

# A synthetic review of terrestrial biological research from the Alberta oil sands region: ten years of published literature

## Supplementary Information – Appendix 2

**Table A2a:** Summary table of mammal distribution responses to anthropogenic disturbance features in the OSR at the local (smaller spatial) scale. To be included in the table, publications had to (1) consider a response variable of mammal abundance or occupancy (i.e. a distribution response); (2) consider specific anthropogenic disturbance (i.e. did not use summary metrics such as % disturbed landscape); (3) not be based on predictive modelling studies (i.e. response metrics had to be based on monitoring data); and (4) present metrics of mammal responses (e.g. explanatory model coefficients) to individual variables.

**Table A2b:** Summary table of mammal distribution responses to anthropogenic disturbance features in the OSR at the landscape (larger spatial) scale. To be included in the table, publications had to (1) consider a response variable of mammal abundance or occupancy (i.e. a distribution response); (2) consider specific anthropogenic disturbance (i.e. did not use summary metrics such as % disturbed landscape); (3) not be based on predictive modelling studies (i.e. response metrics had to be based on monitoring data); and (4) present metrics of mammal responses (e.g. explanatory model coefficients) to individual variables.

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				Coyote ( <i>Canis latrans</i> )	Red Fox ( <i>Vulpes vulpes</i> )	Wolf ( <i>Canis lupus</i> )	Lynx ( <i>Lynx canadensis</i> )	Snowshoe hare ( <i>Lepus americanus</i> )	Ermine ( <i>Mustela erminea</i> )	Fisher ( <i>Pekania pennanti</i> )	Marten ( <i>Martes americana</i> )	Mink ( <i>Neovison vison</i> )	River Otter ( <i>Lontra canadensis</i> )	Wolverine ( <i>Gulo gulo</i> )	Red squirrel ( <i>Sciurus vulgaris</i> )	Caribou ( <i>Rangifer tarandus</i> )	Deer ( <i>Odocoileus virginianus</i> )	Moose ( <i>Alces alces</i> )	Black bear ( <i>Ursus americanus</i> )		
Literature review	Toews et al. 2017	Linear	Trail	-	-	↑	-	-	-	-	-	-	-	-	-	-	↑	↓	-		
			Seismic	↑	-	↑	-	-	-	-	-	-	-	-	-	-	-	↑	↓	-	
			Pipeline	↑	-	↑	-	-	-	-	-	-	-	-	-	-	-	-	↑	↓	-
			Transmission line	-	-	↑	-	-	-	-	-	-	-	-	-	-	-	-	↑	↓	-
Remote camera	Tigner et al. 2014 Tigner et al. 2015	Linear	Open ≤ 2 m	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	0	
			Open 3-4 m	-	-	-	-	-	-	-	-	↓	-	-	-	-	-	-	-	↑	
			Open 5 m	-	-	-	-	-	-	-	-	↓	-	-	-	-	-	-	-	↑	
			Open ≥ 6m	-	-	-	-	-	-	-	-	↓	-	-	-	-	-	-	-	↑	
			Partial ≥ 6m	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	↑	
Snow tracking	Toews et al. 2017	Linear	Trail	0	0	0	-	-	-	-	-	-	-	-	-	-	0	0	-		
			Seismic	↑	-	0	-	-	-	-	-	-	-	-	-	-	-	0	0	-	
			Pipeline	0	-	0	0	-	-	-	-	-	-	-	-	-	-	-	0	0	-
			Transmission line	0	-	0	0	-	-	-	-	-	-	-	-	-	-	-	0	0	-
		Polygonal	Agriculture	0	-	0	0	-	-	-	-	-	-	-	-	-	-	-	0	0	-
			Wellsite	0	-	0	0	-	-	-	-	-	-	-	-	-	-	-	0	0	-
Scat surveys	Wasser et al. 2011	Linear	Primary road	-	-	0	-	-	-	-	-	-	-	-	-	-	↓	0	↓		
			Secondary road	-	-	0	-	-	-	-	-	-	-	-	-	-	-	↓	0	↑	
			Tertiary road	-	-	0	-	-	-	-	-	-	-	-	-	-	-	↓	0	↑	
Telemetry	Dickie et al. 2017	Linear	Unused / unknown	-	-	↑	-	-	-	-	-	-	-	-	-	-	↑	0	↓		
			Trail	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Seismic - conventional	-	-	↑	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Seismic - low impact	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Pipeline	-	-	↑	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Latham et al. 2011a	Linear	Transmission line	-	-	↑	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Road	-	-	↑	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Polygonal	-	-	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Latham et al. 2011b	Linear	Seismic - conventional	-	-	↑	-	-	-	-	-	-	-	-	-	-	-	-	-	↑	
			Seismic - low impact	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	↑	
Dickie et al. 2020	Polygonal	Pipeline	-	-	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	↑		
		Road	-	-	↑	-	-	-	-	-	-	-	-	-	-	-	-	-	↑		
ABMI Models	ABMI Biodiversity Browser (www.abmi.ca)	Human footprint	Linear density	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		
			Wellsite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	↑	
			Human habitation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	↑	
			Soft linear	0	↑	0	↑	0	0	0	0	0	0	↓	↓	0	0	0	↑	↑	
			Hard linear	↑	0	↓	↓	0	0	0	↓	0	0	↓	↓	↓	↓	↓	↓	↓	↓
Scat surveys	Scrafford et al. 2017	Linear	Agriculture	↑	↑	↓	↓	↓	0	↓	↓	0	↓	↓	↓	↓	↓	↑	↓		
			Forestry	↑	↓	0	0	0	0	0	↓	0	0	-	-	↓	↓	↓	↓	-	
			Energy	↑	↑	↓	↑	↓	↓	0	↓	0	0	-	-	↓	↓	↑	↑	-	
		Polygonal	Urban	↑	↑	↓	↓	↓	↓	↓	↓	↓	0	↓	↓	↓	↓	↓	↑	↑	
			Transportation	↑	0	↓	↑	0	0	↓	0	0	0	-	-	↓	↓	↑	↑	-	

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Literature review	Toews et al. 2017	Linear	Trail	-	-	↑	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
			Seismic	↑	-	↑	-	-	-	-	-	-	-	-	-	-	-	-	↑	↑	-	-	
			Pipeline	↑	-	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Transmission line	-	-	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Road	↑	-	↓	↓	-	-	-	-	-	-	-	-	-	-	-	-	↑	↑	-	-
		Polygonal	Agriculture	↑	-	0	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Wellsite	↑	-	↓	-	-	-	-	-	-	-	-	-	-	-	-	-	↓	-	-	-
			Cutblock (≤ 10 yr)	↓	-	↑	↓	-	-	-	-	-	-	-	-	-	-	-	-	↑	↓	-	-
			Cutblock (10-40 yr)	↑	-	↓	↑	-	-	-	-	-	-	-	-	-	-	-	-	↓	↑	-	-
			Cutblock (> 40 yr)	↓	-	↓	↑	-	-	-	-	-	-	-	-	-	-	-	-	↑	↑	-	-
Total Anthro			↑	-	↓	↓	-	-	-	-	-	-	-	-	-	-	-	↑	↑	-	-		
Remote camera	Fisher and Burton 2018	Linear	Trail	0	0	↑	↑	0	-	↓	-	-	-	-	↑	-	↓	↓	0	0			
			3D Seismic	↑	↓	0	↑	↑	-	↓	-	-	-	-	↑	-	0	↑	↓	↓	↓		
			Seismic	0	0	0	0	↑	-	0	-	-	-	-	0	-	0	0	0	0	0		
			Cutline	↑	↓	0	0	0	-	0	-	-	-	-	0	-	↓	↓	0	0	0		
			Pipeline	↓	0	0	↓	0	-	↑	-	-	-	-	0	-	0	↓	0	0	0		
			Road	↑	0	↓	↑	0	-	0	-	-	-	-	↑	-	0	0	0	↓	↓		
		Polygonal	Wellsite	0	↓	0	↓	0	-	0	-	-	-	-	↓	-	↑	↓	0	0	0		
			Block	↓	↑	↑	0	0	-	0	-	-	-	-	0	-	↑	↑	↓	↓	↓		
			Cutblock	0	0	0	↑	↓	-	0	-	-	-	-	0	-	↑	↑	0	0	0		
		Total Anthro			↑	↓	↑	↑	↑	-	↓	-	-	-	↑	-	↑	↓	↓	↓	↓		
Fisher et al. 2020 (annual)	Linear	Trail	-	-	-	-	-	-	-	-	-	-	-	-	-	-	↓	-	-	-			
		3D Seismic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-			
		Seismic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-			
		Cutline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-			
		Pipeline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-			
		Road	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-			
	Polygonal	Wellsite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	↑	-	-	-			
		Block	-	-	-	-	-	-	-	-	-	-	-	-	-	-	↑	-	-	-			
		Cutblock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	↑	-	-	-			
	Total Anthro			-	-	-	-	-	-	-	-	-	-	-	-	-	↑	-	-	-			
Tattersall et al. 2019	Linear	Seismic line density	↑	-	-	↑	-	-	-	-	-	-	-	-	-	-	-	-	↓				
Tigner et al. 2014, 2015	Linear	Seismic line density	-	-	-	-	-	-	-	↓	-	-	-	-	-	-	-	-	0				

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			Coyote ( <i>Canis latrans</i> )	Red Fox ( <i>Vulpes vulpes</i> )	Wolf ( <i>Canis lupus</i> )	Lynx ( <i>Lynx canadensis</i> )	Snowshoe hare ( <i>Lepus americanus</i> )	Ermine ( <i>Mustela erminea</i> )	Fisher ( <i>Pekania pennanti</i> )	Marten ( <i>Martes americana</i> )	Mink ( <i>Neovison vison</i> )	River Otter ( <i>Lontra canadensis</i> )	Wolverine ( <i>Gulo gulo</i> )	Red squirrel ( <i>Sciurus vulgaris</i> )	Caribou ( <i>Rangifer tarandus</i> )	Deer ( <i>Odocoileus virginianus</i> )	Moose ( <i>Alces alces</i> )	Black bear ( <i>Ursus americanus</i> )	
Snow tracking	Toews et al. 2018	Linear	Trail	0	- ↓	0	-	-	-	-	-	-	-	-	-	0	0	-	
			Seismic	0	- ↑	0	-	-	-	-	-	-	-	-	-	-	0	0	-
			Road	↑	- ↓	↓	-	-	-	-	-	-	-	-	-	-	↑	0	-
		Polygonal	Agriculture	↑	- ↓	↓	-	-	-	-	-	-	-	-	-	-	↑	0	-
			Wellsite	↑	-	0	0	-	-	-	-	-	-	-	-	-	0	0	-
			Cutblock	0	-	0	0	-	-	-	-	-	-	-	-	-	↑	↑	-
	Total Anthro			↑	- ↓	↓	-	-	-	-	-	-	-	-	-	↑	0	-	
	Toews et al. 2017	Linear	Trail	0	- ↓	0	-	-	-	-	-	-	-	-	-	-	0	0	-
			Seismic	0	- ↑	0	-	-	-	-	-	-	-	-	-	-	↓	0	-
			Pipeline	↑	- ↑	0	-	-	-	-	-	-	-	-	-	-	0	0	-
Transmission line			0	-	0	0	-	-	-	-	-	-	-	-	-	0	0	-	
Road			↑	- ↓	0	-	-	-	-	-	-	-	-	-	-	↑	↓	-	
Polygonal		Agriculture	↑	-	0	↓	-	-	-	-	-	-	-	-	-	0	0	-	
		Wellsite	↑	-	0	0	-	-	-	-	-	-	-	-	-	0	0	-	
		Cutblock (≤ 10 yr)	0	-	0	0	-	-	-	-	-	-	-	-	-	↑	0	-	
		Cutblock (10-40 yr)	0	-	0	0	-	-	-	-	-	-	-	-	-	0	↑	-	
		Cutblock (> 40 yr)	0	-	0	↑	-	-	-	-	-	-	-	-	-	0	0	-	
Total Anthro			↑	- ↓	↓	-	-	-	-	-	-	-	-	-	↑	0	-		
Telemetry	Linear	Seismic line	↑	- ↑	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Pipeline	↑	- ↓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Road	↑	- ↑	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Polygonal	Wellsite	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Settlement	↑	- ↑	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Cutblocks (< 6 yr)	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Cutblocks (6-30 yr)	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Cutblocks (> 30 yr)	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Other human	↓	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	

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