	6135879	TLSA	0	0	0	0	0	0	0	0	0	0	0
114	01-Aug-16	23:34	5	513139	6136317	TLSA	0	0	0	1	0	0	0	0	2	0	0
115	02-Aug-16	0:02	5	512633	6136403	TLSA	0	0	0	0	0	0	0	0	0	0	0
116	02-Aug-16	0:11	5	512264	6136044	TLSA	0	0	0	0	0	0	0	0	0	0	0
117	02-Aug-16	0:25	5	511887	6135687	TLSA	0	0	0	0	0	0	0	0	0	0	0
118	02-Aug-16	0:37	5	511857	6134609	TLSA	0	0	0	1	0	0	0	0	2	0	0
119	02-Aug-16	0:46	5	512221	6134224	TLSA	0	0	0	0	0	0	0	0	0	0	0
120	02-Aug-16	0:56	5	512301	6133719	TLSA	0	0	0	0	0	0	0	0	0	0	0
121	02-Aug-16	1:05	5	512300	6133183	TLSA	0	0	0	0	0	0	0	0	0	0	0
122	02-Aug-16	1:17	5	512669	6132821	TLSA	0	0	0	1	0	0	0	0	1	0	0
123	02-Aug-16	1:26	5	513195	6132801	TLSA	0	0	0	0	0	0	0	0	0	0	0
124	02-Aug-16	1:36	5	513409	6132344	TLSA	0	0	0	0	0	0	0	0	0	0	0
125	02-Aug-16	2:21	5	516738	6131715	TLSA	0	0	0	0	0	0	0	0	0	0	0
126	02-Aug-16	2:44	5	517223	6131568	TLSA	0	0	0	0	0	0	0	0	0	0	0
127	02-Aug-16	3:00	5	517742	6131601	TLSA	0	0	0	0	0	0	0	0	0	0	0
128	02-Aug-16	3:09	5	518260	6131565	TLSA	0	0	0	0	0	0	0	0	0	0	0
129	02-Aug-16	3:19	5	518775	6131569	TLSA	0	0	0	1	0	0	0	0	1	0	0
130	02-Aug-16	3:27	5	519294	6131566	TLSA	0	0	0	0	0	0	0	0	0	0	0
131	02-Aug-16	3:36	5	519825	6131568	TLSA	0	0	0	1	0	0	0	0	4	0	0
132	02-Aug-16	3:56	5	519708	6133916	TLSA	0	0	0	0	0	0	0	0	0	0	0
133	02-Aug-16	4:06	5	519196	6133916	TLSA	0	0	0	0	0	0	0	0	0	0	0
134	02-Aug-16	4:30	5	518660	6133914	TLSA	0	0	0	0	0	0	0	0	0	0	0
135	02-Aug-16	4:40	5	518088	6133918	TLSA	0	0	0	0	0	0	0	0	0	0	0

Appendix I6

***Bat Acoustic Surveys in the
Pike 2 Terrestrial Local Study Area – 2012***

Appendix I6: Bat Acoustic Surveys in the Pike 2 TLSA - 2012

Plot #	Date	Time Start	Duration (min)	Easting NAD 83	Northing NAD 83	Study Area	Bat Species Group Detected										Number of Passes
							Red Bat	Little Brown Bat	Northern Bat	Myotis Spp.	Big Brown/ Silver Bat	Silver-haired Bat	Hoary Bat	High Freq. Bat	Low Freq. Bat		
1	30-Jul-12	22:26	225	518162	6135624	TLSA	1	0	0	0	0	0	0	0	0	0	1
1	30-Jul-12	22:26	225	518162	6135624	TLSA	0	1	0	0	0	0	0	0	0	0	2
1	30-Jul-12	22:26	225	518162	6135624	TLSA	0	0	0	0	1	0	0	0	0	0	3
2	30-Jul-12	2:18	5	517669	6135730	TLSA	0	0	0	0	0	0	0	0	0	0	0
3	30-Jul-12	2:26	5	517296	6136080	TLSA	0	0	0	0	0	0	0	0	0	0	0
4	30-Jul-12	2:33	5	516929	6136431	TLSA	0	0	0	0	1	0	0	0	0	0	3
4	30-Jul-12	2:33	5	516929	6136431	TLSA	0	0	0	1	0	0	0	0	0	0	1
5	31-Jul-12	4:25	5	518634	6135764	TLSA	0	0	0	0	0	0	0	0	0	0	0
6	31-Jul-12	4:32	5	519093	6135573	TLSA	0	0	0	0	0	0	0	0	0	0	0
7	31-Jul-12	4:39	5	519523	6135321	TLSA	0	0	0	0	0	0	0	0	0	0	0
8	04-Aug-12	21:22	348	522447	6140736	TLSA	1	0	0	0	0	0	0	0	0	0	2
8	04-Aug-12	21:22	348	522447	6140736	TLSA	0	1	0	0	0	0	0	0	0	0	85
8	04-Aug-12	21:22	348	522447	6140736	TLSA	0	0	0	1	0	0	0	0	0	0	3
8	04-Aug-12	21:22	348	522447	6140736	TLSA	0	0	0	0	1	0	0	0	0	0	23
8	04-Aug-12	21:22	348	522447	6140736	TLSA	0	0	0	0	0	0	1	0	0	1	1
8	04-Aug-12	21:22	348	522447	6140736	TLSA	0	0	0	0	0	0	0	0	1	0	1
9	04-Aug-12	3:21	5	521782	6141173	TLSA	0	0	0	0	0	0	0	0	0	0	0
10	04-Aug-12	3:30	5	522228	6141380	TLSA	0	0	0	0	0	0	0	0	0	0	0
11	04-Aug-12	3:39	5	522724	6141477	TLSA	0	1	0	0	0	0	0	0	0	0	2
12	04-Aug-12	3:48	5	523207	6141570	TLSA	0	1	0	0	0	0	0	0	0	0	1
12	04-Aug-12	3:48	5	523207	6141570	TLSA	0	0	0	0	1	0	0	0	0	0	1
13	04-Aug-12	3:59	5	523365	6142046	TLSA	0	0	0	0	0	1	0	0	0	0	1
14	05-Aug-12	21:20	275	521886	6135362	TLSA	0	0	1	0	0	0	0	0	0	0	5
14	05-Aug-12	21:20	275	521886	6135362	TLSA	0	1	0	0	0	0	0	0	0	0	10
14	05-Aug-12	21:20	275	521886	6135362	TLSA	0	0	0	1	0	0	0	0	0	0	8
14	05-Aug-12	21:20	275	521886	6135362	TLSA	0	0	0	0	0	0	0	1	0	0	2
15	05-Aug-12	1:58	5	521844	6134858	TLSA	0	0	0	0	0	0	0	0	0	0	0
16	05-Aug-12	2:05	5	522107	6134435	TLSA	0	0	0	0	0	0	0	0	0	0	0
17	05-Aug-12	2:12	5	522635	6134379	TLSA	0	0	0	0	0	0	0	0	0	0	0
18	05-Aug-12	2:18	5	523164	6134325	TLSA	0	0	0	0	0	0	0	0	0	0	0
19	05-Aug-12	2:25	5	523580	6134017	TLSA	0	0	0	0	0	0	0	0	0	0	0
20	05-Aug-12	2:37	5	523945	6133679	TLSA	0	0	0	0	1	0	0	0	0	0	1
21	05-Aug-12	2:46	5	523770	6133201	TLSA	0	0	0	0	0	0	0	0	0	0	0
22	05-Aug-12	2:54	5	523628	6132714	TLSA	0	0	0	0	0	0	0	0	0	0	0
23	05-Aug-12	3:01	5	524133	6132619	TLSA	0	1	0	0	0	0	0	0	0	0	2
24	05-Aug-12	3:38	5	521473	6134489	TLSA	0	1	0	0	0	0	0	0	0	0	1
24	05-Aug-12	3:38	5	521473	6134489	TLSA	0	0	0	0	0	0	0	1	0	0	1
25	05-Aug-12	3:45	112	520723	6134625	TLSA	0	0	0	0	0	1	0	0	0	0	2
25	05-Aug-12	3:45	112	520723	6134625	TLSA	1	0	0	0	0	0	0	0	0	0	2
25	05-Aug-12	3:45	112	520723	6134625	TLSA	0	1	0	0	0	0	0	0	0	0	3
25	05-Aug-12	3:45	112	520723	6134625	TLSA	0	0	0	1	0	0	0	0	0	0	1
25	05-Aug-12	3:45	112	520723	6134625	TLSA	0	0	0	0	1	0	0	0	0	0	1
26	06-Aug-12	21:19	290	513385	6132792	TLSA	0	1	0	0	0	0	0	0	0	0	2
26	06-Aug-12	21:19	290	513385	6132792	TLSA	0	0	0	1	0	0	0	0	0	0	3
26	06-Aug-12	21:19	290	513385	6132792	TLSA	0	0	0	0	0	0	0	1	0	0	2
27	06-Aug-12	2:12	5	512880	6132815	TLSA	0	0	0	0	0	0	0	0	0	0	0
28	06-Aug-12	2:22	5	512376	6132869	TLSA	0	0	0	0	0	0	0	0	0	0	0
29	06-Aug-12	2:30	5	511872	6132861	TLSA	0	0	0	0	0	0	0	0	0	0	0
30	06-Aug-12	2:38	5	511367	6132887	TLSA	0	0	0	0	1	0	0	0	0	0	1
31	06-Aug-12	2:46	5	510860	6132918	TLSA	0	0	0	0	0	0	0	0	0	0	0
32	06-Aug-12	2:53	5	510358	6132900	TLSA	0	0	0	0	0	0	0	0	0	0	0
33	06-Aug-12	3:00	5	509852	6132872	TLSA	0	1	0	0	0	0	0	0	0	0	1
34	06-Aug-12	3:07	5	509345	6132849	TLSA	0	0	0	0	1	0	0	0	0	0	1
34	06-Aug-12	3:07	5	509345	6132849	TLSA	0	0	0	0	0	0	0	1	0	0	3
35	06-Aug-12	3:19	5	508851	6132802	TLSA	1	0	0	0	0	0	0	0	0	0	1
36	06-Aug-12	3:28	5	508345	6132838	TLSA	0	0	0	0	1	0	0	0	0	0	1
37	06-Aug-12	3:48	5	507953	6133185	TLSA	0	0	0	0	0	1	0	0	0	0	1
38	06-Aug-12	3:54	5	507565	6133548	TLSA	0	0	0	0	0	0	0	0	0	0	0
39	07-Aug-12	21:52	5	529913	6135928	TLSA	0	0	0	0	0	0	0	0	0	0	0
40	07-Aug-12	23:57	5	528053	6140640	TLSA	0	1	0	0	0	0	0	0	0	0	2
40	07-Aug-12	23:57	5	528053	6140640	TLSA	0	0	0	1	0	0	0	0	0	0	2
40	07-Aug-12	23:57	5	528053	6140640	TLSA	0	0	0	0	0	0	0	1	0	0	1
41	07-Aug-12	0:14	5	527715	6140279	TLSA	0	1	0	0	0	0	0	0	0	0	1
41	07-Aug-12	0:14	5	527715	6140279	TLSA	0	0	0	1	0	0	0	0	0	0	1
41	07-Aug-12	0:14	5	527715	6140279	TLSA	0	0	0	0	0	0	0	1	0	0	6
42	07-Aug-12	0:24	5	527573	6139791	TLSA	0	1	0	0	0	0	0	0	0	0	1
43	07-Aug-12	0:32	5	527635	6139280	TLSA	0	1	0	0	0	0	0	0	0	0	14
44	07-Aug-12	0:40	301	527996	6139267	TLSA	0	0	0	0	0	0	1	0	0	0	1
44	07-Aug-12	0:40	301	527996	6139267	TLSA	0	1	0	0	0	0	0	0	0	0	74
44	07-Aug-12	0:40	301	527996	6139267	TLSA	0	0	0	1	0	0	0	0	0	0	10
44	07-Aug-12	0:40	301	527996	6139267	TLSA	0	0	0	0	1	0	0	0	0	0	4
44	07-Aug-12	0:40	301	527996	6139267	TLSA	0	0	0	0	0	0	1	0	0	0	27
44	07-Aug-12	0:40	301	527996	6139267	TLSA	0	0	0	0	0	0	0	1	0	0	2

Appendix 17

***Pike 2 Incidental Species Observations in
the Terrestrial Local Study Area***

Appendix I7: Pike 2 Incidental Species Observations in TLSA

Common Name	Scientific Name	Observation Source			FWMIS (Y or N) ²	Season(s) of Observation
		Total # of Observations	Field Survey	Devon App ¹		
Ring-necked Duck	<i>Aythya collaris</i>	100	100	0	N	Summer
Boreal Chorus Frog	<i>Pseudacris maculata</i>	94	94	0	N	Spring
Common Nighthawk	<i>Chordeiles minor</i>	63	63	0	N	Spring/Summer
Hermit Thrush	<i>Catharus guttatus</i>	50	50	0	N	Spring/Summer
Wilson's Snipe	<i>Gallinago delicata</i>	49	49	0	N	Spring/Summer
White-winged Crossbill	<i>Loxia leucoptera</i>	45	45	0	N	Spring/Summer
Ruby-crowned Kinglet	<i>Regulus calendula</i>	36	36	0	N	Spring/Summer
White-throated Sparrow	<i>Zonotrichia albicollis</i>	34	34	0	N	Spring/Summer
Swainson's Thrush	<i>Catharus ustulatus</i>	25	25	0	N	Spring/Summer
Wood Frog	<i>Lithobates sylvatica</i>	25	25	0	N	Spring
Common Loon	<i>Gavia immer</i>	24	24	0	N	Spring/Summer
Yellow-rumped Warbler	<i>Setophaga coronata</i>	21	21	0	N	Spring/Summer
Chipping Sparrow	<i>Spizella passerina</i>	20	20	0	N	Spring/Summer
Ovenbird	<i>Seiurus aurocapillus</i>	19	19	0	N	Spring/Summer
Gray Jay	<i>Perisoreus canadensis</i>	18	18	0	N	Spring/Summer/Winter
Common Raven	<i>Corvus corax</i>	16	16	0	N	Spring/Summer/Winter
Gray Wolf	<i>Canis lupus</i>	16	15	1	N	Spring/Summer
Red-eyed Vireo	<i>Buteo jamaicensis</i>	16	16	0	N	Spring/Summer
Dark-eyed Junco	<i>Junco hyemalis</i>	14	14	0	N	Spring/Summer
Sandhill Crane	<i>Antigone canadensis</i>	14	14	0	Y	Spring/Summer
Tree Swallow	<i>Tachycineta bicolor</i>	13	13	0	N	Spring/Summer
Western Toad	<i>Anaxyrus boreas</i>	13	13	0	Y	Spring
Greater Yellowlegs	<i>Tringa melanoleuca</i>	11	11	0	N	Spring
Tennessee warbler	<i>Oreothlypis peregrina</i>	11	11	0	N	Spring/Summer
Winter Wren	<i>Troglodytes hiemalis</i>	11	11	0	N	Spring/Summer
American Kestrel	<i>Falco sparverius</i>	9	9	0	N	Spring/Summer
Boreal Chickadee	<i>Poecile hudsonicus</i>	9	9	0	N	Spring/Summer/Winter
Great Horned Owl	<i>Bubo virginianus</i>	9	9	0	N	Spring/Summer
Olive-sided Flycatcher	<i>Contopus cooperi</i>	9	9	0	N	Spring/Summer
Alder Flycatcher	<i>Empidonax alnorum</i>	8	8	0	Y	Spring/Summer
LeConte's Sparrow	<i>Ammodramus leconteii</i>	8	8	0	N	Spring/Summer
Mallard	<i>Anas platyrhynchos</i>	8	8	0	N	Spring/Summer
Black-capped Chickadee	<i>Poecile atricapillus</i>	7	7	0	N	Winter
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>	7	7	0	N	Spring/Summer
Lincoln's Sparrow	<i>Melospiza lincolni</i>	7	7	0	N	Spring/Summer
Red-tailed Hawk	<i>Buteo jamaicensis</i>	7	7	0	N	Spring/Summer
Sora	<i>Porzana carolina</i>	7	7	0	N	Spring/Summer
Black Bear	<i>Ursus americanus</i>	6	2	4	N	Spring/Summer
Canada Goose	<i>Branta canadensis</i>	6	6	0	N	Spring/Summer
Bald Eagle	<i>Haliaeetus leucocephalus</i>	5	5	0	Y	Spring/Summer/Autumn
Barn Swallow	<i>Hirundo rustica</i>	5	5	0	Y	Spring/Summer
Coyote	<i>Canis latrans</i>	5	4	1	N	Spring/Summer
Great Blue Heron	<i>Ardea herodias</i>	5	5	0	N	Spring/Summer
Palm Warbler	<i>Setophaga palmarum</i>	5	5	0	N	Spring/Summer
Red Fox	<i>Vulpes vulpes</i>	5	2	3	N	Spring/Summer
Ruffed Grouse	<i>Bonasa umbellus</i>	5	5	0	N	Spring/Winter
Swamp Sparrow	<i>Melospiza georgiana</i>	5	5	0	N	Spring/Summer
Wilson's Warbler	<i>Cardellina pusilla</i>	5	5	0	N	Spring/Summer
American White Pelican	<i>Pelecanus erythrorhynchos</i>	4	4	0	Y	Spring/Summer
Common Yellowthroat	<i>Geothlypis trichas</i>	4	4	0	Y	Spring/Summer
Grouse Spp.	-	4	4	0	N	Summer/Winter
Northern Flicker	<i>Colaptes auratus</i>	4	4	0	N	Spring/Summer
Snowshoe Hare	<i>Lepus americanus</i>	4	4	0	N	Summer/Winter
White-tailed Deer	<i>Odocoileus virginianus</i>	4	3	1	N	Spring/Summer
Common Redpoll	<i>Acanthis flammea</i>	3	3	0	N	Winter
Least Flycatcher	<i>Empidonax minimus</i>	3	3	0	N	Spring/Summer
Northern Harrier	<i>Circus hudsonius</i>	3	3	0	N	Spring/Summer
Sharp-shinned hawk	<i>Accipiter striatus</i>	3	3	0	N	Spring/Summer
solitary sandpiper	<i>Tringa solitaria</i>	3	3	0	N	Spring/Summer
American Robin	<i>Turdus migratorius</i>	2	2	0	N	Spring
Bat Spp.	-	2	2	0	N	Spring
Belted Kingfisher	<i>Megasceryle alcyon</i>	2	2	0	N	Summer
Black-backed Woodpecker	<i>Picoides arcticus</i>	2	2	0	N	Spring
Caribou	<i>Rangifer tarandus caribou</i>	2	1	1	Y	Spring

Common Name	Scientific Name	Observation Source			FWMIS (Y or N) ²	Season(s) of Observation
		Total # of Observations	Field Survey	Devon App ¹		
Cedar Waxwing	<i>Bombycilla cedrorum</i>	2	2	0	N	Spring/Summer
Deer Spp.	<i>Odocoileus spp.</i>	2	2	0	N	Spring/Winter
Lesser Yellowlegs	<i>Tringa flavipes</i>	2	2	0	N	Spring/Summer
Pileated Woodpecker	<i>Dryocopus pileatus</i>	2	2	0	N	Winter
Pine Siskin	<i>Spinus pinus</i>	2	2	0	N	Spring/Summer
Red-breasted Nuthatch	<i>Sitta canadensis</i>	2	2	0	N	Spring/Summer
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	2	2	0	N	Spring/Summer
Spruce grouse	<i>Falcapennis canadensis</i>	2	2	0	N	Spring/Summer
American Crow	<i>Corvus brachyrhynchos</i>	1	1	0	N	Spring
American Three-toed	<i>Picoides dorsalis</i>	1	1	0	N	Spring/Summer
Barred Owl	<i>Strix varia</i>	1	1	0	Y	Spring
Blue-headed Vireo	<i>Vireo solitarius</i>	1	1	0	N	Spring
Blue-winged Teal	<i>Spatula discors</i>	1	1	0	N	Spring
Broad-winged Hawk	<i>Buteo platypterus</i>	1	1	0	N	Spring
Bufflehead	<i>Bucephala albeola</i>	1	1	0	N	Spring
Canada Lynx	<i>Lynx canadensis</i>	1	1	0	Y	Spring
Clay-coloured Sparrow	<i>Spizella pallida</i>	1	1	0	N	Spring
Common Merganser	<i>Mergus merganser</i>	1	1	0	N	Summer
Connecticut Warbler	<i>Oporornis agilis</i>	1	1	0	N	Spring
Great Grey Owl	<i>Strix nebulosa</i>	1	1	0	N	Spring
House Wren	<i>Troglodytes aedon</i>	1	1	0	N	Spring/Summer
Killdeer	<i>Charadrius vociferus</i>	1	1	0	N	Spring
Magnolia Warbler	<i>Dendroica magnolia</i>	1	1	0	N	Summer
Muskrat	<i>Ondatra zibethicus</i>	1	1	0	N	Spring
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	1	1	0	N	Spring
Nelson's Sharp-tailed Sparrow	<i>Ammodramus nelsoni</i>	1	1	0	N	Spring
Northern Goshawk	<i>Accipiter gentilis</i>	1	1	0	N	Spring
Northern Waterthrush	<i>Parkesia noveboracensis</i>	1	1	0	N	Summer
Orange-crowned Warbler	<i>Oreothlypis celata</i>	1	1	0	N	Summer
Osprey	<i>Pandion haliaetus</i>	1	1	0	N	Spring
Ring-billed Gull	<i>Larus delawarensis</i>	1	1	0	N	Spring/Summer
Red Crossbill	<i>Loxia curvirostra</i>	1	1	0	N	Summer
Rusty Blackbird	<i>Euphagus carolinus</i>	1	1	0	N	Summer
Short-eared Owl	<i>Asio flammeus</i>	1	1	0	N	Summer
Song Sparrow	<i>Melospiza melodia</i>	1	1	0	N	Summer
Willow Ptarmigan	<i>Lagopus lagopus</i>	1	1	0	N	Spring
Western-wood Peewee	<i>Contopus sordidulus</i>	1	1	0	N	Summer
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	1	1	0	N	Summer
Yellow Warbler	<i>Setophaga petechia</i>	1	1	0	N	Spring

Notes:

¹ Devon app data is submitted by workers and, therefore, species may be misidentified

² FWMIS area search = TLSA

Appendix 18

***Cumulative Effects Management Association
Habitat Suitability Mapping Model Test
- Methods and Results***

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1.0 INTRODUCTION

Habitat suitability, distribution, and supply for each of the valued ecosystem components (VEC) was mapped using ecosite phases at the local (terrestrial local study area [TLSA]) level. Habitat suitability was rated as very high, high, moderate, low or very low/nil for each VEC species using baseline inventory results, scientific literature, regional monitoring and research studies, and consensus-based subjective ratings adapted from a Cumulative Effects Management Association (CEMA) wildlife habitat assessment workshop for wildlife habitat units. The CEMA workshop integrated western science and traditional ecological knowledge to assign suitability ratings (Kansas and Collister 2006). The workshop included 36 government biologists, consultants, traditional land users, hunters, trappers, outfitters and industry representatives (Kansas and Collister 2006).

A habitat suitability assessment validation process was completed for selected VECs to support refinement and evaluation of the CEMA workshop ratings and their application to the Project.

2.0 METHODS

2.1 Valued Ecosystem Components

Ten VEC species or species groups were identified including barred owl, black bear, boreal owl, woodland caribou, fisher, lynx, moose, myotis species and old growth forest birds (Table I8-1). To have a minimum degree of precision with the estimates, the tests were only completed for VECs with a minimum of 20 observations. This, therefore, excluded barred owl (n = 1) and boreal owl (n = 10) from the test.

Table I8-1: Overview of Valued Ecosystem Component Species and Species Group, Sampling Method and Estimated Location Accuracy

VEC/VEC Group	Sample Size (n)	Sampling Method ¹	Estimated Sampling Location Accuracy
Barred owl	1	A + CP	Low
Black bear	22	PC	High
Boreal owl	10	A + CP	Low
Caribou	148	WT + PC	High
Fisher	86	WT + PC	High
Lynx	191	WT + PC	High
Moose	124	WT + PC	High
Myotis spp.	67	AB	Moderate
Western toad	52	A	Low
Old growth forest birds	111	A	Moderate

Note:

¹ A = Auditory point counts; CP = Call playback; WT = Winter tracking; PC = Pellet group counts; AB = Acoustic bat survey.

Observations of species and species groups were collected during the Project specific field surveys, incidental observations and from other surveys which overlapped with the TLSA. Depending upon the species or the survey approach, the survey/results differ in accuracy of location. For example, winter tracking and pellet group counts are considered as having a high location accuracy (the exact location of the track or pellet group is known) resulting in an accurate estimation of habitat suitability class usage.

Conversely, auditory surveys of song birds (i.e., old growth forest birds) is moderately accurate as these can be detected from a relatively short distance, and one can be relatively certain about the habitat type for the detected observations.

On the other hand, because western toads and owls can be detected from a large distance, auditory surveys for these species, and the resulting species detections, are considered as having low positional accuracies. Call playbacks survey techniques can also result in a target species leaving their core area or nest site to approach the playback location and, therefore, are observed in a different habitat type/location. The *Myotis* species groups also pose a challenge because the sonograms are recorded when the bats are foraging and not at roosting sites. Detections, therefore, likely don't represent optimal roosting habitat.

Therefore, based on survey type alone, the location accuracy for fisher, lynx, moose, and woodland caribou is assumed to be high; old growth forest birds and *Myotis* species can be assumed to be moderate; and barred owl, boreal owl and western toad can be assumed to be low (Table I8-1). The result is that the test of use versus availability is likely to yield more reliable results for VECs with High and Moderate estimated location accuracy.

2.2 Habitat Suitability Classes

Most the VECs were grouped into five suitability classes, including very low, low, moderate, high, and very high. For old growth forest birds, a different classification system was used separating young forest from Old Growth forest types including deciduous, mixedwood, conifer-white spruce, conifer-black spruce and conifer-pine.

If the habitat suitability mapping, and the underlying Alberta Vegetation Inventory/Ecosite phase mapping from which it is based, is accurate, we would expect to see more use of habitats identified as high or very high suitability for a given species (or either of the old growth forest types for the old growth forest birds), and less use of habitats identified as low and very low suitability (and young forest) in relation to supply of each habitat class.

2.2.1 Results

Based on observations alone, it appears some species show considerable use of some of the low and moderate suitability habitats (e.g., fisher and lynx) (Table I8-2). In addition, 77% of the old growth forest bird observations occur in areas mapped as young forest (Table I8-3). However, the habitat supply (available by class) and use data were plotted together to identify whether there is a preference for certain habitat suitability classes. If use levels exceeded availability bars, this indicated preference for a suitability class and use below these bars indicates avoidance. If the use is as expected based on availability, the bars overlap.

Table I8-2: Summary of Observations by Suitability Class for each Valued Ecosystem Component

VEC	Number of Observations by Habitat Suitability Class by VEC					
	Very Low	Low	Moderate	High	Very High	Total
Barred owl			1			1
Black bear		11	6	5		22
Boreal owl	7	2		1		10
Caribou	1	15	14	61	57	148
Fisher	1	71	11	3		86
Lynx		142	22	20	7	191
Moose		59	45	20		124
Myotis spp.	33	16		18		67
Western toad	20	3	10	19		52

VEC	Number of Observations by Old Growth Forest Cover Type						
	Young Forest	Deciduous	Mixedwood	White Spruce	Black Spruce	Pine	Total
Old growth forest birds	77	2	9	11	0	12	111

Table I8-3 provides a summary of availability of each habitat suitability class for each VEC.

Table I8-3: Summary of Percentage Availability by Suitability Class for each Valued Ecosystem Component

VEC	Percent Availability by Habitat Suitability Class for Each VEC				
	Very Low	Low	Moderate	High	Very High
Barred owl	66.3	30.4	2.7	0.3	0.3
Black bear	2.1	61.5	21.9	14.5	0.0
Boreal owl	39.5	49.7	8.4	2.4	0.0
Caribou	2.1	38.5	27.2	25.8	6.4
Fisher	5.2	62.9	28.7	2.6	0.7
Lynx	2.1	50.4	27.5	20.0	0.0
Moose	2.1	31.6	49.1	14.0	3.2
Myotis spp.	45.9	38.1	10.5	3.1	2.4
Western toad	5.2	52.2	35.1	7.5	0.0

VEC	Percent Availability Old Growth Forest Cover Type					
	Young Forest	Deciduous	Mixedwood	White Spruce	Black Spruce	Pine
Old growth forest birds	96.0	1.4	1.0	0.6	0.1	0.9

3.0 RESULTS

- Barred owl – analysis not possible because of low sample point geographic resolution and low sample size.
- Boreal owl – analysis not possible because of low sample point geographic resolution and low sample size.
- Western toad – analysis not possible because of low sample point geographic resolution.
- Black bear – showed an avoidance for very low and low, habitat suitability classes, and a preference for moderate and high habitat suitability class (Figure I8-1).
- Woodland caribou – avoided very low habitat, low and moderate habitat suitability classes, and preferred high and very high habitat suitability (Figure I8-2).
- Fisher – avoided low and moderate habitat suitability classes and selected for low and high habitat suitability classes (Figure I8-3):
 - low suitability selection was likely the result of the hunting of hare during high hare densities, which result in less core habitat selection because of the more dispersed nature of hare.
- Lynx – selected for low and very high habitat suitability classes and avoided all other classes (Figure I8-4):
 - low suitability selection was likely the result of the hunting of hare during high hare densities, which result in less core habitat selection because of the more dispersed nature of hare.
- Moose – selected for low and high habitat suitability classes and avoided all other classes (Figure I8-5):
 - low suitability selection was for mature Pine stands and likely for thermal cover and not forage.
- Old growth forest birds – avoided young forest and showed strong selection for old growth forest (Figure I8-6).
- Myotis species – avoided low, moderate, and very high habitat suitability classes, and showed a strong selection for high habitat suitability class (Figure I8-7):
 - avoidance of very high suitability was likely a survey limitation which detects bats at night while foraging in areas optimal for foraging rather than optimal roost locations.

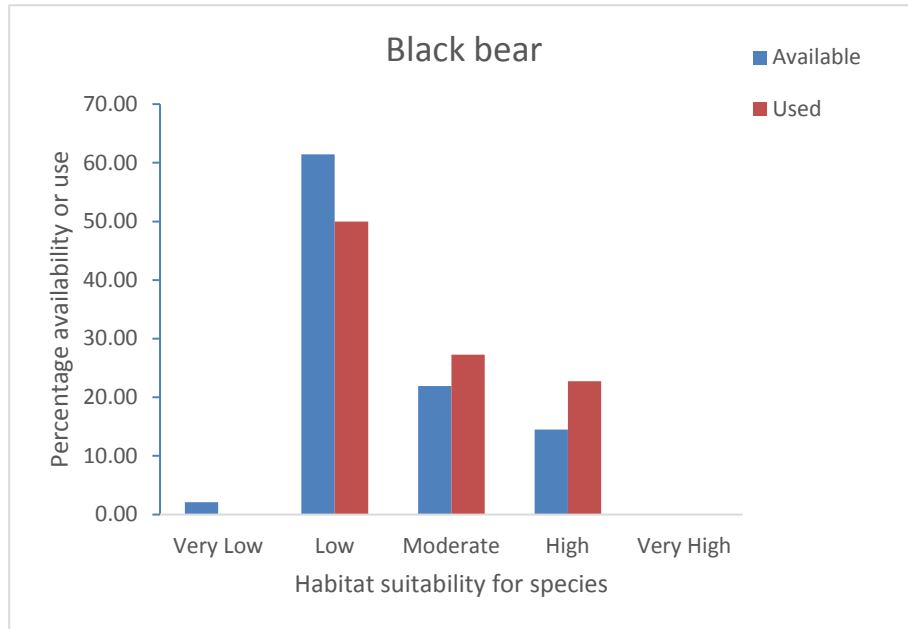


Figure I8-1: Relative Availability and Use of Habitat Suitability Classes by Black Bear (n = 22)

Availability and use are shown as percentages. The availability bars show expected use based on relative supply of each suitability class. Use levels exceeding these bars indicates preference for a suitability class and use below these bars indicates avoidance. If use and availability bars overlap, the use is as expected based on availability.

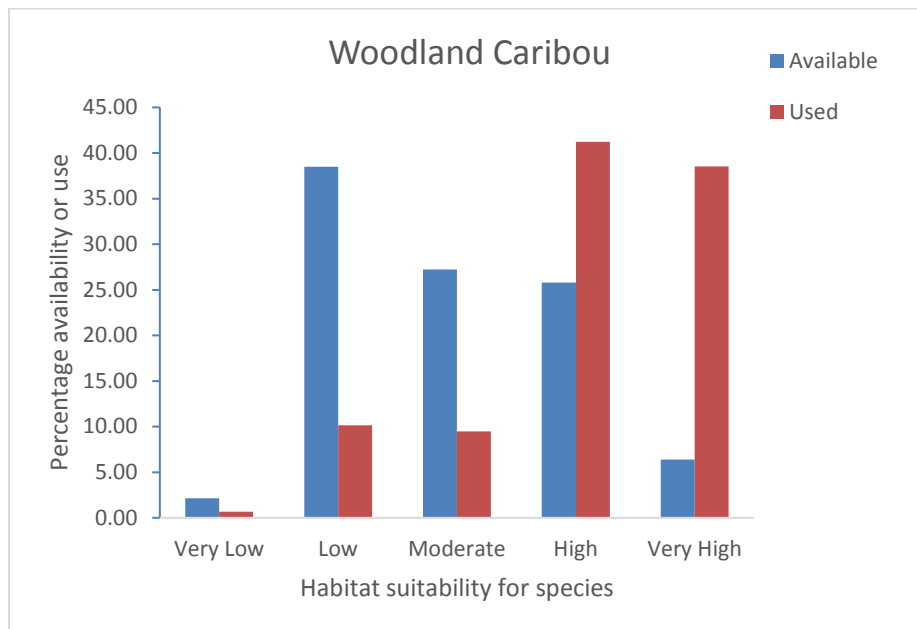


Figure I8-2: Relative Availability and Use of Habitat Suitability Classes by Caribou (n = 148)

Availability and use are shown as percentages. The availability bars show expected use based on relative supply of each suitability class. Use levels exceeding these bars indicates preference for a suitability class and use below these bars indicates avoidance. If use and availability bars overlap, the use is as expected based on availability.

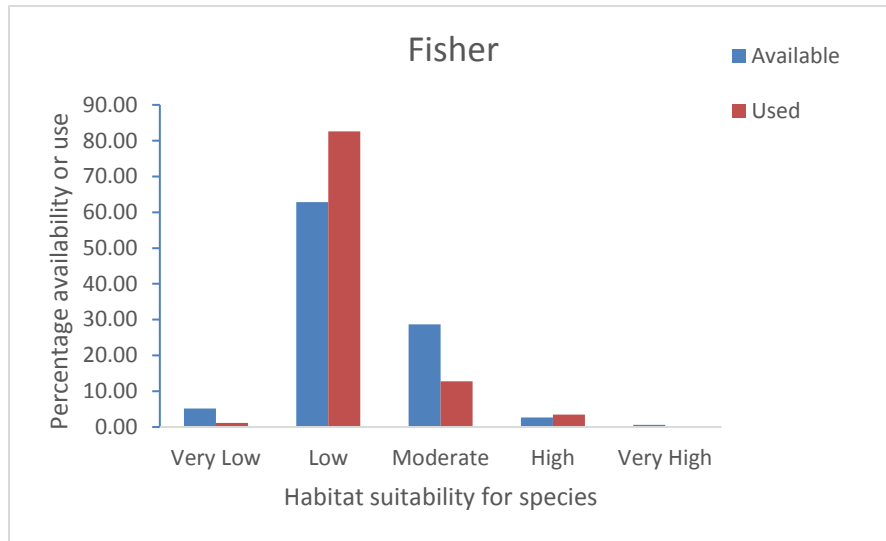


Figure 18-3: Relative Availability and Use of Habitat Suitability Classes by Fisher (n = 86)

Availability and use are shown as percentages. The availability bars show expected use based on relative supply of each suitability class. Use levels exceeding these bars indicates preference for a suitability class and use below these bars indicates avoidance. If use and availability bars overlap, the use is as expected based on availability.

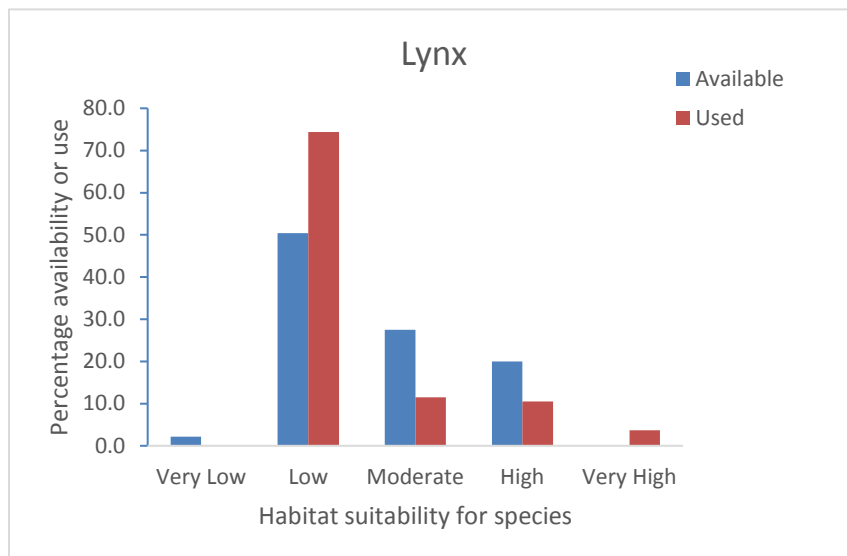


Figure 18-4: Relative Availability and Use of Habitat Suitability Classes by Lynx (n = 191)

Availability and use are shown as percentages. The availability bars show expected use based on relative supply of each suitability class. Use levels exceeding these bars indicates preference for a suitability class and use below these bars indicates avoidance. If use and availability bars overlap, the use is as expected based on availability.

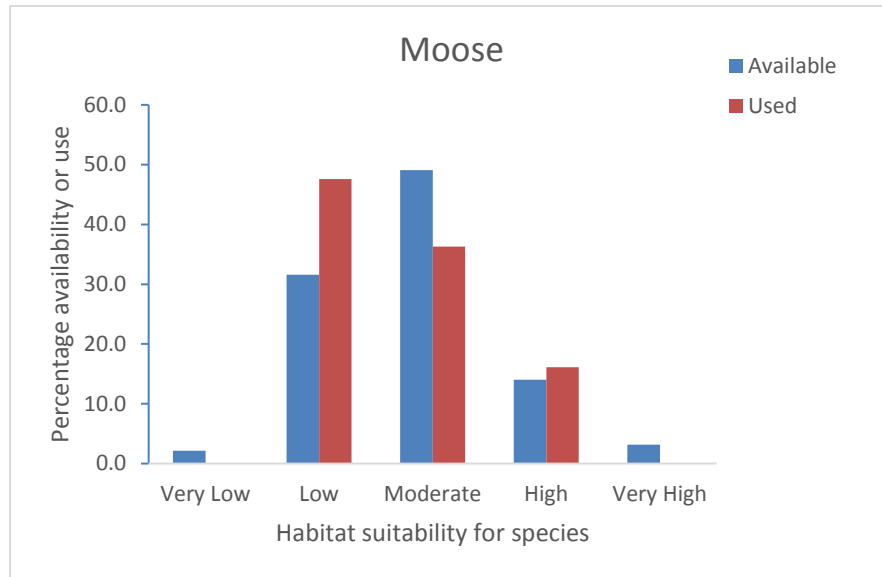


Figure I8-5: Relative Availability and Use of Habitat Suitability Classes by Moose (n = 124)

Availability and use are shown as percentages. The availability bars show expected use based on relative supply of each suitability class. Use levels exceeding these bars indicates preference for a suitability class and use below these bars indicates avoidance. If use and availability bars overlap, the use is as expected based on availability.

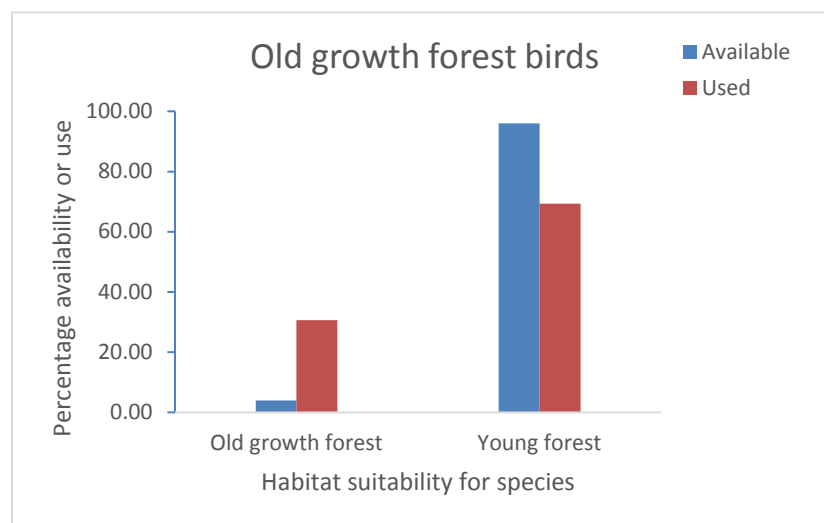


Figure I8-6: Relative Availability and Use of Habitat Suitability Classes by Old Growth Forest Birds (n = 111)

Availability and use are shown as percentages. The availability bars show expected use based on relative supply of each suitability class. Use levels exceeding these bars indicates preference for a suitability class and use below these bars indicates avoidance. If use and availability bars overlap, the use is as expected based on availability.

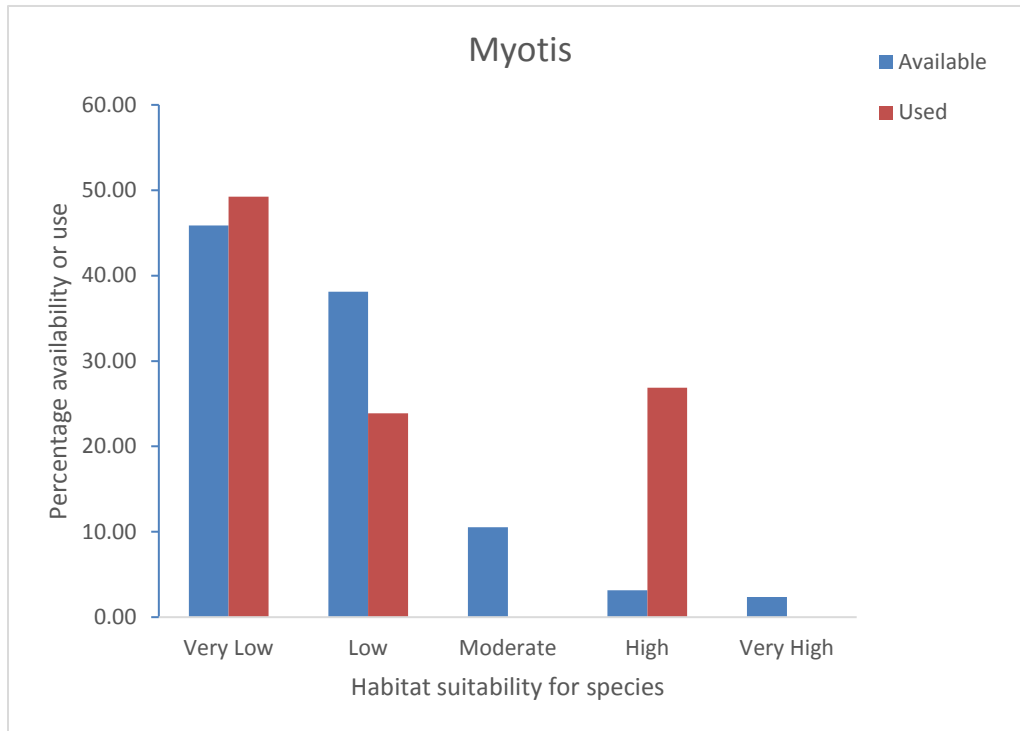


Figure I8-7: Relative Availability and Use of Habitat Suitability Classes by Myotis spp. (n = 67)

Availability and use are shown as percentages. The availability bars show expected use based on relative supply of each suitability class. Use levels exceeding these bars indicates preference for a suitability class and use below these bars indicates avoidance. If use and availability bars overlap, the use is as expected based on availability.

4.0 REFERENCES

Kansas, J.L. and D.M. Collister. 2006. *Wildlife Habitat Mapping – SEWG (South) Study Area*. Prep. for Cumulative Effects Management Association by URSUS Ecosystem Management Ltd. 62 pp.