Fort McKay First Nation

Models and Data:

What are they saying about cumulative effects on wildlife species important to the community of Fort McKay

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1.0 INTRODUCTION

Wildlife is an integral part of the Fort McKay's culture. Since the start of development (late 1960s) there has been a transformation of traditional lands from boreal forest and wetlands into oil sands development (open pit mines, *in situ* operations, and associated infrastructure). The environmental impact assessments (EIAs) prepared by oil sands operators and proponents repeatedly claim that these developments will have little impact on wildlife populations and their habitats because reclamation will return the land to a productive state. Fort McKay Community members are skeptical of future reclamation success and believe that development already has negatively impacted certain wildlife populations. The Fort McKay also has concerns about the project by project review process and the assessment of cumulative effects.

This report provides brief summaries of studies that show cumulative effects on wildlife important to the Fort McKay. This report also presents wildlife data from EIAs and the findings of a recent study on wildlife habitat models used in the oil sands region. Four wildlife species; moose, beaver, fisher/marten, and Canada lynx are emphasized because of their cultural importance. The moose and beaver are considered Cultural Keystone species for the Fort McKay Community (Garibaldi 2006). Canada lynx, fisher, and marten are furbearers vital to the Fort McKay's traditional economy. Fisher and marten are lumped together because of the difficultly in differentiating their snow tracks in the field. Sources of information for this report are as follows:

- Results of the Fort McKay Specific Assessment (FMSA);
- Results of modeling completed for the Lower Athabasca Regional Plan (LARP) and Terrestrial Ecosystem Management Framework (TEMF);
- Aerial surveys completed by the Alberta Sustainable Resource Development (ASRD);
- Wildlife data collected in the oil sands region in support of environmental impact assessments;
- Population viability analysis (PVA) modelling reports completed in the oil sands region; and
- Analysis of habitat models used in the oil sands region completed by CEMA.

In 2011, 1.7 million barrels of bitumen were produced in the oil sands region of Alberta. This quantity is expected to reach 3.5 million barrels per day by 2020 (Alberta Government 2012). We summarize modeling results that predict impacts from oil sands development. We also provide information that shows how the present project by project EIA process is failing to assess cumulative effects on wildlife. We provide recommendations that will reduce impacts and allow for the future recovery of wildlife in the Fort McKay's Traditional Territory.

2.0 FORT MCKAY SPECIFIC ASSESSMENT

The wildlife component of the Fort McKay Specific Assessment (FMSA was completed to assess wildlife habitat loss in the Fort McKay's Traditional Territory (Fort McKay IRC 2010). The assessment considered impacts to the specific land used by the Fort McKay Community for traditional activities. Land areas were designate as "Intensive", "Moderate", or "Low" Culturally Sensitive Ecosystems (CSE) for traditional land use. This provided an indication of how proposed development was impacting food hunting and the traditional economy. In addition, land impacts were measured in two study areas, a 40 township study area (FTSA) surrounding Fort McKay Community and the larger Fort McKay Traditional Territory. The FTSA was selected because it includes several important cultural features (e.g., wildlife areas) and is near Fort McKay.

Wildlife habitat loss was measured against predevelopment levels to assess the cumulative effects of current and future development in the Fort McKay Traditional Territory. Further, wildlife loss was based on full (planned) development, not post-reclamation. This was because of the uncertainty of reclamation successfully restoring high quality wildlife habitat. Furthermore, the current pace of reclamation suggests that any land developed will likely be lost to traditional land use for several generations and this will likely contribute to a significant loss of traditional environmental knowledge (TEK). Impacts to wildlife habitat and moose populations are assessed in the context of the following development scenarios:

- Pre-Development Scenario – this is prior to oil sands development. Depending on data availability the actual date of the Pre-Development Case varies from 1954 to 1965.
- Current Scenario/Base Case – existing situation (i.e. what you would see if you looked on the ground, water, air right now). Depending on data availability the actual date of the Current Case varies from 2003 to 2008.
- Planned Development Case – this scenario includes additional planned development.

Wildlife impacts are expressed in three levels of environmental consequences (negligible, moderate, and high). The determination of environmental consequences is explained in the FMSA (Fort McKay IRC 2010). The impacts to moose, beaver, Canada lynx, and fisher/martin are summarized in the following sections.

2.1 Moose

Moose have been highly impacted in the FTSA (Base Case). The Planned Development Case indicated high levels of impact in the Intense Use CSE of the Fort McKay's Traditional Territory (Table 1).

Table 1: Wildlife Habitat Assessment Environmental Consequences for Moose by Study Areas and Development Scenario and Case

Wildlife Species and Study Area	Pre-Development	Net Change: Base Case to Pre-Development		Net Change: Planned Development Case to Pre-Development	
		%	Environmental Consequence	%	Environmental Consequence
Intense Use CSE	Negligible	-20	Moderate	-30	High
Moderate Use CSE	Negligible	+0	Negligible	-1	Low
Low Use CSE	Negligible	+0	Negligible	-0	Negligible
FTSA	Negligible	-25	High	-35	High

2.2 Beaver

Beaver have been highly impacted in the FTSA (Base Case) and in the Intense Use CSE. Planned Development Case predicts high levels of impacts in the Moderate Use CSE use area and moderate impacts in the Low Use CSE (Table 2).

Table 2: Wildlife Habitat Assessment Environmental Consequences for Beaver by Study Areas and Development Scenario and Case

Wildlife Species and Study Area	Pre-Development	Net Change: Base Case to Pre-Development		Net Change: Planned Development Case to Pre-Development	
		%	Environmental Consequence	%	Environmental Consequence
Intense Use CSE	Negligible	-23	High	-28	High
Moderate Use CSE	Negligible	-17	Moderate	-21	High
Low Use CSE	Negligible	-9	Low	-11	Moderate
FTSA	Negligible	-20	High	-31	High

2.3 Canada Lynx

Canada lynx have been highly impacted in the FTSA (Base Case). Planned Development Case predicts high levels of impacts in the Intense Use CSE (Table 3).

Table 3: Wildlife Habitat Assessment Environmental Consequences for Canada Lynx by Study Areas and Development Scenario and Case

Wildlife Species and Study Area	Pre-Development	Net Change: Base Case to Pre-Development		Net Change: Planned Development Case to Pre-Development	
		%	Environmental Consequence	%	Environmental Consequence
Intense Use CSE	Negligible	-14	Moderate	-24	High
Moderate Use CSE	Negligible	-9	Low	-13	Moderate
Low Use CSE	Negligible	+0	Negligible	-1	Low
FTSA	Negligible	-26	High	-35	High

2.4 Fisher/Marten

Fisher/Marten have been highly impacted in the FTSA (Base Case). Planned Development Case predicts high levels of impacts in the Intense Use CSE (Table 4).

Table 4: Wildlife Habitat Assessment Environmental Consequences for Fisher/Marten by Study Areas and Development Scenario and Case

Wildlife Species and Study Area	Pre-Development	Net Change: Base Case to Pre-Development		Net Change: Planned Development Case to Pre-Development	
		%	Environmental Consequence	%	Environmental Consequence
Intense Use CSE	Negligible	-10	Moderate	-22	High
Moderate Use CSE	Negligible	-10	Low	-16	Moderate
Low Use CSE	Negligible	-4	Low	+1	Negligible
FTSA	Negligible	-22	High	-35	High

3.0 TERRESTRIAL ECOSYSTEM MANAGEMENT FRAMEWORK

The Terrestrial Ecosystem Management Framework (TEMF) was developed by CEMA (2008). It was the recommended approach for managing the cumulative effects on ecosystems and landscapes in the Regional Municipality of Wood Buffalo (RMWB).

TEMF used computer modeling (ALCES simulations) on various environmental indicators to predict the effects of industrial activity. The simulations measured changes from the indicator Range of Natural Variation (RNV). RNV provides an estimation of the between year variation of an indicator (e.g., habitat quality) without industrial activity. The model includes natural disturbance such as fire, climate, and insect outbreaks.

Wildlife indicators selected included habitat for moose, fisher, woodland caribou and black bear. Results showed that the wildlife habitat indicators for these wildlife species were below or at the lower limit of their NRV. The ALCES simulations demonstrated that the density of linear features (e.g., pipeline rights-of-way, seismic lines, etc.) is a primary cause of declines in these wildlife habitat indicators. TEMF predicted that declines would continue unless changes to land use are made in oil sands regions.

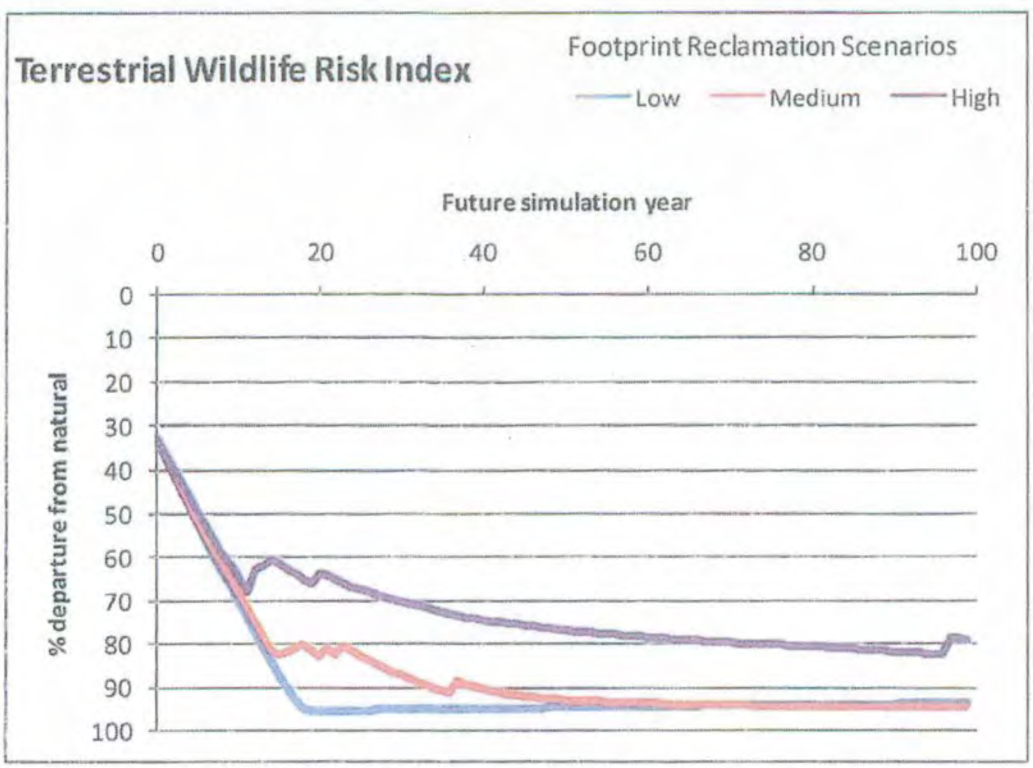
The TEMF report indicated that aggressive steps needed to be taken immediately to preserve these wildlife indicators in the RMWB. Recommendations included establishing protected zones representing 20% to 40% of the RMWB, aggressive management of off-highway vehicle access, and improving and accelerating reclamation of the land (CEMA 2008).

4.0 LOWER ATHABASCA REGIONAL PLAN

The Lower Athabasca Regional Plan (LARP) was completed by the Government of Alberta (GOA) in August 2012. In the development of the LARP, the GOA used ALCES simulation modeling to evaluate planning options in the Lower Athabasca Region. Moose and fisher habitat quality were used as terrestrial wildlife indicators to assess the impacts of development as if it continued at the current rate (Baseline). Baseline assumes that foot print intensity, public policies, and market forces remain unchanged from present. The changes to moose and fisher habitat were projected into the future against the RNV (explained previously).

The computer simulations of the Baseline found that moose and fisher habitat quality declined rapidly. Moose and fisher were 30% below RNV at year 0 (2009) of the simulation into the future. Within 20 years fisher and moose habitat quality was at least 60% below the RNV. Figure 1 shows change from RNV in three different footprint reclamation rate scenarios. Fisher habitat was affected most heavily by the loss of old growth forest. Moose habitat was most affected by an increased human footprint. The increased footprint provides more access for hunters and trappers (ALCES Group 2009).

Figure 1: Simulated future response of terrestrial indicators (moose and fisher habitat) under three scenarios (low, medium, and high) of reclamation rates. High rates of reclamation reduce rate of decline.



5.0 POPULATION VIABILITY ANALYSIS

Population Viability Analysis (PVA) modeling links changes in habitat with demographic parameters and environmental variation and allows a prediction of species extinction in a specified area (Golder Associates Ltd. [Golder] 2012). PVA has been used in the oil sands to assess the probability of moose extinction in at least three EIAs (Dover Operating Corp. [Dover] 2010, Golder 2012, and Parsons Creek Aggregates 2010). These PVAs were in areas that overlapped the Fort McKay's Traditional Territory.

Dover (2010) predicted a decline in moose abundance of less than 1% from Base Case to Application Case. The decline from Base Case to Planned Development Case was approximately 6% and the possibility of local extirpation. Parsons Creek Aggregates PVA predicted that moose populations would decline but additional information was not provided in the EIA. The Golder (2012) PVA predicted that the abundance, carrying capacity and population density of moose would decline by about 9% for a Planned Development Case. This PVA predicted that the probability of population extirpation remains less than 0.001% in all cases.

The Golder (2012) conclusion assumed no density dependence or environmental variation. Dover (2010) showed in sensitivity analyses that a decrease in survival and fecundity estimates by as little as 10% could cause an increased population decline.

The Dover (2010) and Golder (2012) PVAs used almost identical references (Table 5). The most recent data used in the Golder PVA was 1996. The Dover PVA included moose survey data from WMU 531 completed in 2009 (ASRD 2009 in Table 5 is same as Morgan and Powell 2009 in this report). Golder did not include the most recent WMU 530 (Morgan and Powell 2010) data in the PVA completed in 2012.

Oil sands production has doubled between 2000 and 2011 and is predicted to double again by 2020 (Alberta Government 2012). The GOA acknowledges that the cumulative effects of population growth and economic development in the region are increasing pressures on the region's air, water, land and biodiversity (Alberta Government 2012). It is likely that the Golder (2012) assumption of no environmental variation is incorrect and the 10% change in survival and fecundity has occurred (Dover 2010). This raises the concern that moose populations will decline faster than predicted in the PVAs.

Table 5: List of references used in support of the Dover (2010) and Golder (2012) PVA of moose populations.

Golder (2012)	**Dover (2011)**
	ASRD (2009)
Bibaud and Archer (1973)	Bibaud and Archer (1973)
BOVAR Environmental Ltd. (1996)	BOVAR Environmental Ltd. (1996)
Brusnyk and Westworth (1986)	Brusnyk and Westworth (1986)
Cook and Jacobsen (1978)	Cook and Jacobsen (1978)
Eccles and Duncan (1988)	Eccles and Duncan (1988)
Hauge and Keith (1978, 1980, 1981)	Hauge and Keith (1978, 1980, 1981)
Penner (1976)	Penner (1976)
Rolley and Keith (1980)	Rolley and Keith (1980)
Salter et al. (1986)	Salter et al. (1986)
Skinner (1996)	Skinner (1996)
Thompson et al. (1980)	Thompson *et al.* (1980)
Westworth (1980)	Westworth (1980)
Westworth and Associates (1978)	Westworth and Associates (1978)
Westworth and Brusnyk (1982)	Westworth and Brusnyk (1982)

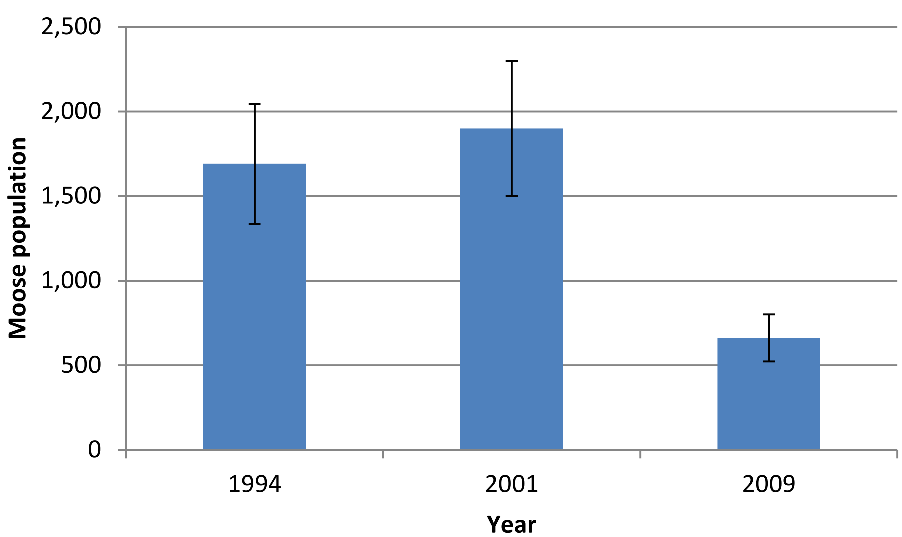
6.0 GOVERNMENT OF ALBERTA AERIAL MOOSE SURVEYS

The Government of Alberta is responsible for the management of moose populations in Alberta. There are several wildlife management units (WMUs) 518, 519, 529, 530, 531, and 532 that overlap the oil sands region (Westworth 2002). WMUs 518, 519, and 529 overlap with the south portion, 531 the west portion and 530 the east portion of the region. Of particular interest to the Fort McKay are WMUs 530 and 531. These WMUs overlap large areas of the Fort McKay's Traditional Territory and include the Community of Fort McKay and their reserves The two most recent moose surveys of WMU 531(Morgan and Powell 2009) and WMU 530 (Morgan and Powell 2010) were funded through Fort McKay and completed by ASRD.

6.1 WMU 531

WMU 531 overlaps with the west portion of the Fort McKay Traditional Territory and includes the community of Fort McKay, Indian Reserve (IR) 174A, IR 174B, and Buffalo and Moose lakes. Since the early 1990s, the Alberta Government has completed three aerial moose surveys (1993/94, 2001, and 2009) in WMU 531. Since 1993/1994 the estimated moose populations has declined from a density of 0.10 moose/km^2 (1,900 moose) to 0.04 moose/km^2 (662 moose) (Figure 2). This decline is statistically significant. The cost to survey WMU 531 in 2009 was approximately $76,000 (Morgan and Powell 2009).

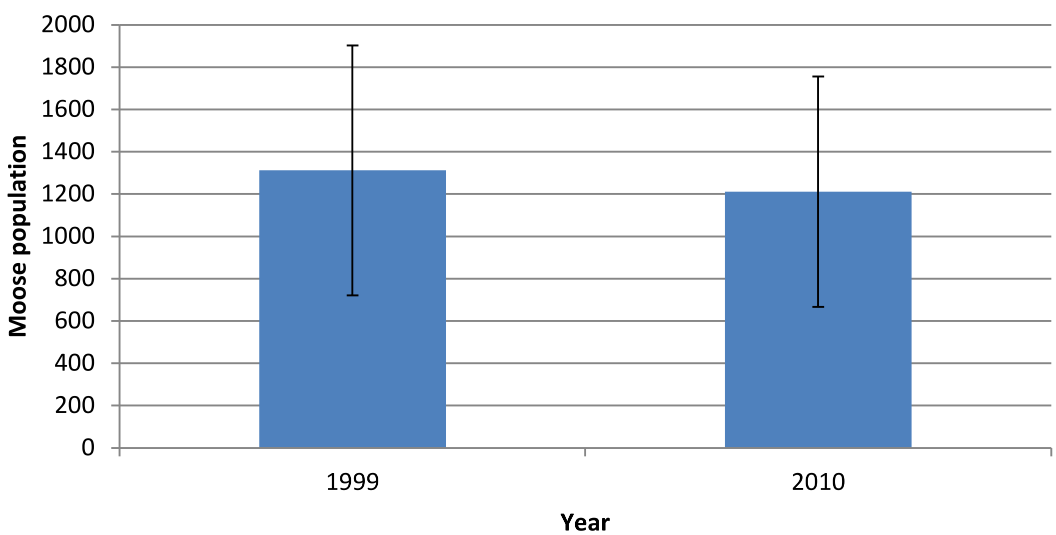
Figure 2: Moose populations observed in WMU 531 in 1994, 2001, and 2009.



6.2 WMU 530

WMU 530 overlaps with the east portion of the Fort McKay's Traditional Territory and includes IR 174C. This WMU was surveyed in 1994, 1999, 2003 and 2010 by ASRD. This WMU was surveyed with two difference methods with coverage of difference areas. In 1994 and 2003 the complete WMU was surveyed. In 1999 and 2010 the south half of the WMU was surveyed, which overlaps with the Fort McKay's Traditional Territory. When the moose population estimates from 1994 and 2003 are compared (same methods and area coverage), and the populations estimates from 1999 and 2010 are compared (same methods and area coverage) a moose population decline is noted. However, there is an overlap of confidence limits in the results from 1999 and 2010 (1312 +/- 624 vs. 1211 +/- 501) (Figure 3). The apparent declines in moose populations between 1994 and 2003 and 1999 and 2010 are not statistically significant. The cost to survey WMU 530 in 2010 was approximately $50,000 (Morgan and Powell 2010).

Figure 3: Moose populations observed in WMU 530 in 1999 and 2010.



7.0 WILDLIFE SURVEYS

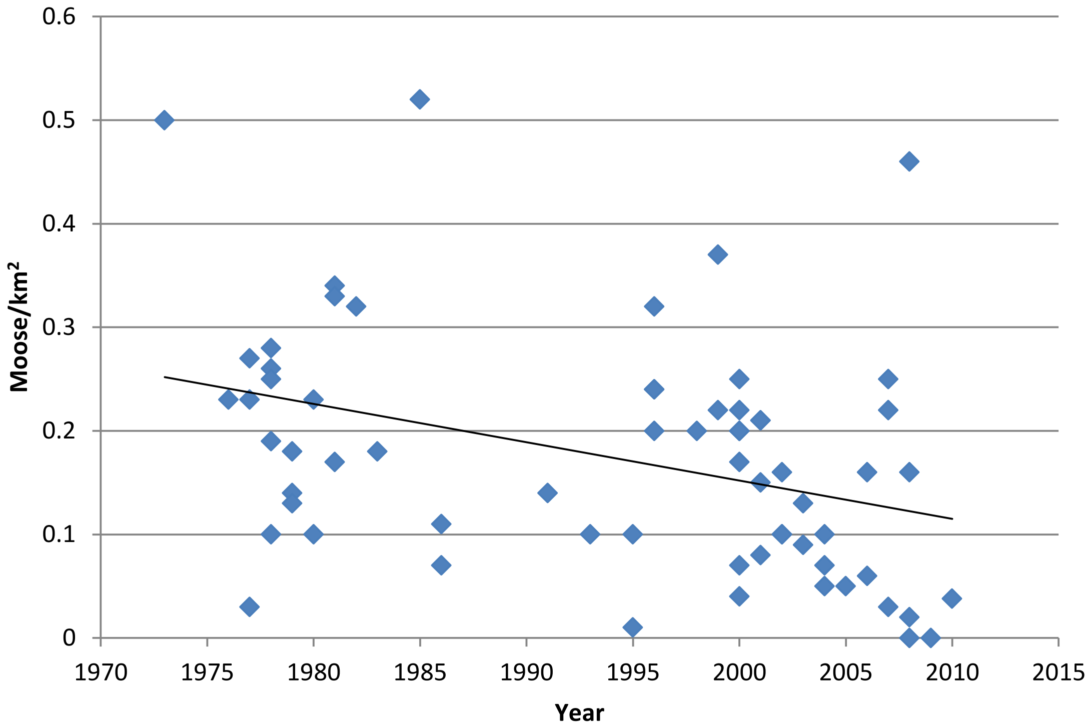
Proponents of oil sands projects are required to describe the wildlife resources within the proposed project area as part of an EIA. Typically a proponent hires biologists to describe the wildlife community in a local study area (LSA). Breeding bird surveys, winter track counts, aerial surveys, and other surveys are usually completed to determine the presence of wildlife species. In addition, wildlife surveys to detect species at risk (e.g., yellow rail) are often completed. The types and number (sample size) of wildlife surveys are variable depending on project size, project type, and the habitat of the area.

Wildlife surveys have been conducted in the oil sands region since the mid-1970s. Vast amounts of data have been collected on several different wildlife species. Golder (2010) compiled the data from several EIAs on a variety of wildlife species that included moose, beaver, Canada lynx, and fisher/marten. The Golder report has been appended to EIAs completed in the oil sands region (e.g., Dover Commercial Project). The following sections are a summary of the data for moose, beaver, Canada lynx, and fisher/marten (combined) from Golder (2010). The mean density was calculated, the results plotted, and the correlation coefficient (density vs. year) was calculated. The correlation coefficient provides a statistical measure of the relationship between wildlife density and year. A strong correlation (e.g., r=0.95) would suggest a change in wildlife density over time.

7.1 Moose

Data from 53 EIAs and reports were reviewed. In these EIAs moose densities ranged from 0-0.52 moose/km^2 with a mean density of 0.17 moose/km^2 (n=65). The reported densities from 1973 to 2010 are presented in Figure 4. The correlation coefficient was 0.37.

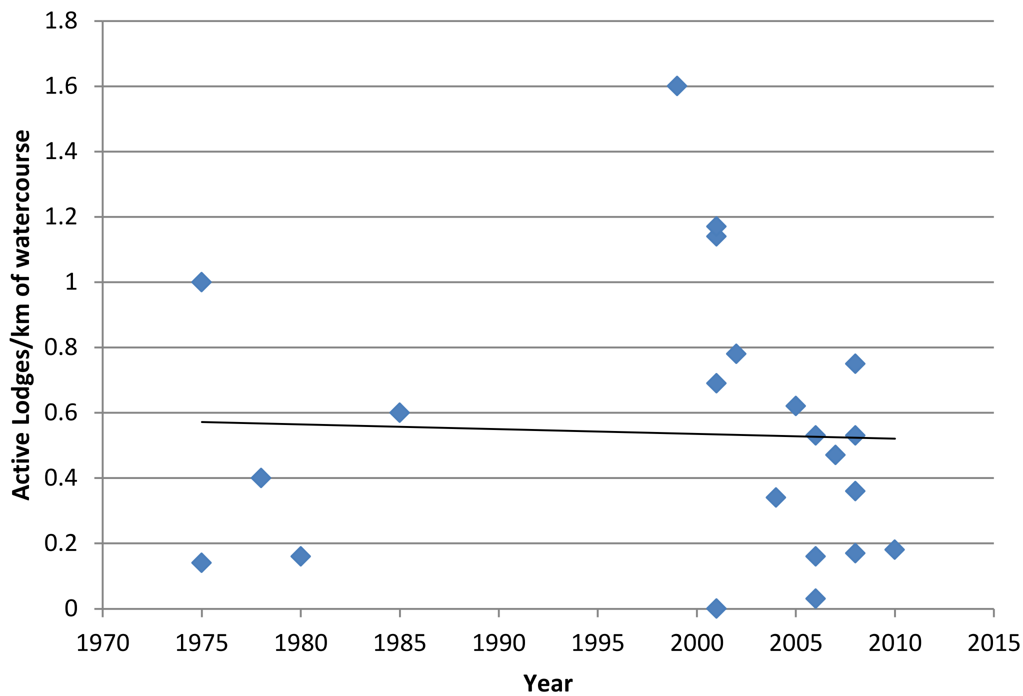
Figure 4: Moose density (moose/km^2) data by year from aerial surveys completed in the oil sands region.



7.2 Beaver

Data from 39 EIAs were analyzed. Several methods were used in the EIA wildlife surveys to measure beaver abundance used (e.g., lodges/km^2). Only active lodges/km of watercourse, stream, and tributary were included in this analysis. Densities ranged from 0-1.6 active lodges/km of watercourse with a mean value of 0.54 active lodges/km (n=22). The densities from 1975 to 2010 are presented in Figure 5. The correlation coefficient was weak with a value of 0.04.

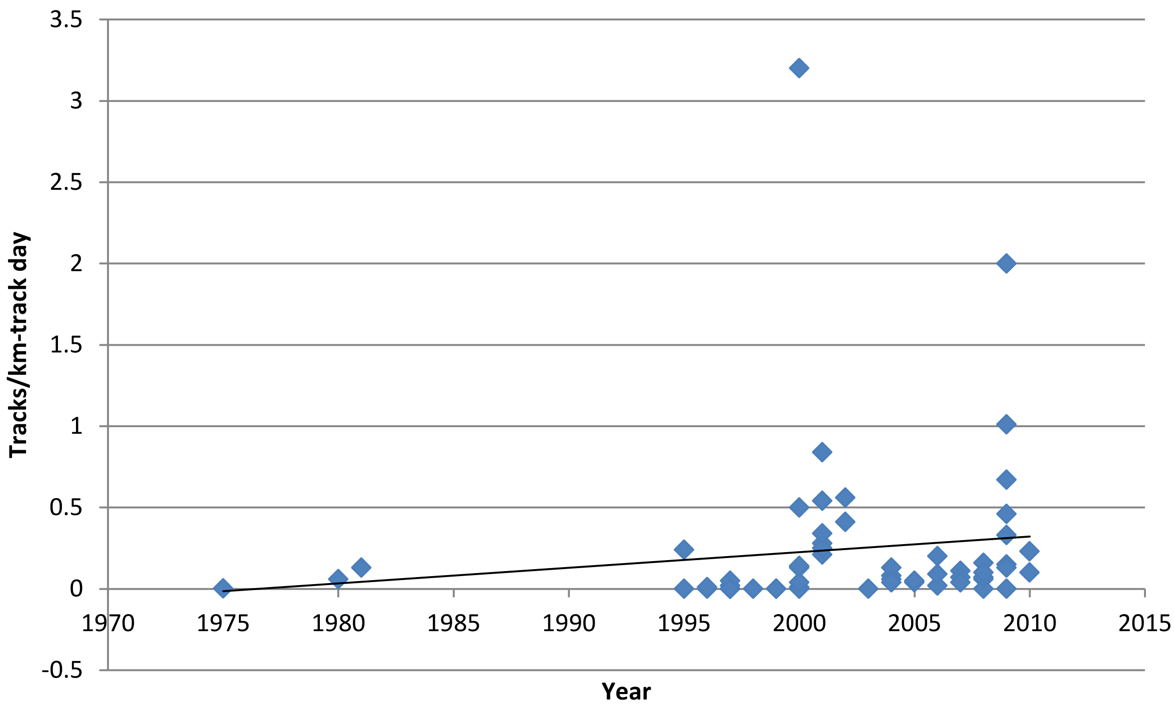
Figure 5: Active beaver lodge density (lodges/km of watercourse) data by year from aerial surveys completed in the oil sands region.



7.3 Canada Lynx

Data from 47 EIAs and reports were analyzed. Densities ranged from 0-0.32 Canada lynx tracks/km-track day with a mean value of 0.24 Canada lynx tracks/km-track day (n=60). The densities from 1975 to 2010 are presented in Figure 6. The correlation coefficient was weak with a value of 0.13.

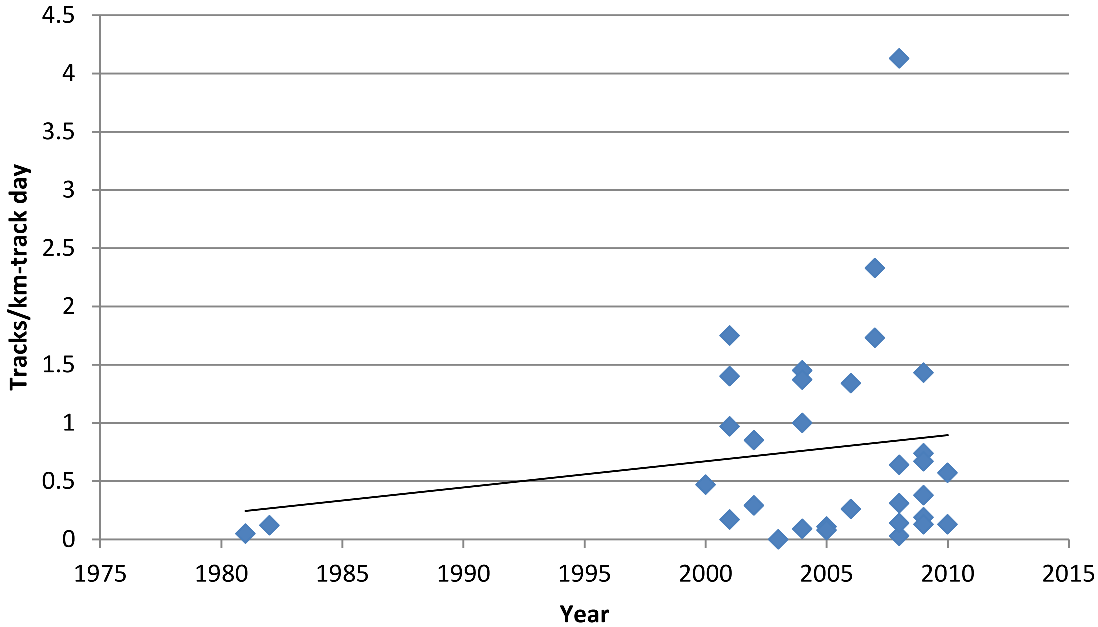
Figure 6: Canada lynx density (Canada lynx tracks/km-track day) data by year from winter track surveys completed in the oil sands region.



7.4 Fisher/Marten

Data from 27 EIAs that combined fisher and marten tracks were analyzed. This is consistent with FMSA results presented previously. Other EIAs reported data on specifically fisher or marten. Densities ranged from 0.03-4.13 fisher or marten tracks/km-track day with a mean value of 0.76 fisher or marten tracks/km-track day (n=33). The densities from 1981 to 2010 are presented in Figure 7. The correlation coefficient was weak with a value of 0.17.

Figure 7: Fisher/Marten (tracks/km-track day) data by year from winter track surveys completed in the oil sands region.



8.0 HABITAT MODELS

The most frequently used method of assessing impacts to wildlife is by predicting the amount of wildlife habitat being removed or disturbed by a proposed project. This is typically done by using habitat models for specific wildlife species or species groups (e.g., old growth forest birds). The primary assumption is that wildlife populations are positively correlated to the amount of appropriate habitat.

Muir *et al.* (2011), on behalf of CEMA, reviewed 22 EIAs completed in the oil sands region and evaluated the wildlife habitat models used to determine habitat quality. Muir *et. al.* (2011) determined the type of model used, if the model was validated, and how well the model performed (its predictive ability). 228 wildlife habitat models were reviewed. In the 22 reviewed EIAs, moose were modeled 21 times, fisher/marten 20 times, Canada lynx 16 times, and beaver (as semi-aquatic furbearer) 23 times. Of the 228 models reviewed 44.3% (101) were validated. The moose models were validated 67%, fisher/marten 70%, Canada lynx 75%, and beaver (semi-aquatic furbearers) 44% of the time.

For each validated model, its predictive ability (i.e., how well it worked) was determined by subjectively ranking the model with a category of good, moderate, fair, poor, and not clearly specified. Muir *et. al.* (2011) used the following parameters to rate models:

> **Good** - Model predictions correlated well with species observations for all habitat suitability rankings correlation statistic (if provided) is at least 0.7. Validation methods were appropriate. Modeller called model "acceptable".
>
> **Moderate** - Model predictions matched with species observations for most habitat suitability rankings. Moderate correlation statistic (if provided) of 0.40 – 0.69. One of LSA/RSA scale is assessed as "good", then other as "moderate". "Acceptable" external expert review of model. "Good" rating downgraded to "Moderate" if observations/predictions correlation did not take area of habitat suitability classes into account.
>
> **Fair** - Model predictions matched with species observations for some habitat suitability rankings. Absence of species observations is consistent with most area mapped as low or poor suitability. One of LSA/RSA scale is assessed as "good", then other as "poor". Only internal review and/or calibration of model. Moderate, but non-significant correlation between observations and habitat suitability. Moderate correlation between observations and habitat suitability but model developer expressed reservations due to few samples or difficulties in identifying observations to species (e.g., grouse tracks).
>
> **Poor** - Model predictions did not match with species observations for most habitat suitability rankings.
>
> **Not clearly specified** - Model developer did not sufficiently document model validation methods and results to allow a rank to be determine

Of the 101 validated models 80% (81 models) were assigned a validation correlation statistic that allowed the model to be rated. Based on the above rating system, only 37% (30 models) of the 81 models reviewed were ranked as “good” or “moderate.” The remaining models (63%) were ranked as fair and poor or did not have adequate documentation to allow ranking.

Muir *et.al* (2011) indicated that there was an increasing trend of documented model validation with EIAs submitted from 2005 and later. Since 2005, an average of 54.8% of the models in these EIAs had some validation documented. Prior to 2005, 32.4% of the models had documented validation.

9.0 CONCLUSIONS

The Fort McKay Specific Assessment shows that a large amount of wildlife habitat has been removed from Fort McKay's Traditional Territory. The environmental consequence of habitat change is high for moose, beaver, Canada lynx, and fisher/marten in the areas most important to the people of Fort McKay (Intense Use CSE) and in the areas near the Community of Fort McKay (the FTSA). It is clear that the wildlife habitat of moose, beaver, Canada lynx, and fisher/marten has been severely impacted by oil sands development.

CEMA (2008) recommends that at a regional scale, environmental indicators to be maintained within 10% of the RNV. This objective was set to allow for "some regional scale loss of ecological value resulting from the regions' important economic development, while maintaining ecological risk at acceptable levels". Both the GOA for LARP and CEMA for the TEMF have completed studies assessing impacts to wildlife indicators in areas that overlap with the oil sands region and the Fort McKay's Traditional Territory. Both studies have shown significant declines, greater than 10%, in the NRV of wildlife indicators. If development practices (Baseline) are not changed it is very likely that there will be adverse effects to wildlife populations. It is unlikely that the new protected areas included in LARP (Alberta Government 2012) are sufficient to prevent wildlife indicator declines.

In the past 19 years (since 1993) the GOA has completed only three surveys in WMU 531 and four surveys in WMU 530. The results of these surveys have shown a reduction in moose populations. Recent surveys completed in WMU 531 (2009) and 530 (2010) have been funded through the Fort McKay and completed by ASRD. The surveys cost approximately $75,000 (WMU 531) and $50,000 (WMU 530). These surveys are inexpensive, yet the GOA is not counting moose populations frequently enough. This does not allow the proper management (e.g., set harvest levels) of this important wildlife species.

Wildlife surveys are used to describe the wildlife use in areas of development. Many surveys have been included in the Fort McKay's Traditional Territory since the 1970s. However, when analyzed it is apparent that these data is not useful for assessing wildlife populations and cumulative effects in the oil sands region and in the Fort McKay's Traditional Territory. The survey results are highly variable and in all cases the correlations between years and population parameter (e.g.., track density) are very weak. Essentially, no meaningful trends about regional population and cumulative effects to wildlife populations can be determined from this data. It is clear that project by project wildlife surveys do not provide meaningful information for monitoring regional wildlife populations and cumulative effects.

Three PVA results completed within the Fort McKay's Traditional Territory predicted a reduction in moose populations. Sensitivity analysis indicated that small changes to moose survival and fecundity could have dramatic effects on future moose populations. Further, the documented information used in the PVAs tended to be old (prior to 1996). Based on the amount of development in the oil sands region since 1996, it is very likely that moose survival and fecundity have changed.

PVA predictions may be underestimating moose population declines. Additional scientific studies on moose populations and their biology (i.e., survival and fecundity) are required.

To predict impacts to wildlife, wildlife habitat models are frequently used. In 22 EIAs reviewed a total of 228 habitat models were used. An analysis of these models indicated that only 101 were validated and only 30 of these validated models performed moderately well or better. It is evident that the vast majority of wildlife habitat models (198 of 228) used in oil sands EIAs were not validated, not adequately documented, and/or did not perform well. This leads to the conclusion that local impacts are likely inaccurate and, therefore, regional cumulative effects predictions are likely inaccurate as well. Habitat models need to be validated and predictions confirmed. Confirmation of predictions requires scientifically defensible wildlife surveys (e.g., surveys in Morgan and Powell 2009) to determine habitat use and population densities in the oil sands region.

10.0 RECOMMENDATIONS

Several computer models and GOA wildlife surveys point toward declining wildlife populations in the Fort McKay's Traditional Territory. It is clear that project by project wildlife surveys and habitat model are not providing correct and useful information to evaluate cumulative effects. The Fort McKay re-emphasizes the need to implement the recommendations that were requested in the FMSA (Fort McKay IRC 2010). The Fort McKay recommendations address cumulative effects, which all oil sands projects in the Fort McKay's Traditional Territory contribute. The following actions should be taken to understand and address the impacts on wildlife populations:

- Immediate reduction of moose harvest levels allowed for non-Aboriginal hunters throughout the entire oil sands region until current moose populations are known. Current moose populations are unknown in many of the remaining WMUs in the oil sands region.
- Completion of moose surveys for all oil sands region WMUs within the next two years to determine the moose population. Once the population is known, an appropriate management plan and actions be taken in consultation with Fort McKay.
- Determination of the remaining population of Canada Lynx, marten, fisher, beaver and other wildlife populations. The population levels for these species are currently poorly understood. Once populations are determined, development of management and mitigation methods in consultation with Fort McKay.

The following recommendations will reduce this land-use conflict and impacts to wildlife populations in Fort McKay's Traditional Lands:

- Establishment of conservation offsets, including protected areas, to preserve wildlife habitat and populations and provide opportunities for traditional land use in proximity to the Community of Fort McKay.
- Planning of oil sands development based upon wildlife habitat values and traditional land use. For example, preferentially allow oil development in land that is less valuable for traditional land use and has lower wildlife habitat quality values.
- Acceleration of reclamation of disturbed areas in the oil sands area. Additional development approval based upon reclamation performance and reestablishment of effective wildlife habitat. For example, approval of further development be contingent on the amount of moose habitat re-established in reclaimed areas or wildlife habitat protected with conservation offsets.
- Require wildlife monitoring that contributes to validation of habitat models and tests EIA predictions.

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