

Appendix 1. Summary of data sources and assumption for estimating area disturbed by the oil and gas industry in the Western Canadian Sedimentary Basin during the migratory bird breeding season.

Table A1.1 Summary of data sources, analyses, functions, and assumptions used to derive estimated area disturbed during the annual breeding season of migratory birds in the Western Canadian Sedimentary Basin by jurisdiction and ecozone.

Province	Data Source	Functions used	Assumed Width/Size	Seasonality/Area Assumptions
Alberta (Sustainable Resource Development, http://www.altalis.com/prod_base_base.html)				
Seismic	SRD Base Layer Database	Buffer analysis	pre-2005: 6 m † post-2005: 3.75m †	1 – 5% ¶
Pipelines	SRD Base Layer Database	Buffer analysis	20 m †	Distribution: 1% Gathering: Area*0.81*Well assumptions#
Wells	SRD Base Layer Database	Buffer analysis	Square (2 ha) ‡	Boreal: 14-18% § Prairie: 21-27% §
Oil sands	Gillanders et al. (2008) Latifovic et al (2005) Timoney and Lee (2009)	see Figure 2		Low: 14% ††; High: 33% ‡‡
British Columbia (Oil and Gas Commission, ftp://www.bcogc.ca/outgoing/OGC_Data/)				
Seismic	Geophysical database ‡	Buffer analysis	Buffered using distance field. Missing values replaced by weighted mean (2.67 m)	1 – 5% ¶
Pipelines	Pipelines database ‡	None required		
Wells	Wells database ‡	Buffer analysis	Square (2 ha) ‡	Boreal: 14-18% § Prairie: 21-27% §

Province	Data Source	Functions used	Assumed Width/Size	Seasonality/Area Assumptions
Manitoba (Innovation Energy and Mines, http://www.gov.mb.ca/iem/petroleum/gis/wells.zip)				
Seismic	Model prediction	see Appendix 2		1 – 5% ¶¶
Pipelines	Model prediction	see Appendix 2		Distribution: 1% Gathering: Area*0.81*Well assumptions#
Wells	Wells database	Buffer analysis	Square (2 ha) ‡	Boreal: 14-18% § Prairie: 21-27% §
Saskatchewan (Energy and Resources, http://www.infomaps.gov.sk.ca/website/SIR_Oil_And_Gas_Wells/viewer.htm)				
Seismic	Model prediction	see Appendix 2		1 – 5% ¶¶
Pipelines	Model prediction	see Appendix 2		Distribution: 1% Gathering: Area*0.81*Well assumptions#
Wells	Wells database	Buffer analysis	Square (2 ha) ‡	Boreal: 14-18% § Prairie: 21-27% §

† SRD Application Disposition Process and Tracking database

‡ Canadian Association of Petroleum Producers (personal communication), 1 ha for well pad and 1 ha for associated access

§ Based proportion of annual wells completed during breeding season of May-July (Boreal) and April-July (Prairie) from monthly well count data (http://www.caodc.ca/statistics/wellcounts_wc_monthly.html)

| Canadian Association of Petroleum Producers (personal communication)

¶¶ 20% of seismic exploration is conducted outside of winter period (Ziff Energy Group 2003) and assumed 25% of this occurs during the breeding season

Total pipeline area * 0.81 (~81% gathering lines) * proportion of clearing assumed for Well seasonality (since new wells must be connected to distribution network)

†† Based upon well site data (low)

‡‡ Assuming oil sands mining operations are approximately constant throughout the year

LITERATURE CITED

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Timoney, K. P., and P. Lee. 2009. Does the Alberta tar sands industry pollute? The scientific evidence. *The Open Conservation Biology Journal* 3:65-81.