Wildlife Management Unit 541 Moose Survey, Northwest Alberta, 21-27 January 2013.

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February 2013

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DISTRIBUTION

Copies of this report have been sent to the Wildlife Management Branch Headquarters of Alberta Environment & Sustainable Resource Development (ESRD) and to the Fish and Wildlife Enforcement Branch of Justice & Solicitor General Office in Red Earth Creek - Copies are also kept on file by the Upper Athabasca Region Senior Wildlife Biologist in High Prairie. Raw data has been incorporated into the Fish and Wildlife Management Information System (FWMIS) database.

ACKNOWLEDGEMENTS

Thanks to Dave Moyles, Bill Johnson, Justin Gilligan, Mark Heckbert, and Mike Banko of ESRD for field assistance during the flights. Dave Moyles and Mark Heckbert provided comments on the draft manuscript.

We would also like to thank Air Jasper and their pilots Barry and Marty Pendrak as well as Highland Helicopters and their pilots Paul Leeson and Rod Drake for their service for the fixed-wing and rotary-wing portions of the survey, respectively.

Funding for this survey was provided by ESRD and the Joint Oils Sands Monitoring Program.

ABSTRACT

An aerial ungulate survey following methodology adapted from the Gasaway survey technique was conducted in January 2013 to assess the moose population in Wildlife Management Unit (WMU) 541. The total estimated population of moose in this unit was 531 ± 179, with a bull:cow:calf ratio of 84:100:57 and a moose density of 0.07/km^2. Of the observed bulls, 73% had already shed their antlers (27 bulls), 18.9% had small antlers (7 bulls), and 8.1% had medium-sized antlers (3 bulls).

INTRODUCTION

Wildlife Management Unit 541 (WMU 541) was created in 2007 by splitting WMU 542 along highway 686 to Peerless Lake and then following the north boundary of township 86 to the east, where everything north of that road became the new WMU 541 and everything south remained WMU 542. Since the split, this is the first time that moose populations in WMU 541 have been surveyed.

ESRD strives to complete aerial moose surveys in each WMU in 3 year intervals or when land and wildlife management issues necessitate increased monitoring and assessment of populations and their distribution.

WMU 541 receives substantial hunting pressure by hunters from First Nations communities. All weather access is limited, which results in pockets of more accessible moose in the vicinity of easily accessible roads. Therefore, regular moose surveys in WMU 541 are important to assess moose population status and trends in order to properly manage the resource. Current information on moose populations and distribution are also required for proper habitat and land use management.

This report contains the results and preliminary analysis of the moose survey conducted in WMU 541 in January 2013 and a brief discussion of implications for ongoing moose management efforts.

METHODS

Study Area

In general terms, WMU 541 is delimited to the south by highway 686 to Peerless Lake and then follows the northern boundary of township 86 eastward; to the east by the Wabasca and Liege Rivers; to the north by the Municipal District (MD) of Opportunity No. 17 boundary (north boundary of township 96); and to the west by highway 88 (Appendix A). For a legal definition of WMU 541 boundaries, refer to Schedule 9, part 1 of the Wildlife Regulation (Queen's Printer 2013). The small communities of Red Earth Creek, Peerless Lake and Trout Lake border the WMU along the south.

The land base in WMU 541 is included within the Central Mixedwood and Lower Boreal Highlands subregions with a small portion of the WMU entering into the Upper Boreal

Highlands subregion in the northeast corner, as described by the Natural Regions Committee (2006).

The forest cover is characterized by tracts of deciduous forest (trembling aspen and balsam poplar) and aspen-dominated mixed wood forest. White spruce and jack pine stands are found in uplands overlying rapidly drained coarse materials. A large portion of the WMU is comprised of lowlands and poorly drained bogs and fens dominated by black spruce, tamarack and willows interspersed with small upland hills of mixed cover.

A few larger lakes such as Graham and Vandersteene Lakes, are found in the southern portion of this WMU. The remainder of the WMU has an abundance of small lakes, ponds, creeks, and rivers. Specifically, the meandering tributaries of the Wabasca and Loon Rivers create the better moose habitat.

Much of the WMU has been fragmented by logging cut blocks, haul roads and the footprint associated with the oil and gas industry (roads, well pads, seismic lines, pipelines, and cutlines). Industrial development is especially prevalent northeast of the hamlet of Red Earth Creek and north of Peerless and Graham Lake. Road and other linear access throughout the WMU increases yearly as new roads are constructed. There was active logging and 3D seismic operations during this survey.

Survey Protocol

An aerial ungulate survey following methodology adapted from the Gasaway survey technique (Gasaway et al. 1986) as described in the Northern Moose Management Program Moose Survey Field Manual (Lynch 1997a) was conducted in January 2013 to assess moose populations in WMU 541. Two fixed-wing aircraft, a Cessna 185 and a Cessna 210, both equipped with wheels, and each with a crew composed of a pilot and two observers (all Alberta ESRD staff) were used for the stratification flights on the 22-24 January 2013. Both aircrafts were based out of Red Earth Creek. Stratification crews in each aircraft flew east-west transects across the WMU at one minute of latitude intervals skipping latitude lines at 5 minute intervals (i.e. skipping latitude lines 55° 50', 55° 55', ...). Air speed during stratification flights was approximately 150 km/hr, and flight altitude over the ground was maintained at 90 m or slightly higher depending on turbulence.

Flying conditions were good for visibility, good for sightability, and fair to good for turbulence. Most of the survey was conducted under partially clear to fully overcast skies from the 22-24 January. Thus, visibility conditions were good but flat light decreased overall sightability, particularly for noting tracks. Snow depth over much of the WMU was 1 meter with a fresh cover of snow overnight (several centimetres) for all three days of the stratification flights. Very strong winds were encountered on 23 January with winds steady at 20-25 km/h and gusting to higher velocities which combined with the topography in the hills surrounding Trout Mountain created some heavy turbulence. This caused moderate to extreme observer fatigue and discomfort for the survey crews on one of the survey days. Ground temperature over the three stratification flight days varied from -15°C to -29°C with a high wind chill factor.

Locations of moose and other wildlife were marked using a Global Positioning System (Garmin GPSmap 60CSx). Latitude lines, flight direction, waypoint numbers, numbers of moose observed, distance to animals, and side of the flight line (north or south) were recorded on stratification data sheets and maps. Weather and observer information was also recorded on the datasheets at the start of the survey and afterwards whenever conditions changed.

The WMU was divided into detailed survey blocks of common size (5 minutes of latitude by 5 minutes of longitude). In cases where the boundaries of the WMU resulted in the creation of blocks considered to be too small as per the survey protocol (Lynch 1997a; i.e. less than 80% of the area of a block of 5 minutes of latitude by 5 minutes of longitude), adjacent undersized blocks were merged to create blocks closer to the standard surface area whenever possible. Thus most survey blocks along the edges of the WMU boundary were of variable sizes. The resulting process produced a map comprised of 124 detailed survey blocks (Appendix B).

Typically, detailed survey blocks are stratified (i.e. classified) into low, medium, and high strata based on the moose densities observed in each block during the stratification flights. Survey blocks were stratified into "low" (0-0.05 moose/km^2), "medium" (0.06-0.12 moose/km^2), and "high" (0.13-0.23 moose/km^2) density strata. Although we stratified blocks into these three strata, the "high" stratum still had relatively low moose densities as compared to typical "high" densities for northern Alberta. In this WMU survey, 143 blocks were classified in the low strata, 24 blocks in the medium strata and 8 blocks in the high strata.

A random sample of five blocks of each stratum were initially selected for intensive moose surveys. Based on an analysis of the results when all blocks had been flown, an additional six "low" and one "medium" strata blocks were randomly selected and surveyed (for a total of eleven "low", six "medium", and five "high" blocks). The survey blocks were well distributed throughout the WMU (Table 1).

Table 1. List of intensive survey blocks searched during the WMU 541 moose survey, January 2013.

Low	Medium	High
3, 19, 20, 30, 56, 102, 105, 123, 124, 131, 147	29, 58, 79, 86,88, 141	11, 12, 45, 66,74

Two Bell 206 Jet Ranger helicopters working out of Red Earth Creek were used to determine the number of moose within each of the intensive survey blocks on 25-27 January 2013. Each block was flown east to west on flight lines spaced every 0.25 minutes of latitude (approximately 400m) apart at speeds of 80-110 km/h and elevations of 45-75m (150-250 ft) above ground. Flight crews consisted of one pilot and three ESRD observers on all flights

Flying conditions for intensive block surveys were good with no to little turbulence, generally calm winds (0-10 km/h), and good visibility. Skies were mostly overcast with flat light. Throughout the intensive block surveys some areas had to be avoided due to the presence of low-lying fog. Snow cover conditions remained the same as those encountered during the stratification survey on the 22-24 January and only degraded slightly over the intensive survey. Temperatures became significantly warmer than the stratification flights (-8°C to -15°C), and moose movements began to increase. Locations of moose and other wildlife were marked using a Global Positioning System (Garmin GPSmap 60CSx). Flight lines, waypoint numbers, and numbers and sex of moose observed were recorded on intensive survey block data sheets. Weather and observer information was also recorded on the datasheets at the start of the survey and afterwards whenever conditions changed.

All moose observed in the survey blocks were classified as either calves or adults and all adults were classified to gender by the presence of a vulva patch for females and either the presence of antlers or absence of vulva patch for bulls. Some moose (n=4) were left unclassified when landscape conditions prevented sexing and ageing. In addition to locations and numbers of moose observed, other wildlife sightings and important landscape features were recorded on survey data sheets.

Intensive survey block results were entered into a population estimate spreadsheet and population parameters were calculated (e.g. population estimate, confidence interval, male:female:juvenile ratios, density, twinning rates; Lynch 1997a.

RESULTS and DISCUSSION

Wildlife Management Unit 541

The total population estimate for moose surveyed in WMU 541 is 531 ± 179 individuals with confidence limits of 33.7% (Table 2). A total of 109 moose were recorded during the fixed wing stratification flights and a total of 106 moose (37 bulls, 44 cows, and 25 calves) were classified in 22 survey blocks during the helicopter intensive surveys. The overall density was 0.07 moose per square kilometre (0.17 moose/square mile). Ratios of bulls and calves to 100 cows were 84 and 57, respectively. Of the cows and calves observed during detailed block surveys, 52.3% were single cows, 38.6% were cows with a single calf, and 9.1% were cows with twins for a twinning rate of 19.0%. Of the observed bulls, 73% had already shed their antlers (27 observed bulls), 18.9% had small antlers (7 observed bulls), and 8.1% had medium-sized antlers (3 observed bulls). Overall, moose appeared to be healthy and in good body condition. There was little evidence of hair loss due to rubbing resulting from winter tick parasitism.

The cow to calf ratio was very good for a forested unit where calves are highly vulnerable to predation by bears and wolves and are also subject to First Nations harvest. This is therefore indicative of good population recruitment potential.

Given the difficulty in observing other wildlife species in forested management units, population estimates for other ungulate species were not derived. However, Woodland Caribou were

observed (n=26) in two blocks, Great Gray Owls (n=2) in two blocks, Northern Goshawks (n=4) in four blocks, Canada Lynx (n=3) in two blocks, a Cooper's Hawk (n=1) in one block, and wolves (n=8) in two blocks.

Survey Budget

A total of 35.4 hours and 39.1 hours were flown for the fixed wing and rotary wing portions of the survey, respectively. This amounted to a total of $18,054.00 and $38,122.50 being spent on fixed-wing and rotary wing aircraft charters, respectively. The aircraft budget for the WMU 541 moose survey was $83,200.00, while only $56,176.50 was spent. We were fortunate that fuel was positioned in strategic locations which resulted in very high survey efficiency in terms of survey time flown on block versus dead-head time and their related fuel consumption. This decreased survey costs significantly. Approximately $5982 was spent on survey crew meals and accommodations (Appendix C).

Future Management

The moose population in WMU 541 shows typical population characteristics of a far northern Alberta moose population with relatively low densities, clumped distribution and relatively high bull:cow ratios. Northern populations of moose typically require higher bull:cow ratios to achieve good breeding success due to their low densities. A public process to determine the moose population goal for this WMU has not been established. Input from the public as well as area First Nations is an important aspect to support the process of determining the overall future population objective.

Expansion of the road access network to service the petroleum extraction and logging industries has continued throughout the WMU in recent years. The low density moose population within this WMU and stakeholders who use the moose resource would benefit from an overall access management plan that controls public use of resource roads. Effective access management will be a key factor in order to maintain or increase the low density moose population.

LITERATURE CITED

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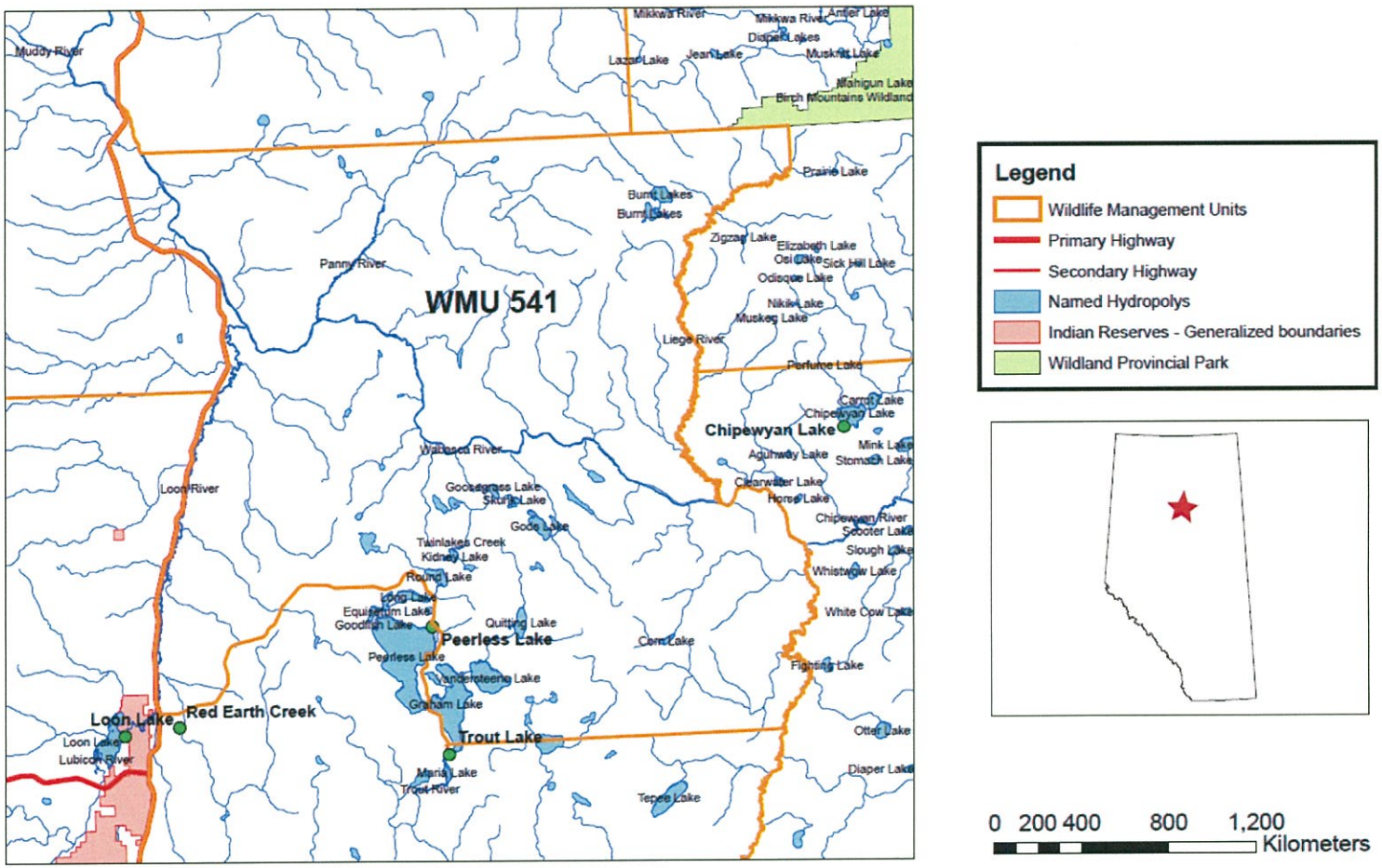
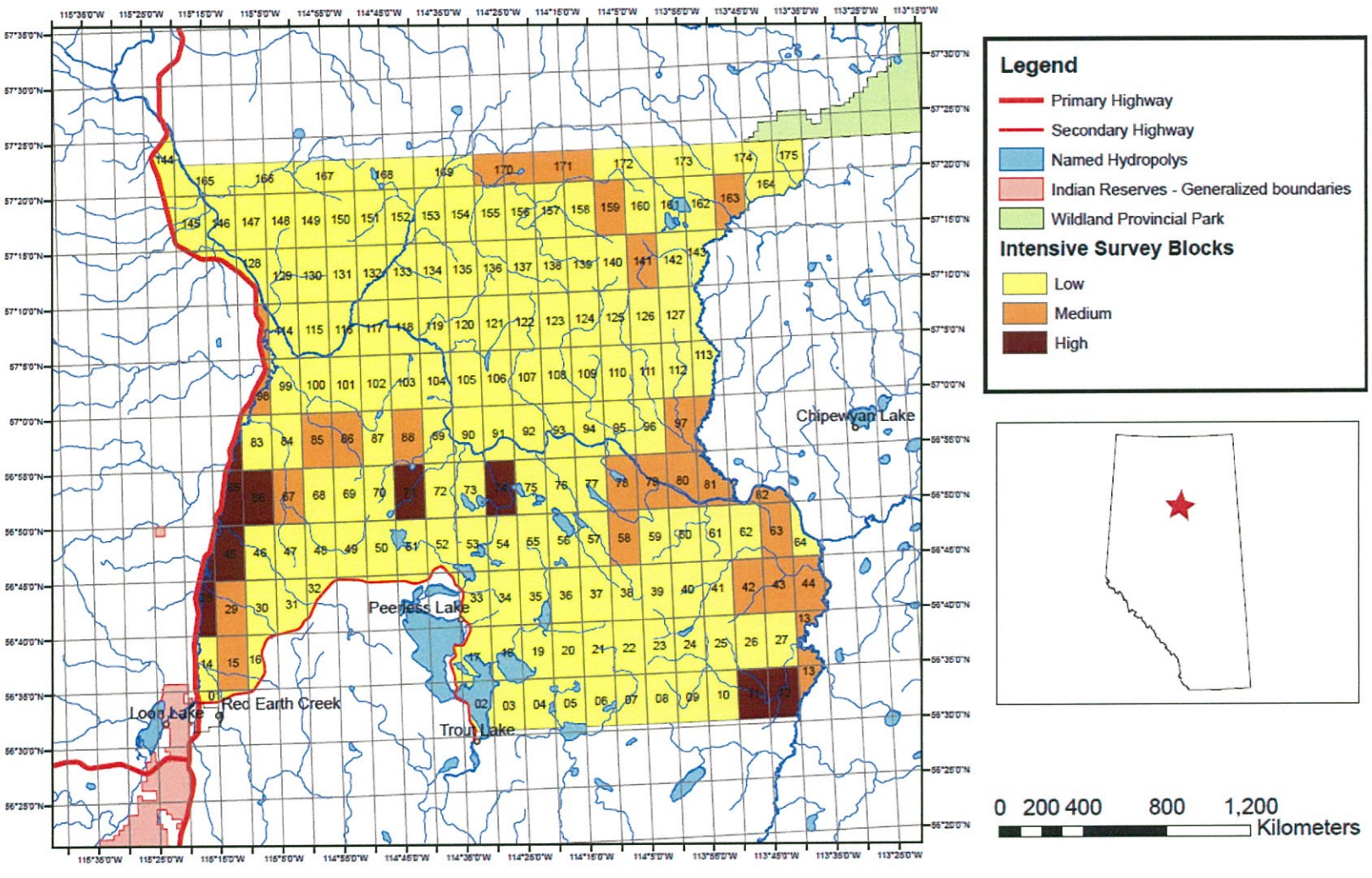
Appendix A. Map of Wildlife Management Unit 541, Lesser Slave Management Area, Alberta. The inset shows the position of WMU 541 within the province of Alberta.



Appendix B. Detailed map of moose survey blocks within Wildlife Management Unit 541, Lesser Slave Management Area, Alberta. A random sample of blocks identified as low, medium, and high density blocks were intensively sampled. The inset shows the position of WMU 541 within the province of Alberta.



Appendix C. Budget for the WMU 541 moose survey, January 2013*.

Expense Type	Unit	Cost Per Unit	Total Cost
Fixed Wing Charter	35.4	$510/hr (wet)	$ 18,054.00
Rotary Wing Charter	39.1	$975 (wet)	$ 38,122.50
Accommodations and meals		$200/day	5,982.00
Total			$62,158.50

*Staff costs were not included within overall survey budget but are part of organisational core staff budgets.