

G:\WX17393\_Man\_Hydro\_Bipole\Bipole\Annual\_Report\_Nov2017\WXD\_Maps\WTD\_and\_Elk\_Distribution\_Map\_2.mxd

**LEGEND**  
BPIII Transmission Line Route (labelled at segment divides)  
AC Collector Lines  
**Elk Occurrences, by year**  
2014  
2017  
**White-tailed Deer Occurrences, by year**  
2014  
2015  
2016  
2017  
Ecozone Boundaries  
Flight Line Transects (P. tenuis Survey Year 2 - Feb. 2016)  
P. tenuis Surveillance Area Boundary  
Pasquia-Bog (The Bog) Aerial Survey Area Boundary

NOTES:  
- Background topographic map extracted from ESRI online basemap services  
- Elk and White-tailed Deer occurrence data is a combination of trail camera data, ground transect data, P. tenuis survey data and aerial survey data.

Datum: NAD83  
Projection: UTM Zone 14N



MANITOBA HYDRO BIPOLE III  
TRANSMISSION PROJECT

White-tailed Deer and Elk  
Distribution Map

PROJECT N<sup>o</sup>: WX17393

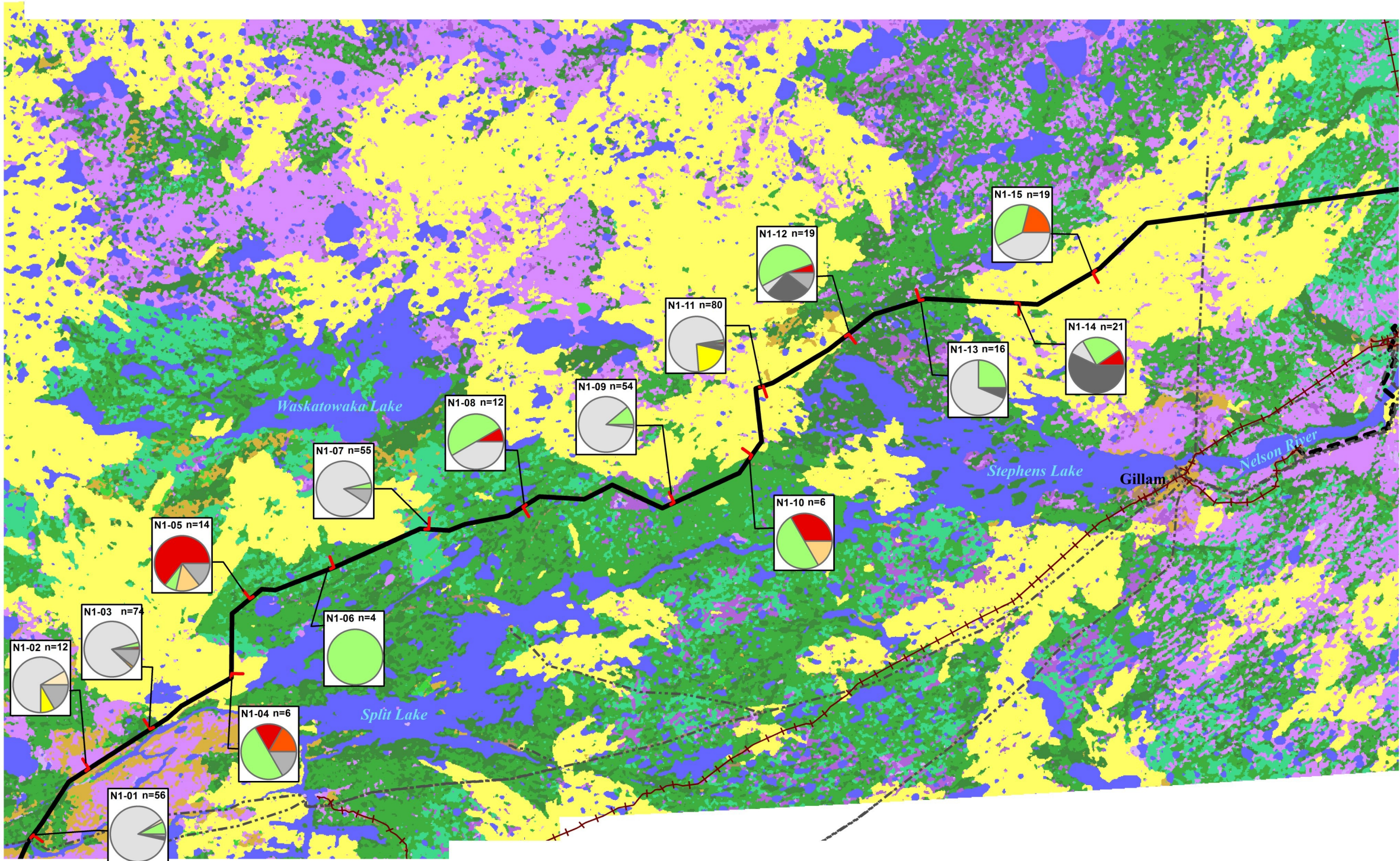
FIGURE: 5-4-1

SCALE: 1:1,165,000

DATE: March 2018







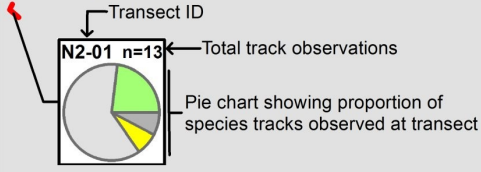
**LEGEND**

- Ground Transect (winter mammal survey 2017)
- Railway
- Highways
- Transmission Line
- BPIII Transmission Line Route
- AC Collector Lines

**Land Cover/Vegetation Types:**

- Water
- Exposed Land
- Developed
- Tall Shrubland
- Low Shrubland
- Treed Wetland
- Shrub Wetland
- Herb Wetland
- Herb
- Grassland
- Annual Crops
- Perennial Crops/Pasture
- Dense Coniferous Forest
- Open Coniferous Forest
- Sparse Coniferous Forest
- Dense Broadleaf Forest
- Open Broadleaf Forest
- Sparse Broadleaf Forest
- Dense Mixedwood Forest
- Sparse Mixedwood Forest

**Label Key:**



**Species:**

- Hare/Snowshoe Rabbit
- Squirrel
- Moose
- Woodland Caribou
- Fisher/Marten
- White-tailed Deer
- Lynx
- Gray Wolf
- Fox (Red or Arctic)
- Mink
- Otter
- Coyote
- Ermine/Weasel
- Wolverine

**NOTES:**

- Land cover types extracted from Canadian Land Cover database LCC2000-V (geogratis.ca)
- Highways extracted from the National Road Network (NRN) (geogratis.ca)
- Railway and Transmission line extracted from CanVec10 (geogratis.ca)

Datum: NAD83  
Projection: UTM Zone 14N



**MANITOBA HYDRO BIPOLE III  
TRANSMISSION PROJECT**

**The Proportion of Tracks for each  
Species Observed along each Transect in  
February 2017 (Section N1)**

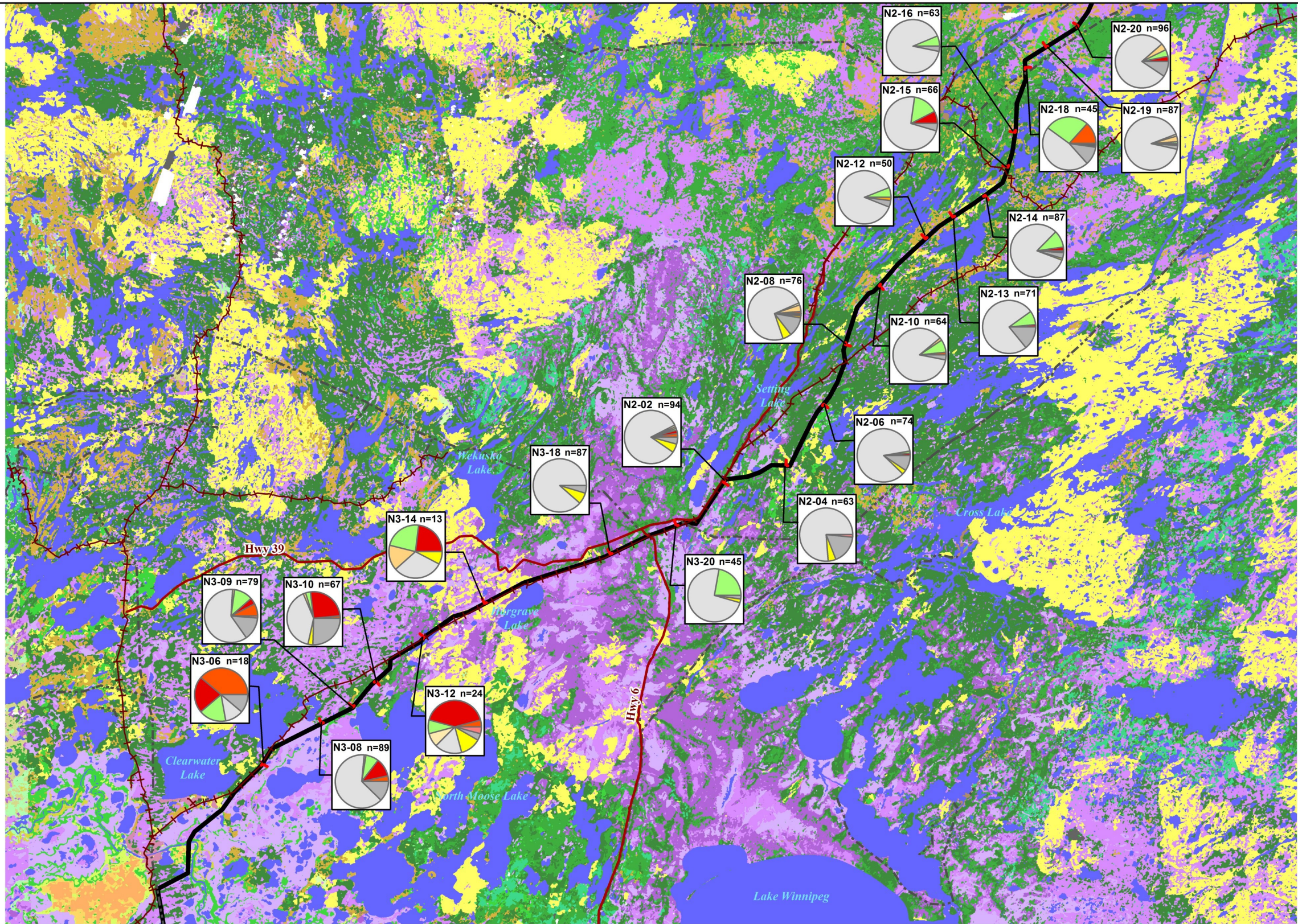
PROJECT N°: WX17393

FIGURE: 5-5-1

SCALE: 1:600,000

DATE: March 2018





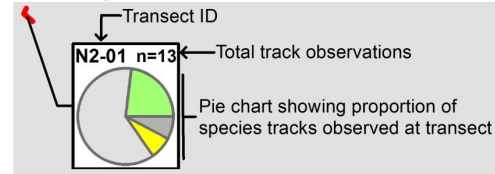
## LEGEND

- Ground Transect (winter mammal survey 2017)
- Railway
- Highways
- Transmission Line
- BPIII Transmission Line Route

### Land Cover/Vegetation Types:

- Water
- Exposed Land
- Developed
- Tall Shrubland
- Low Shrubland
- Treed Wetland
- Shrub Wetland
- Herb Wetland
- Herb
- Grassland
- Annual Crops
- Perennial Crops/Pasture
- Dense Coniferous Forest
- Open Coniferous Forest
- Sparse Coniferous Forest
- Dense Broadleaf Forest
- Open Broadleaf Forest
- Sparse Broadleaf Forest
- Dense Mixedwood Forest
- Sparse Mixedwood Forest

### Label Key:



### Species:

- Hare/Snowshoe Rabbit
- Squirrel
- Moose
- Woodland Caribou
- Fisher/Marten
- White-tailed Deer
- Lynx
- Gray Wolf
- Fox (Red or Arctic)
- Mink
- Otter
- Coyote
- Ermine/Weasel
- Wolverine

### NOTES:

- Land cover types extracted from Canadian Land Cover database LCC2000-V (geogratis.ca)
- Highways extracted from the National Road Network (NRN) (geogratis.ca)
- Railway and Transmission line extracted from CanVec10 (geogratis.ca)

Datum: NAD83  
Projection: UTM Zone 14N



## MANITOBA HYDRO BIPOLE III TRANSMISSION PROJECT

The Proportion of Tracks for each  
Species Observed along each Transect in  
February 2017 (Sections N2 and N3)

PROJECT N°: WX17393

FIGURE: 5-5-2

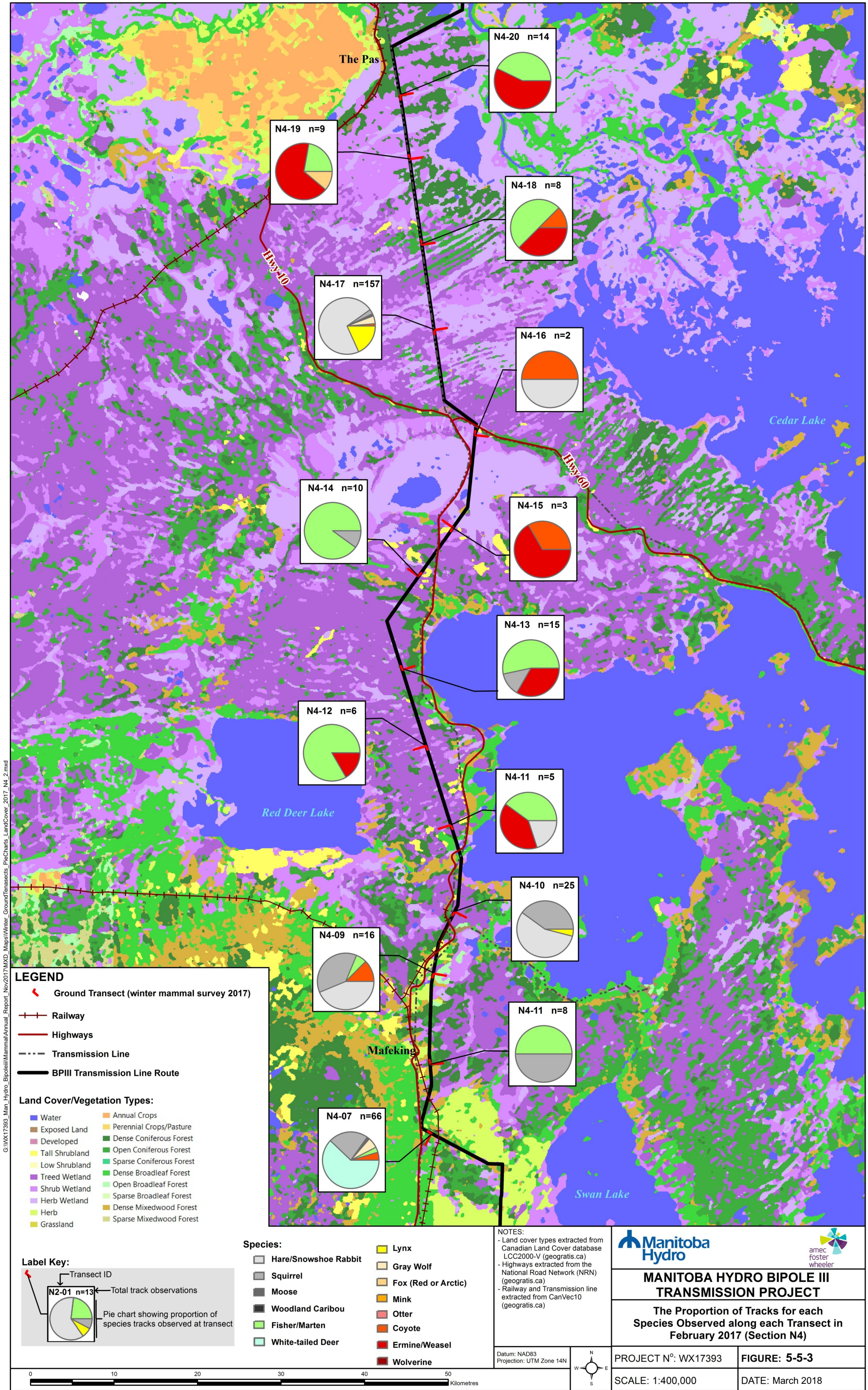
SCALE: 1:1,200,000

DATE: March 2018

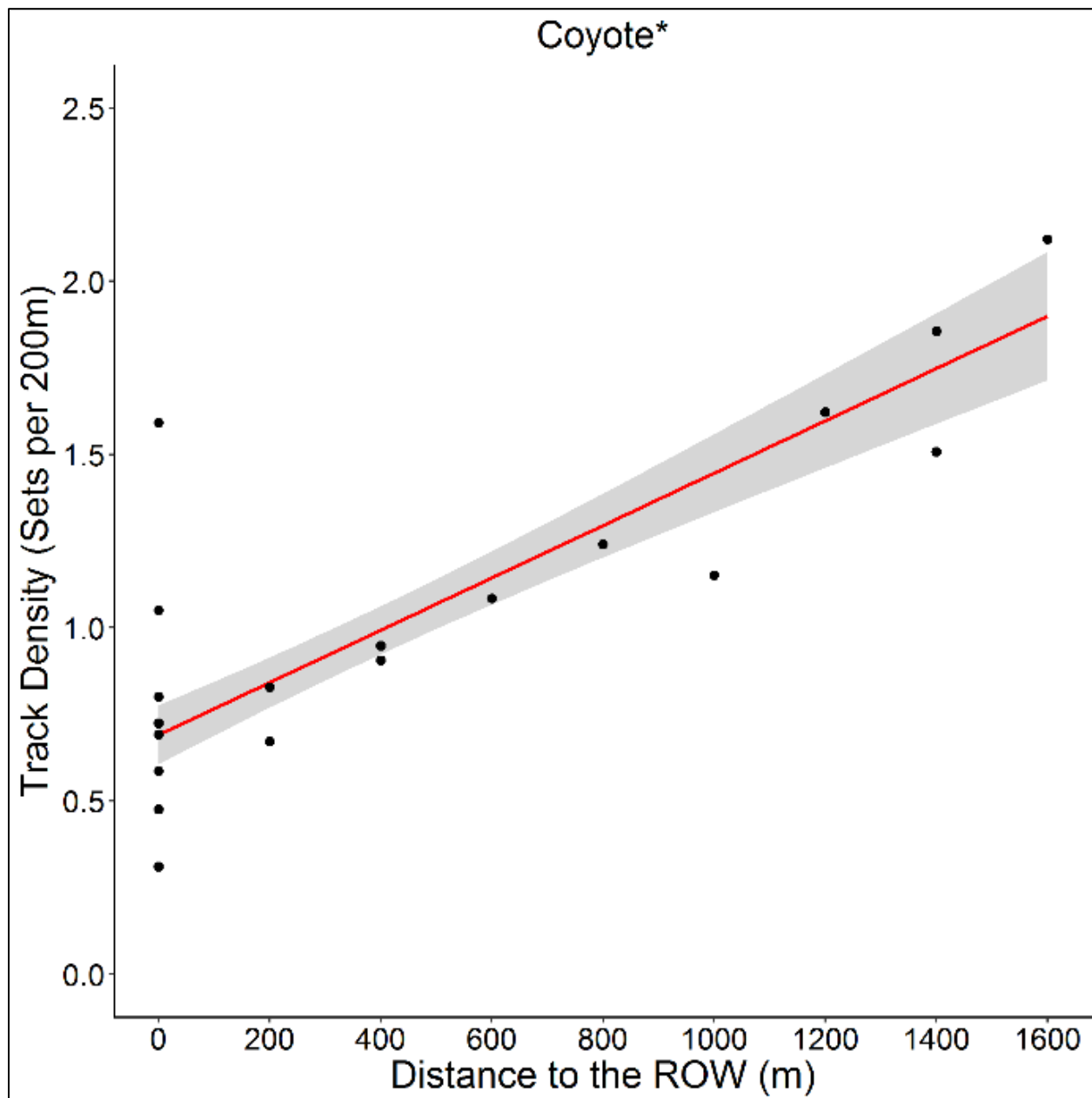
0 60 120 180 240 300 Kilometres



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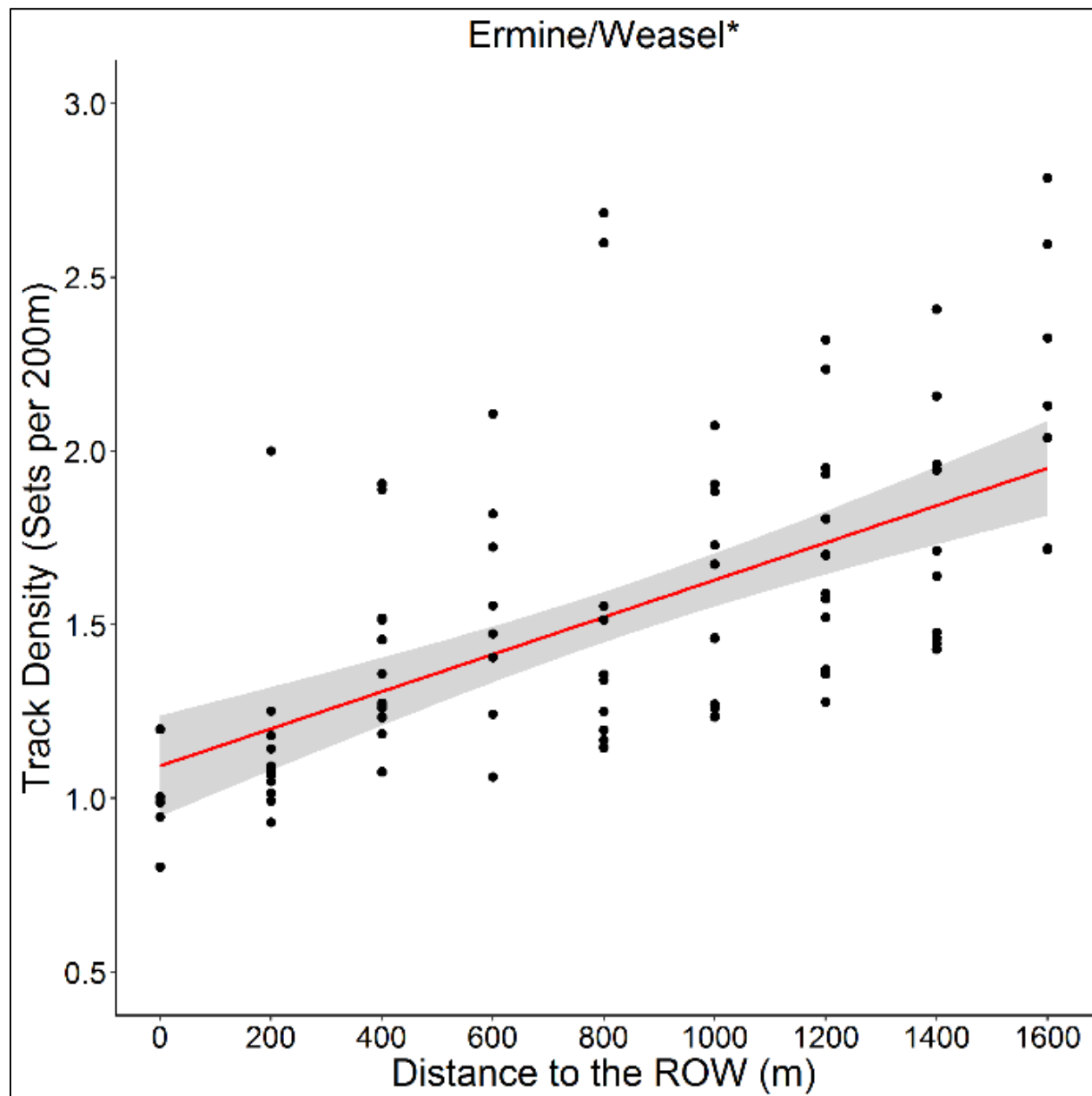


**Figure 5-5-4: Correlation between Track Density and Distance to the ROW for coyotes**

Correlation between track density and distance to the ROW for coyotes estimated by the model described in Table 5-5-4. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

‘\*’ indicates a significant correlation.



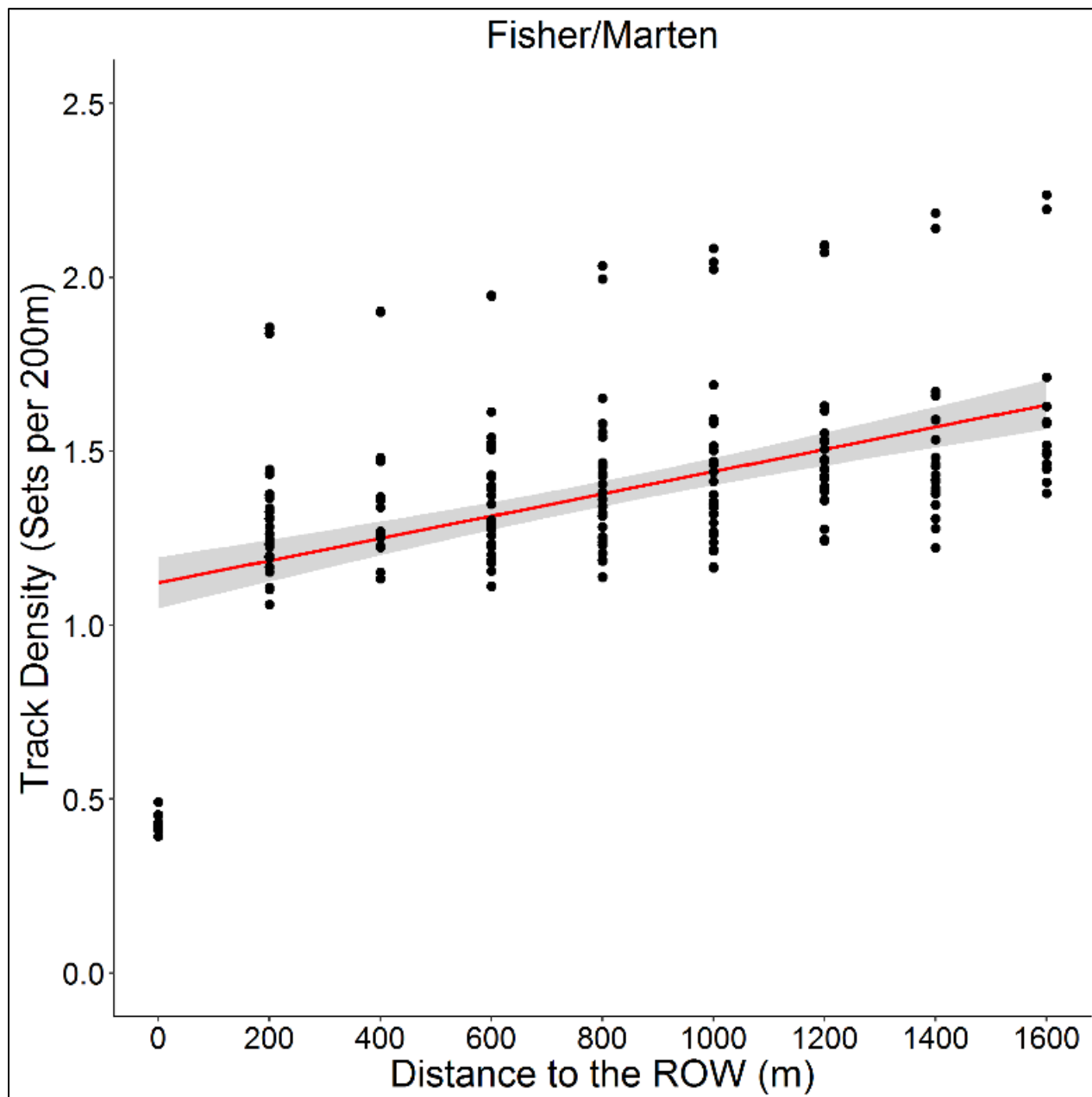


**Figure 5-5-5: Correlation between Track Density and Distance to the ROW for Ermine/Weasel**

Correlation between track density and distance to the ROW for ermine/weasel estimated by the model described in Table 5-5-5. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

‘\*\*’ indicates a significant correlation.

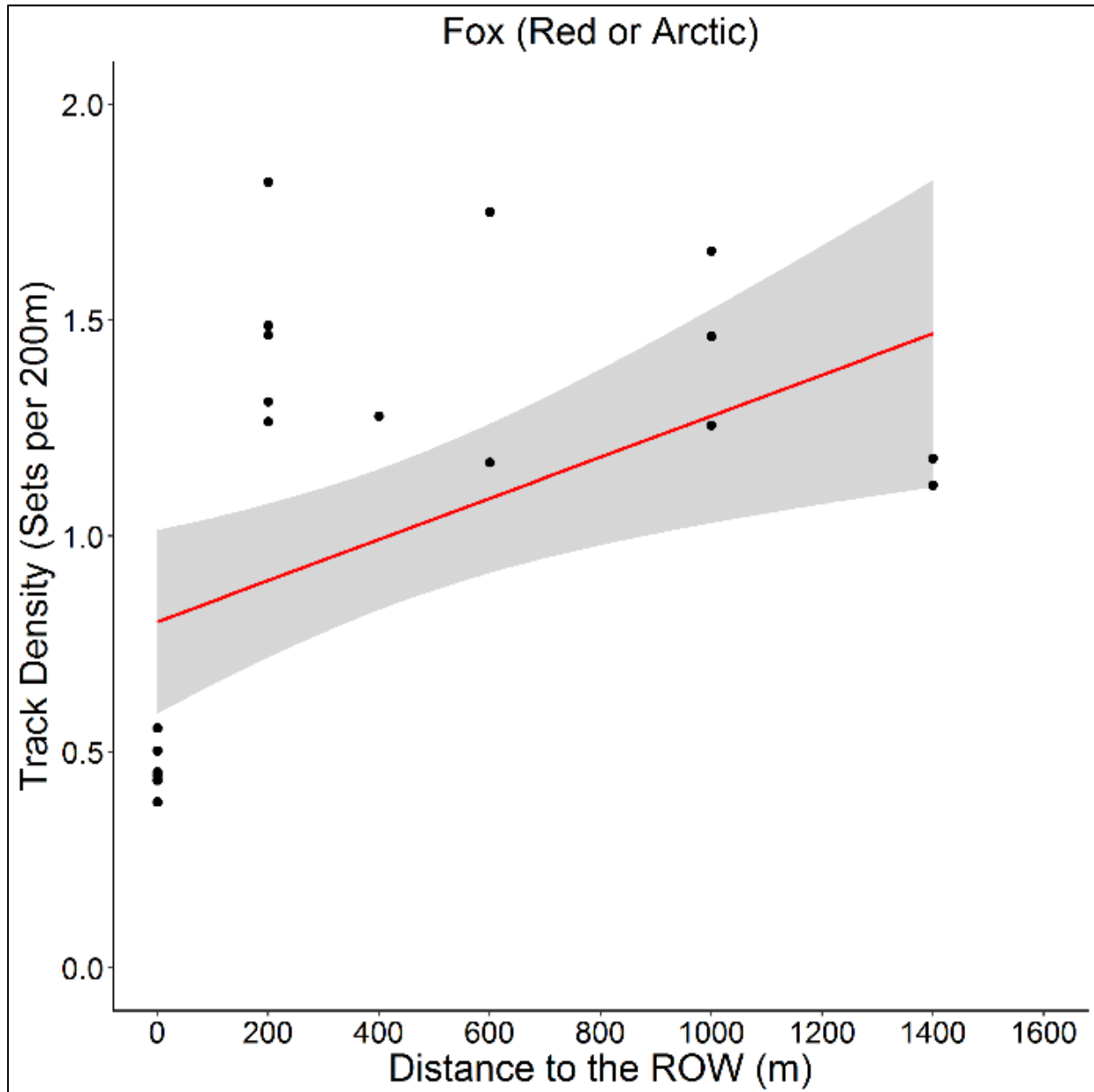




**Figure 5-5-6: Correlation between Track Density and Distance to the ROW for Fisher/Marten**

Correlation between track density and distance to the ROW for fisher/marten estimated by the model described in Table 5-5-6. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

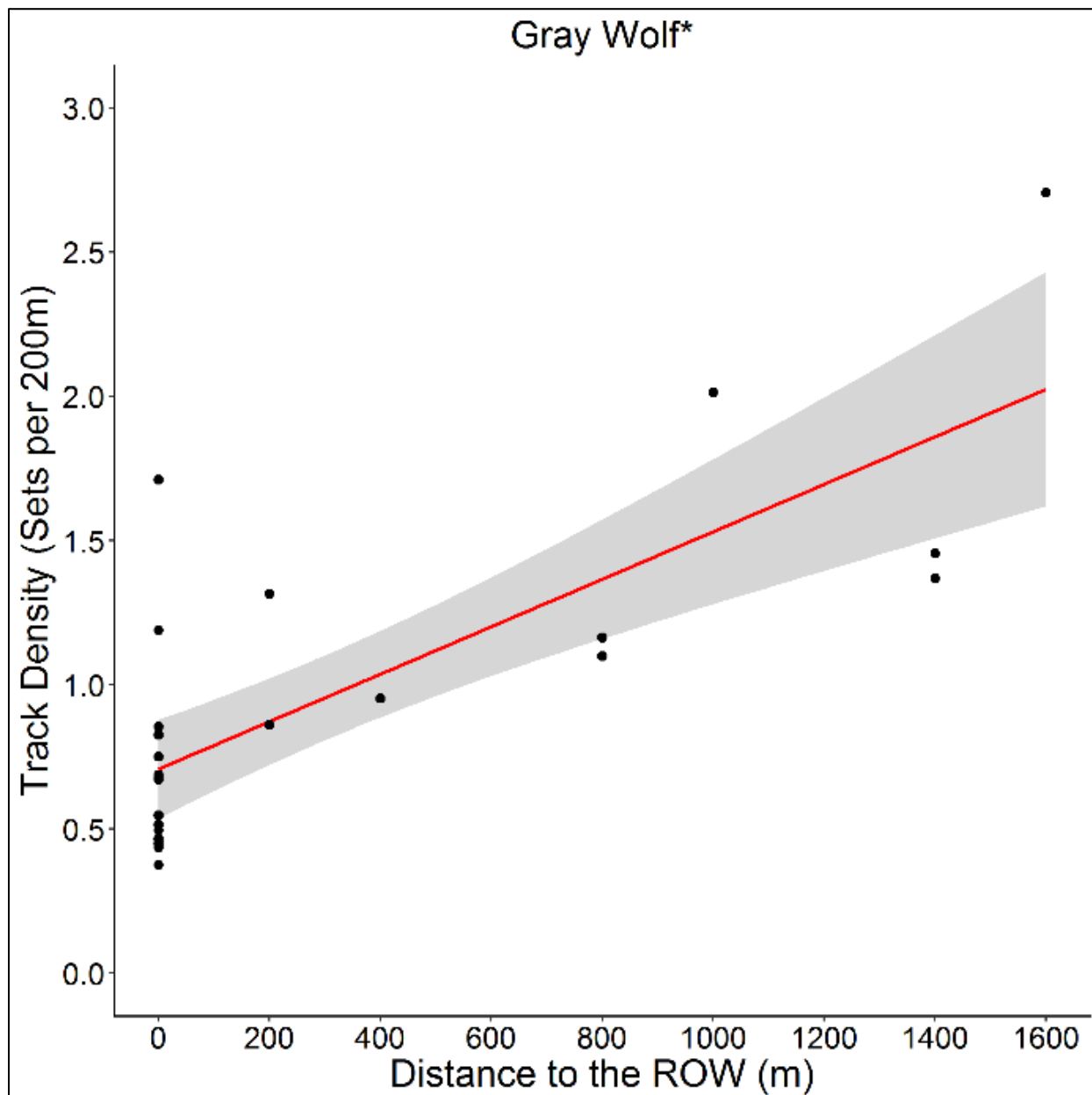




**Figure 5-5-7: Correlation between Track Density and Distance to the ROW for Fox**

Correlation between track density and distance to the ROW for fox estimated by the model described in Table 5-5-7. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.



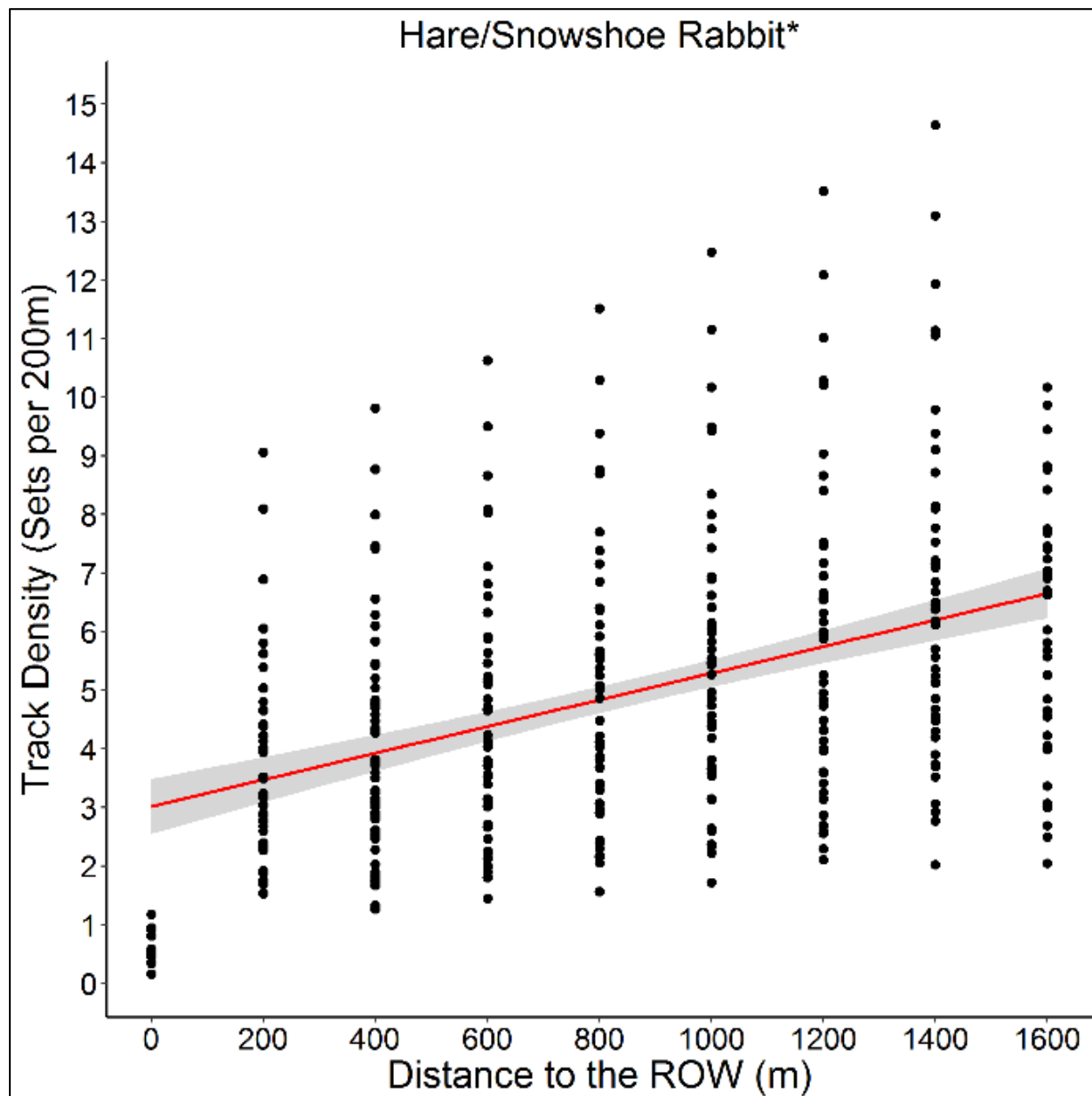


**Figure 5-5-8: Correlation between Track Density and Distance to the ROW for Gray Wolf**

Correlation between track density and distance to the ROW for gray wolf estimated by the model described in Table 5-5-8. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

‘\*’ indicates a significant correlation.



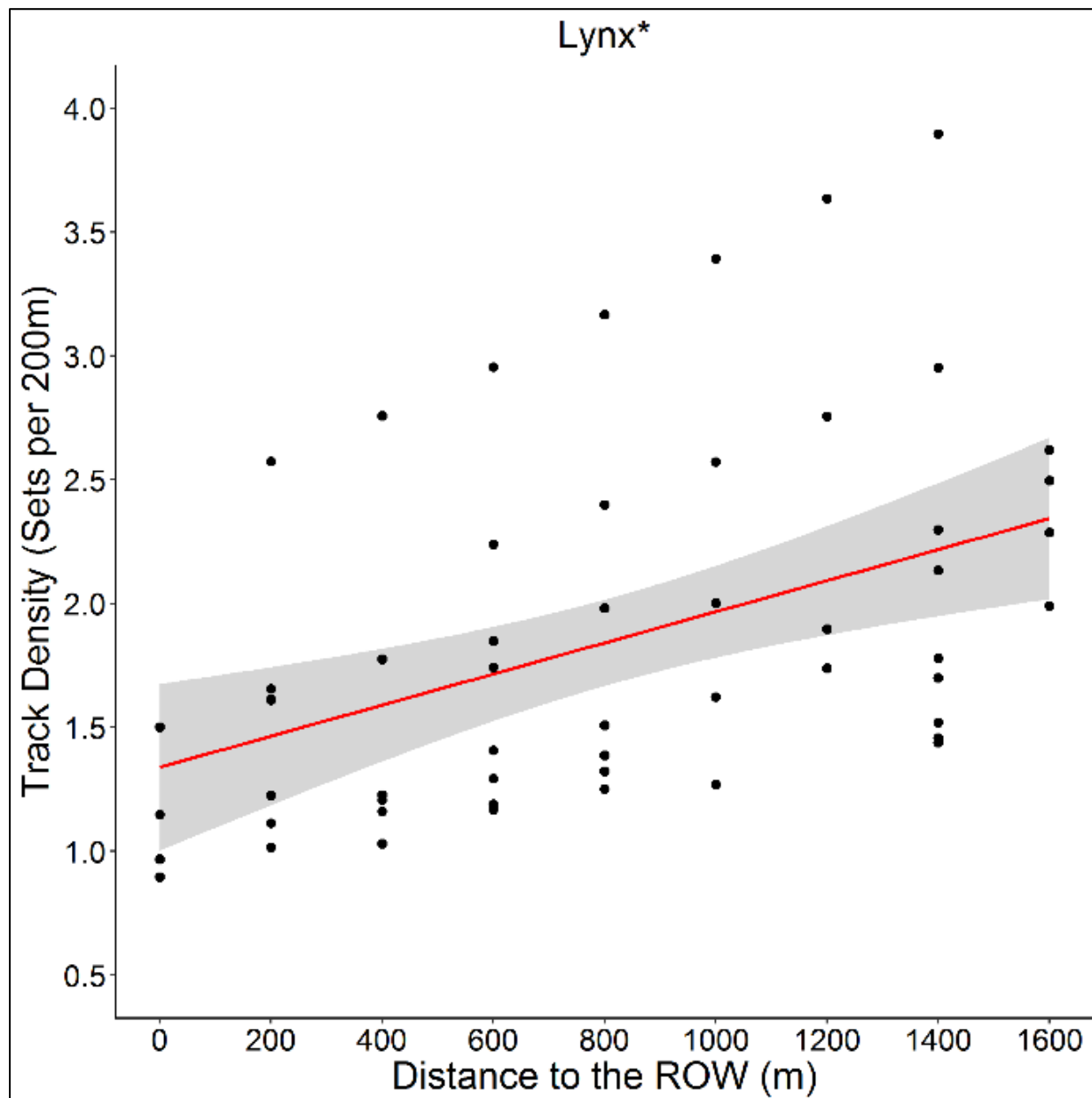


**Figure 5-5-9: Correlation between Track Density and Distance to the ROW for Hare/Rabbit**

Correlation between track density and distance to the ROW for hare/rabbit estimated by the model described in Table 5-5-9. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

‘\*\*’ indicates a significant correlation.



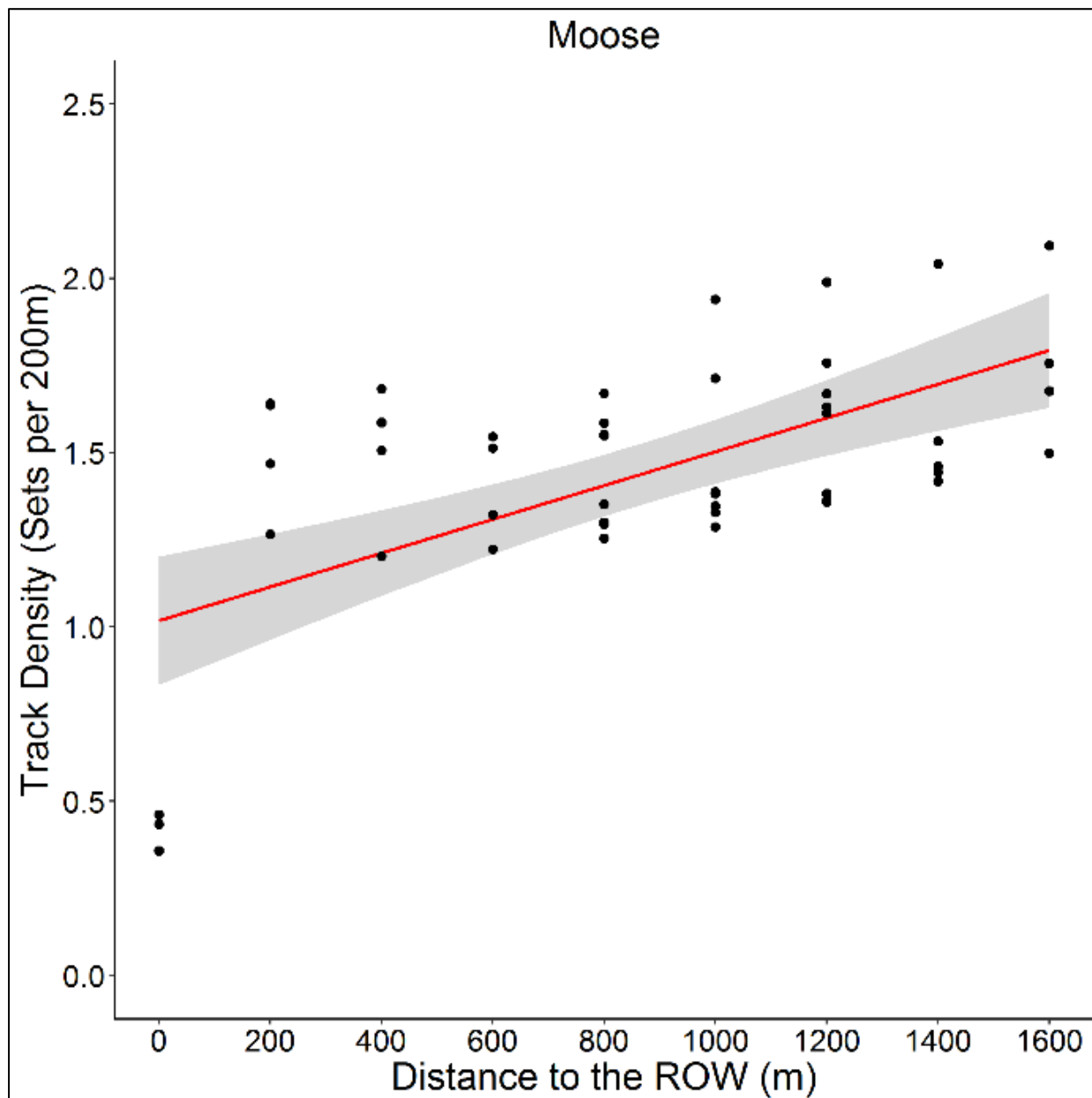


**Figure 5-5-10: Correlation between Track Density and Distance to the ROW for Lynx**

Correlation between track density and distance to the ROW for lynx estimated by the model described in Table 5-5-10. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

“\*” indicates a significant correlation.

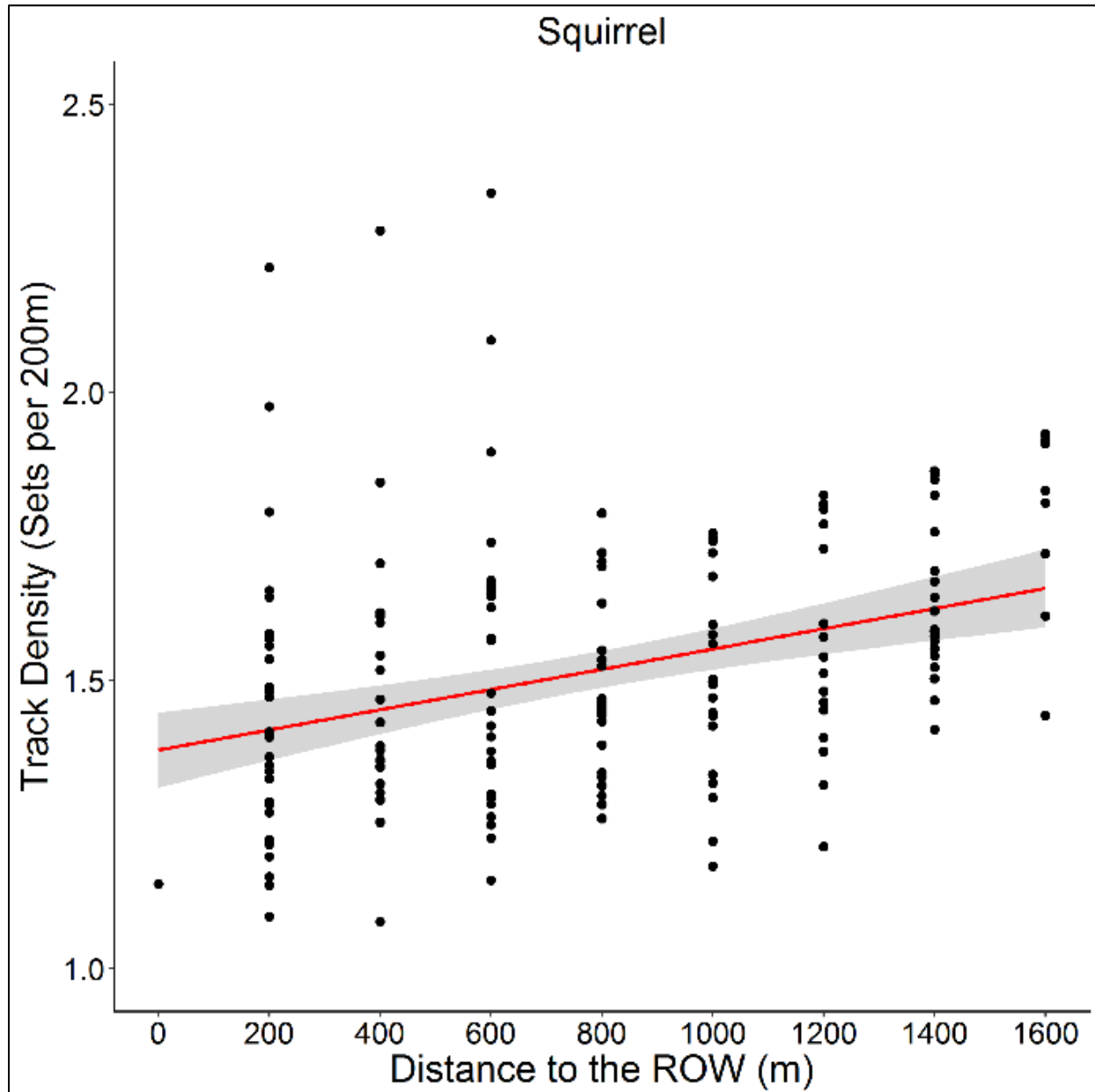




**Figure 5-5-11: Correlation between Track Density and Distance to the ROW for Moose**

Correlation between track density and distance to the ROW for moose estimated by the model described in Table 5-5-11. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.



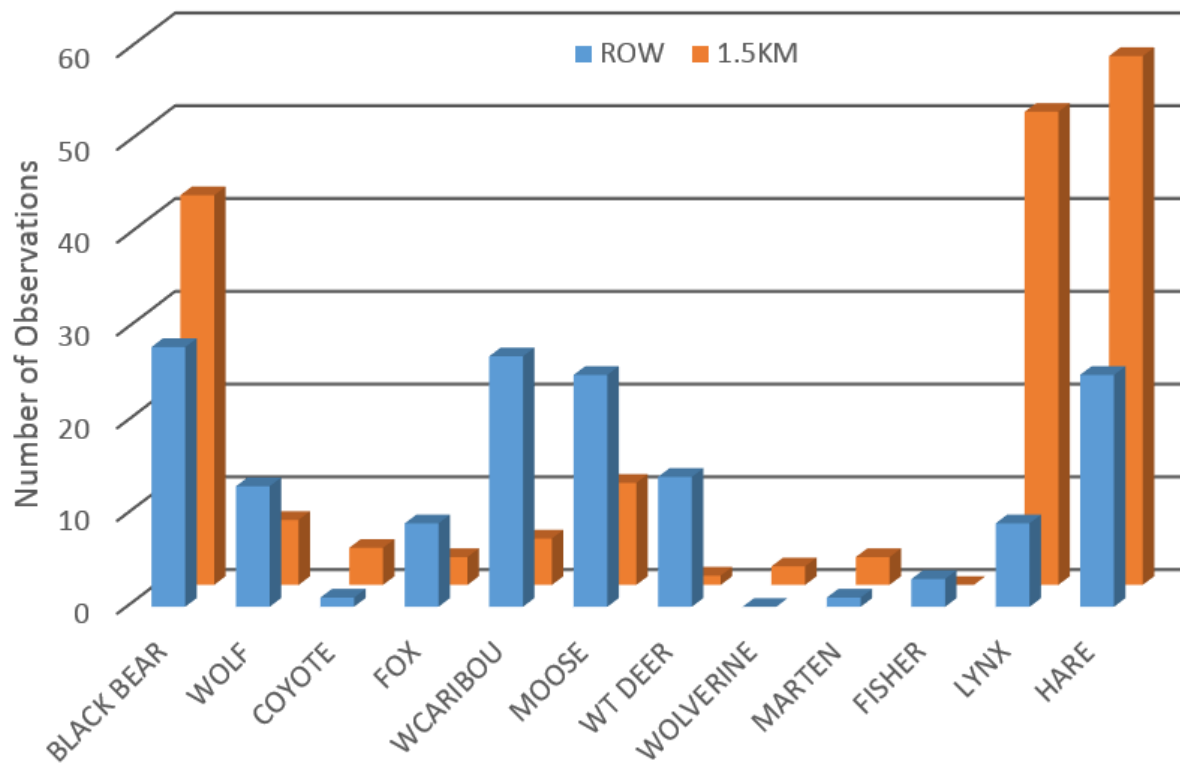


**Figure 5-5-12: Correlation between Track Density and Distance to the ROW for Squirrels**

Correlation between track density and distance to the ROW for squirrels estimated by the model described in Table 5-5-12. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.



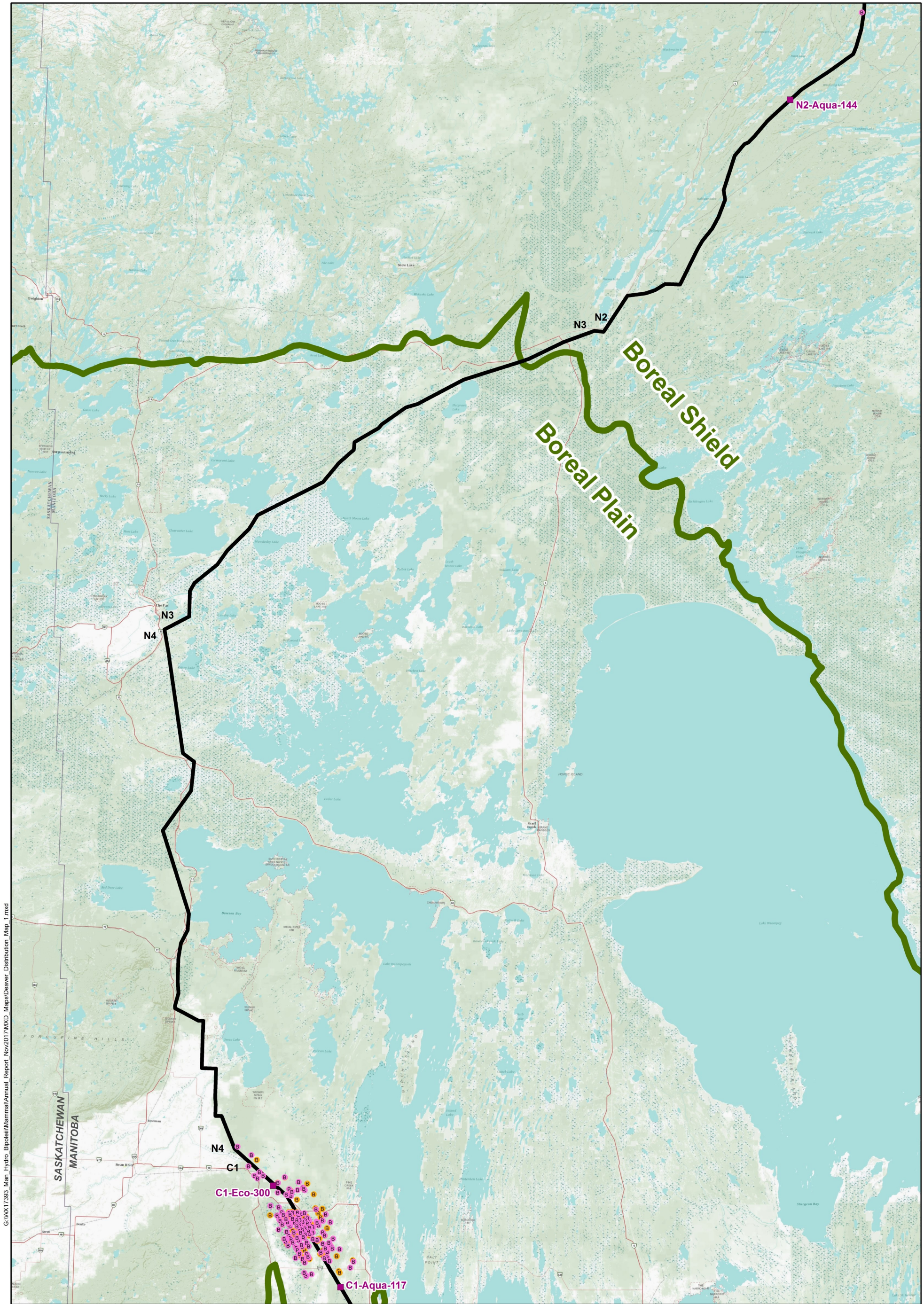
### Mammal Detections at Camera Traps



**Figure 5-5-13: Comparison of Mammal Detections at Camera Traps Positioned near versus Away from the ROW across Seasons, February 2015 to February 2017**



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<b>LEGEND</b> — BPIII Transmission Line Route (labelled at segment dividers) — AC Collector Lines ■ Active Beaver Locations at ESS sites (labelled with ID) <b>Beaver Occurrences, by year</b> ● 2016 ● 2017		Ecozone Boundaries	<b>NOTES:</b> - Background topographic map extracted from ESRI online basemap services - Beaver occurrence data is a combination of trail camera data, ground transect data, and aerial survey data.		
			<b>MANITOBA HYDRO BIPOLE III TRANSMISSION PROJECT</b>		
			<b>Beaver Distribution from Multi-species Aerial Survey</b>		
<b>Datum:</b> NAD83 <b>Projection:</b> UTM Zone 14N				<b>PROJECT N°:</b> WX17393	<b>FIGURE:</b> 5-5-14
 0 30 60 90 120 150 Kilometres				<b>SCALE:</b> 1:1,215,000	<b>DATE:</b> March 2018



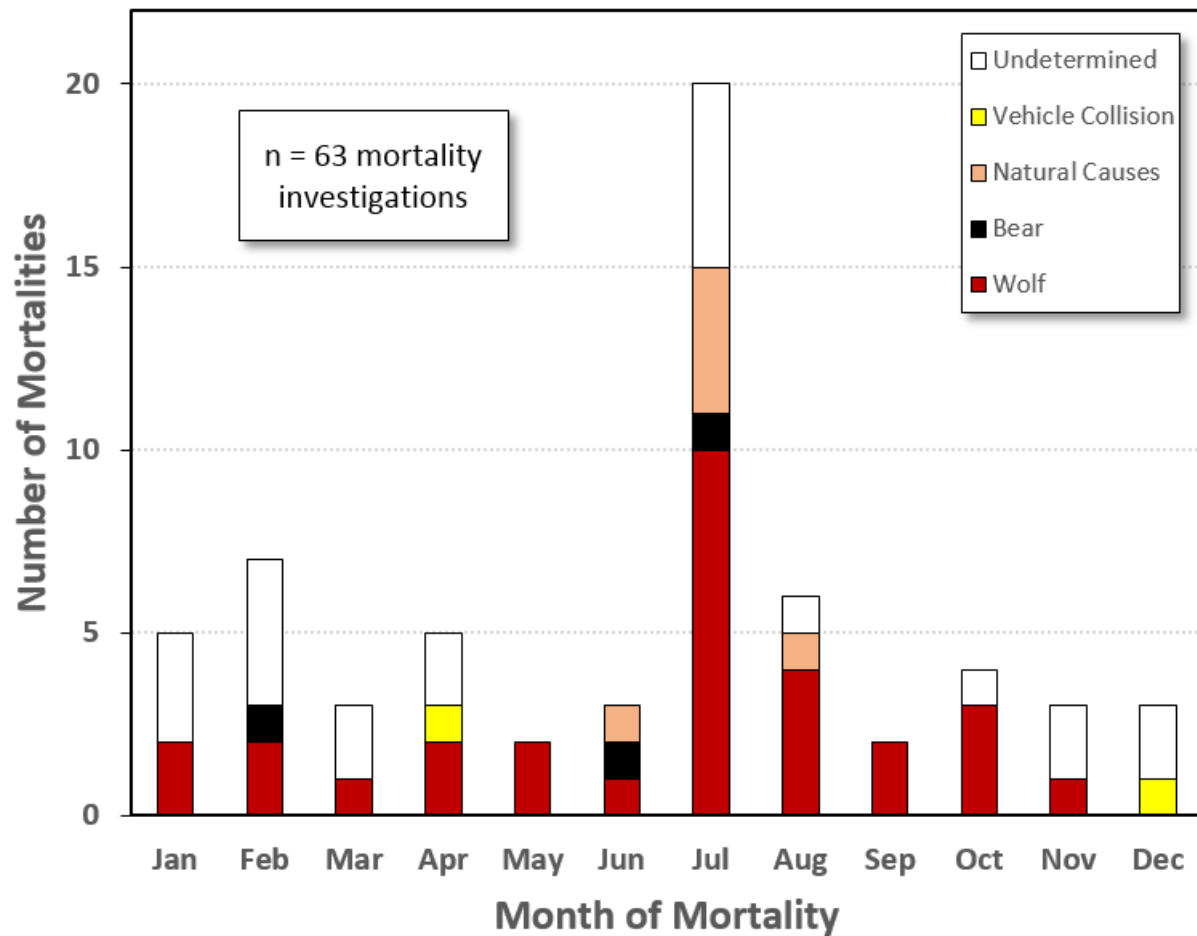
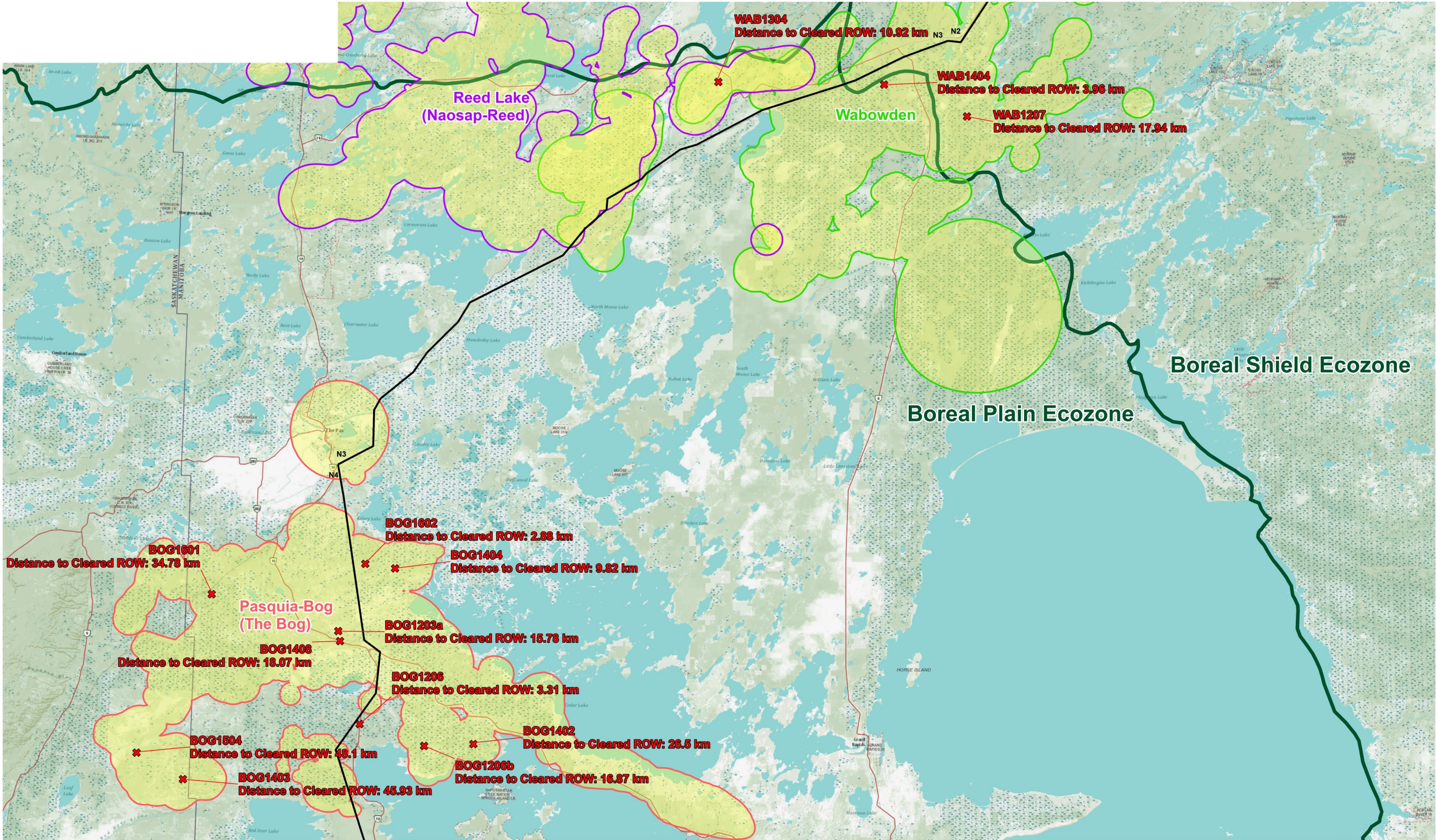


Figure 5-6-1: Mortality Source by Month for Collared Adult Female Caribou (January 2010 – August 2016) all Caribou Ranges Pooled



G:\WX17393\_Man\_Hydro\_BipoleIII\Mammal\Annual\_Report\_Nov2017\MXD\_Maps\Caribou\_Mortality\_Summary\_2.mxd  
G:\WX17393\_Man\_Hydro\_BipoleIII\Mammal\Annual\_Report\_Nov2017\MXD\_Maps\Recent\_Mortality\_Info\_BASE\_2.mxd



**LEGEND**

- Recent Mortality Locations (Labelled with Caribou ID and Distance to cleared ROW)
- BPIII Transmission Line Route
- Ecozones
- Reed Lake (Naosap) 2010-2017 Home Range (45 collars)
- Wabowden 2010-2017 Home Range (57 collars)
- Pasquia-Bog (The Bog) 2010-2017 Home Range (64 collars)

NOTES:  
- Background topographic map extracted from ESRI online basemap services



**MANITOBA HYDRO BIPOLE III TRANSMISSION PROJECT**

**Mortality Locations for Woodland Caribou Relative to Cleared Areas of ROW**

Datum: NAD83  
Projection: UTM Zone 14N



PROJECT N°: WX17393

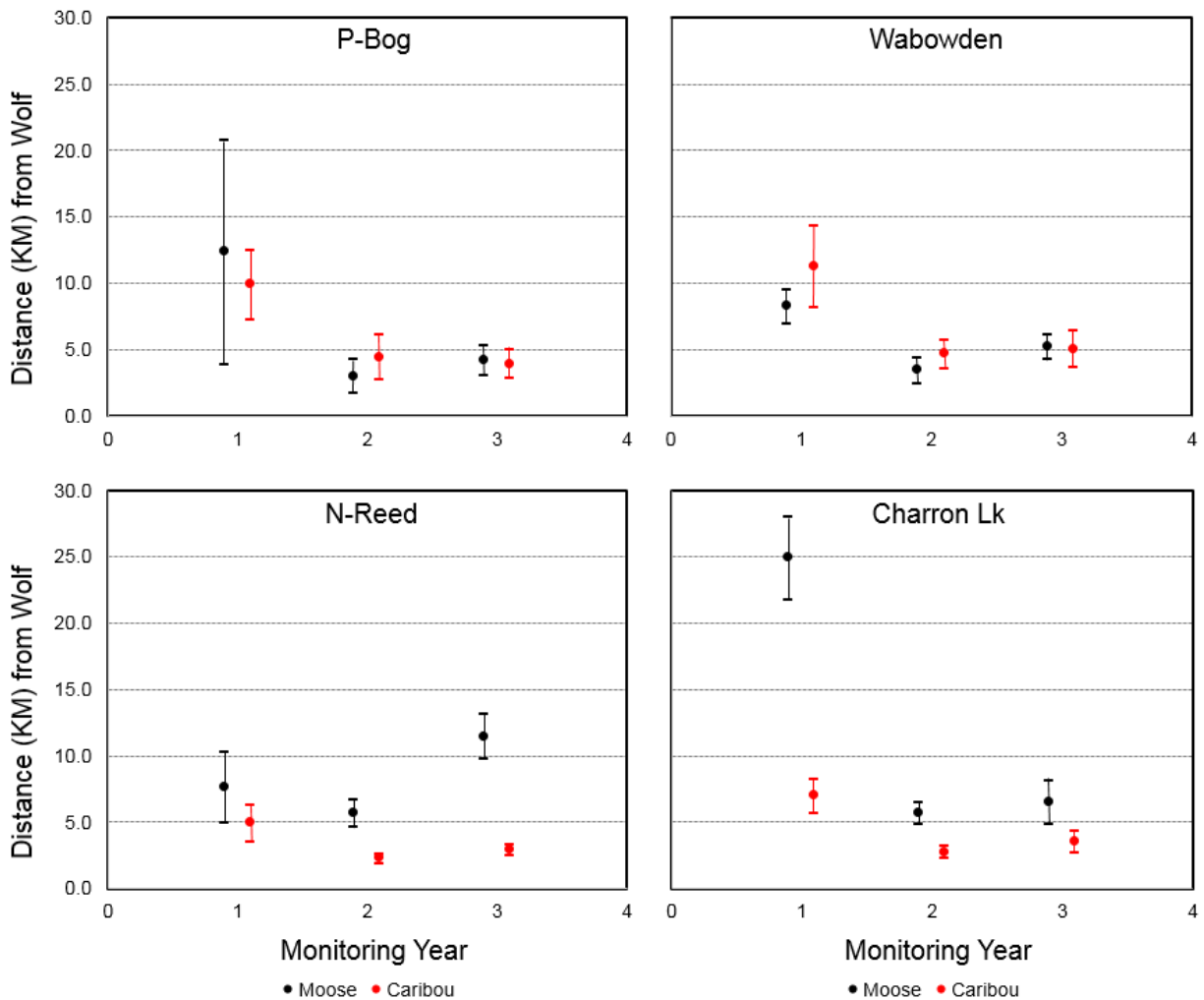
FIGURE: 5-6-2

SCALE: 1:960,000

DATE: March 2018





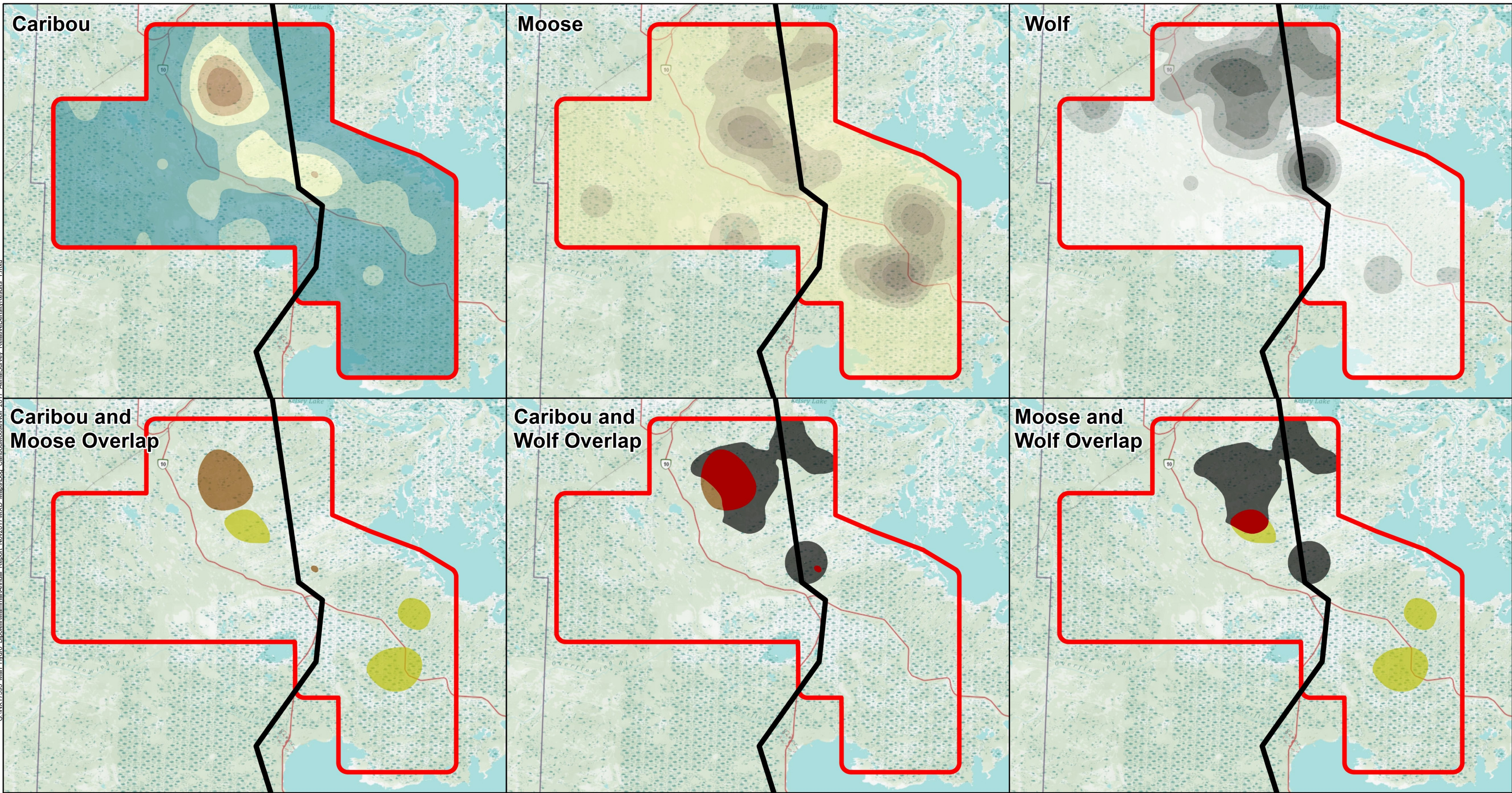


**Figure 5-6-3: Annual Wolf Predation-risk to Boreal Woodland Caribou and Moose during Mid-winter within Monitored Boreal Caribou Ranges, 2014/15 to 2016/17**









**LEGEND**

BPIII Transmission Line Route

Delineated Study Areas for Range

**General Relative Caribou Density**

- Low
- Medium Low
- Medium
- Medium High
- High
- Relatively High Caribou Density Areas

**General Relative Moose Density**

- Low
- Medium Low
- Medium
- Medium High
- High
- Relatively High Moose Density Areas

**General Relative Wolf Density**

- Low
- Medium Low
- Medium
- Medium High
- High
- Relatively High Wolf Density Areas

Areas of Relatively High Density Overlap

NOTES:

- Background topographic map extracted from ESRI online basemap services
- 2017 Field track and observation data used to generate relative density surfaces.
- Point data was weighted by observation count information

Datum: NAD83  
Projection: UTM Zone 14N

**Manitoba Hydro**

amec foster wheeler

**MANITOBA HYDRO BIPOLE III TRANSMISSION PROJECT**

Comparison of High Relative Density Areas for Caribou, Moose and Wolf Observations within the Delineated Pasquia-Bog Study Area

PROJECT N°: WX17393      **FIGURE: 5-6-5**

SCALE: 1:595,000      DATE: March 2018

0 30 60 90 120 150 Kilometres











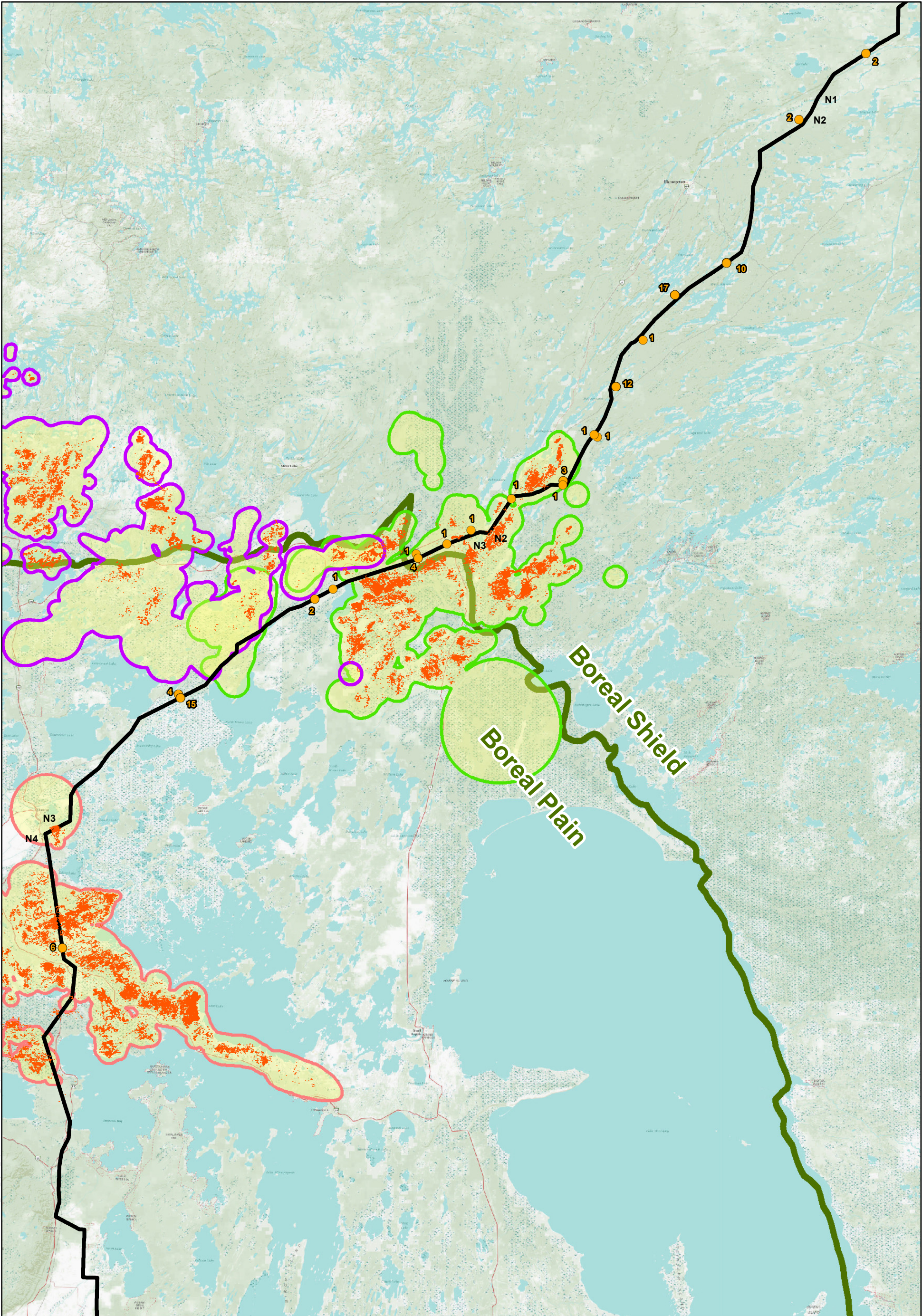
REDACTED



REDACTED

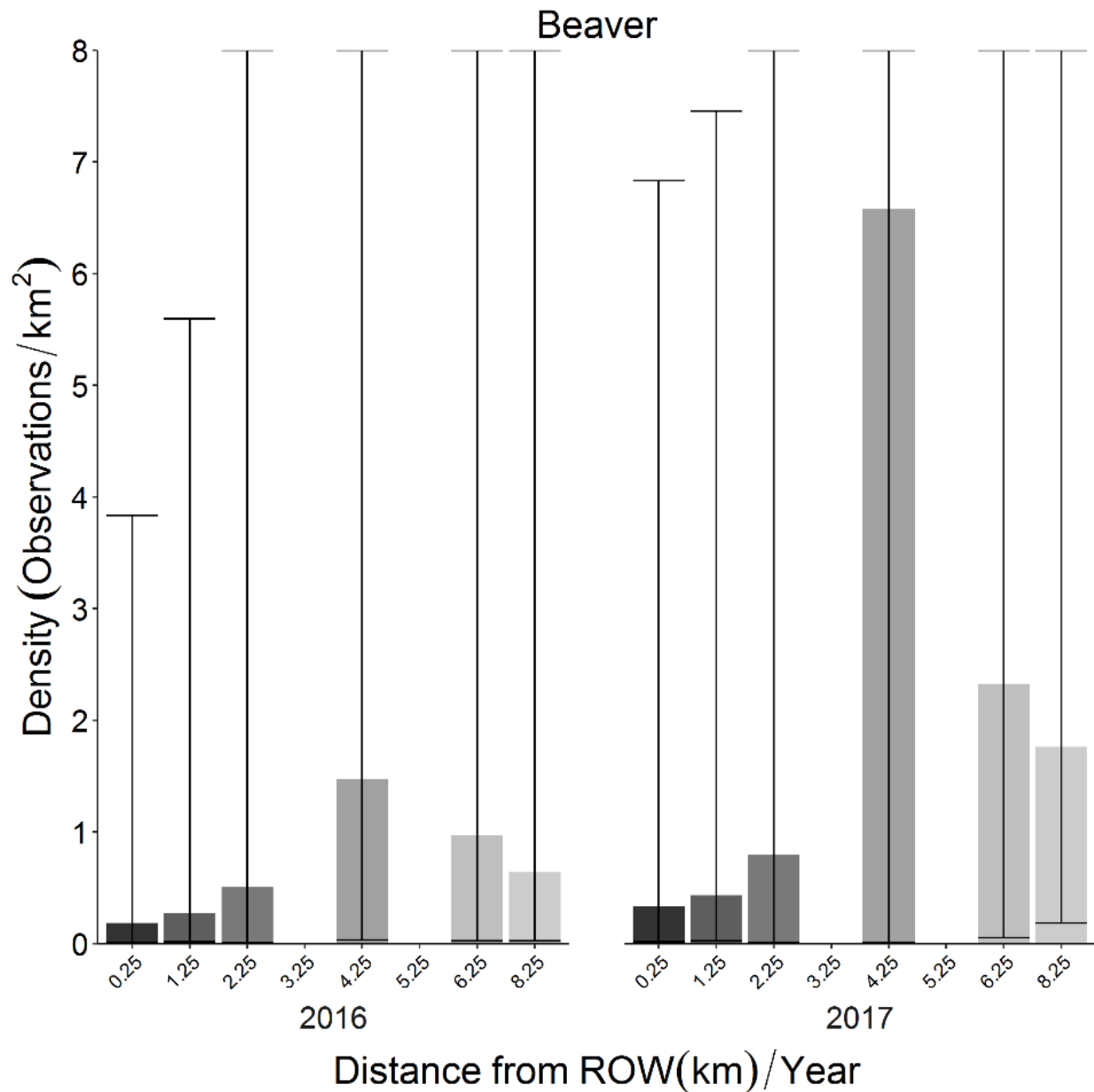


GWX17393\_Man\_Hydro\_BipoleIII Mammal Annual\_Report\_Nov2017MXD\_MapsBlackBear\_Distribution\_Map\_1.mxd



<b>LEGEND</b> — BPIII Transmission Line Route (labelled at segment divides) — AC Collector Lines ● Telemetry Locations during Calf Rearing Period (May 15 to July 15, 2010 to 2017) ● Reed Lake (Naosap) 2010-2017 Home Range (45 collars) ● Wabowden 2010-2017 Home Range (57 collars) ● Pasquia-Bog (The Bog) 2010-2017 Home Range (64 collars) ● Black Bear Occurrences, Trail Camera data from 2015-2016 ● Black Bear Occurrences (labelled with count)		Ecozone Boundaries	<b>NOTES:</b> - Background topographic map extracted from ESRI online basemap services - Black Bear occurrence data is a combination of trail camera data, ground transect data.		
			<b>MANITOBA HYDRO BIPOLE III TRANSMISSION PROJECT</b>		
			<b>Black Bear Distribution Map</b>		
<p>Datum: NAD83 Projection: UTM Zone 14N</p>			PROJECT N°: WX17393	FIGURE: 5-6-10	
			SCALE: 1:1,215,000	DATE: March 2018	

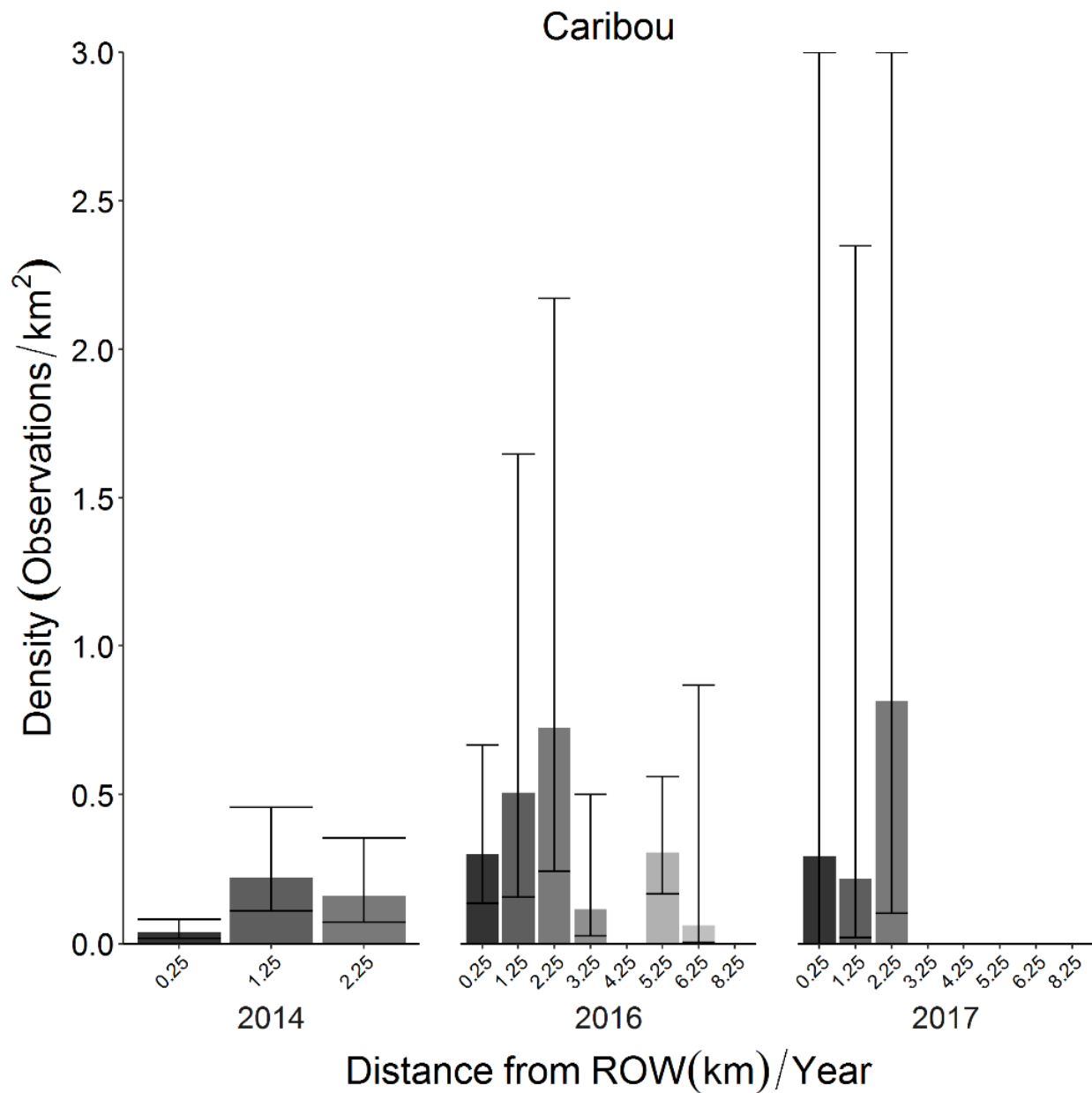




**Figure 5-6-11: Density of Beaver Observations as a Function of the Distance to the Project ROW**

Estimated density and 95% confidence limits of beaver observations from multi-species aerial survey as a function of distance from the ROW. For visualization purposes, upper confidence limits were constrained to 8 observations/km<sup>2</sup>.

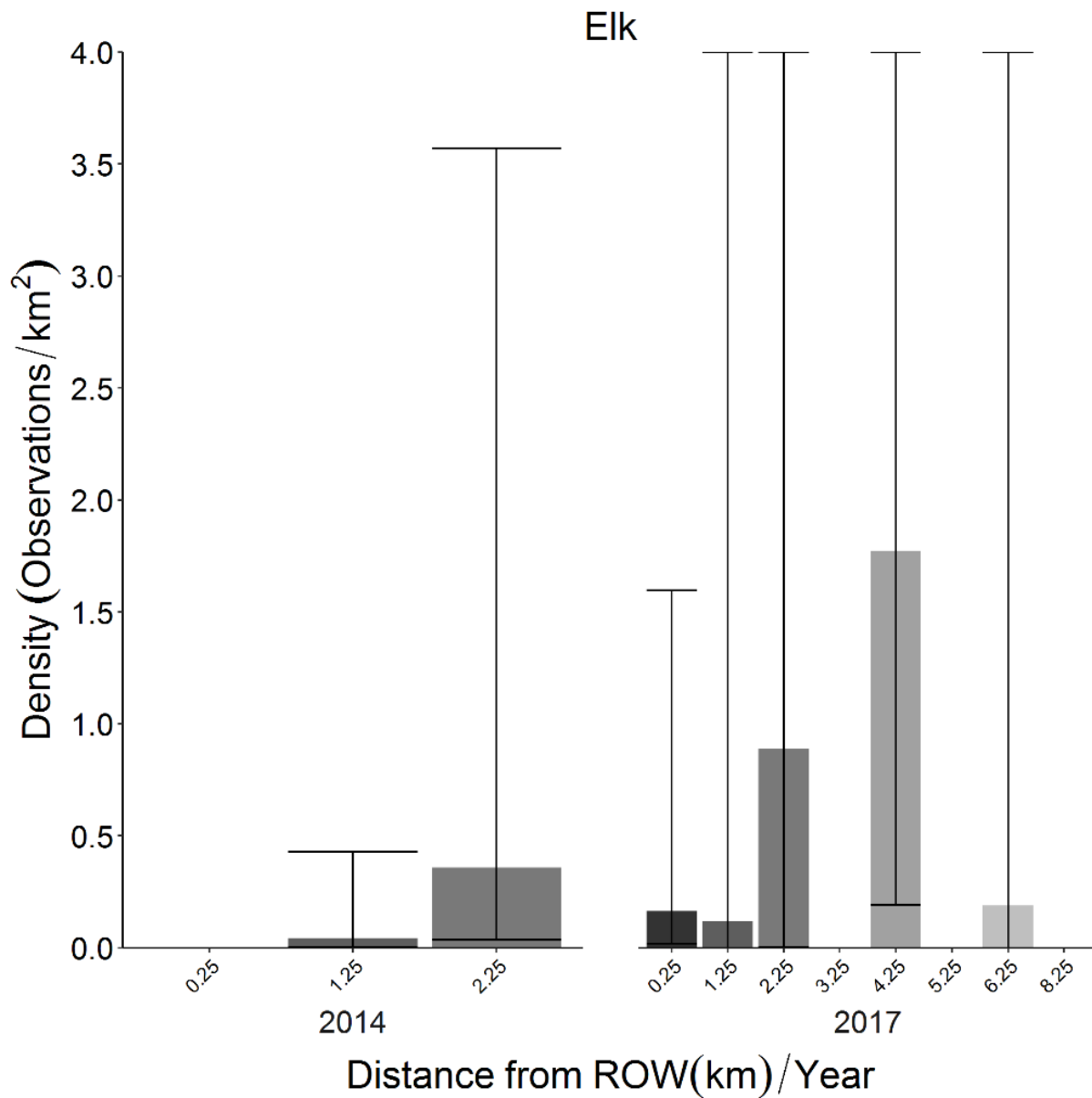




**Figure 5-6-12: Density of Caribou Observations as a Function of the Distance to the Project ROW**

Estimated density and 95% confidence limits of caribou observations with distance from the ROW. For visualization purposes, upper confidence limits were constrained to 3 observations/km².

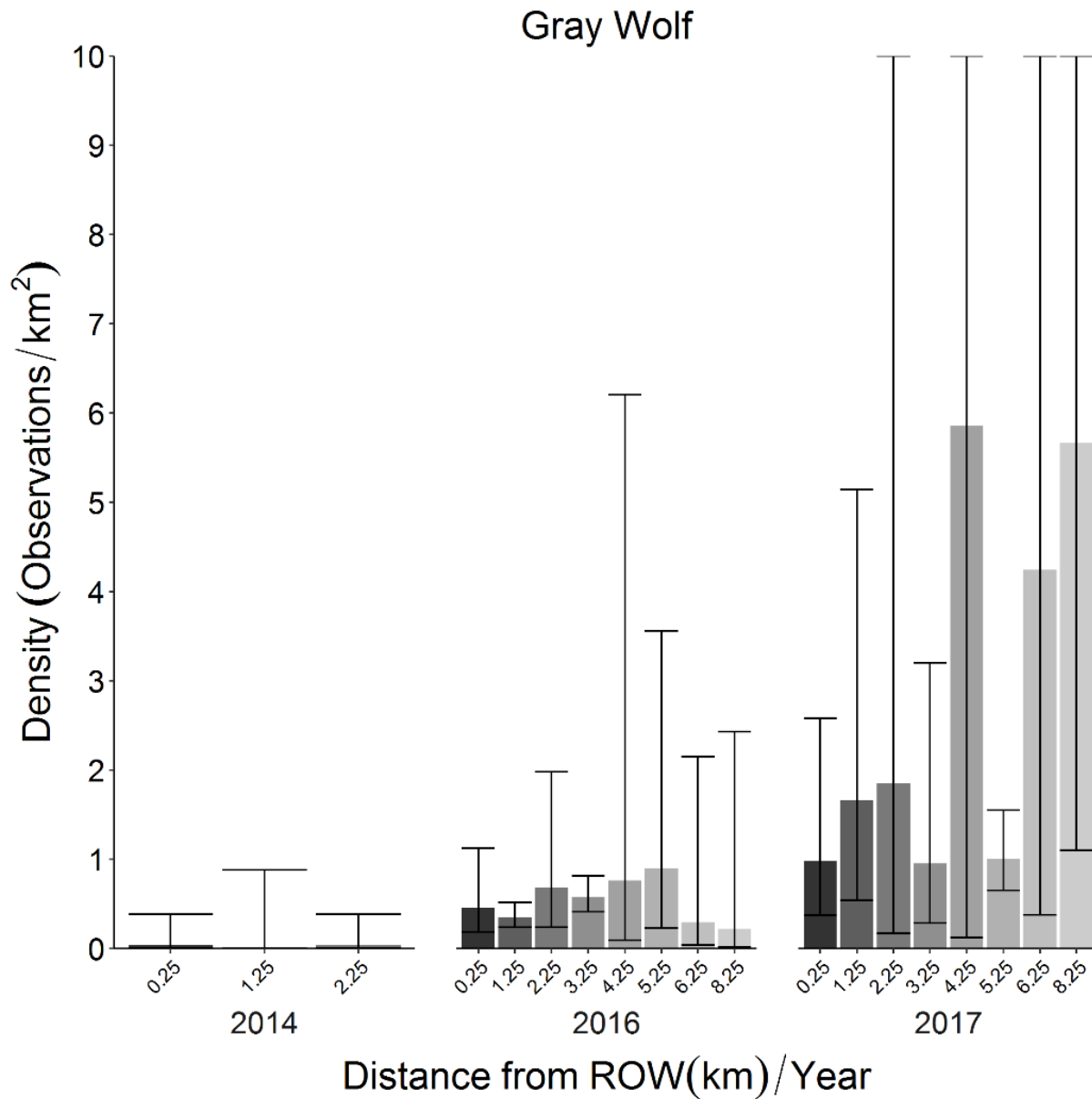




**Figure 5-6-13: Density of Elk Observations as a Function of the Distance to the Project ROW**

Estimated density and 95% confidence limits of elk observations as a function of distance from the ROW. For visualization purposes, upper confidence limits were constrained to 4 observations/km<sup>2</sup>.

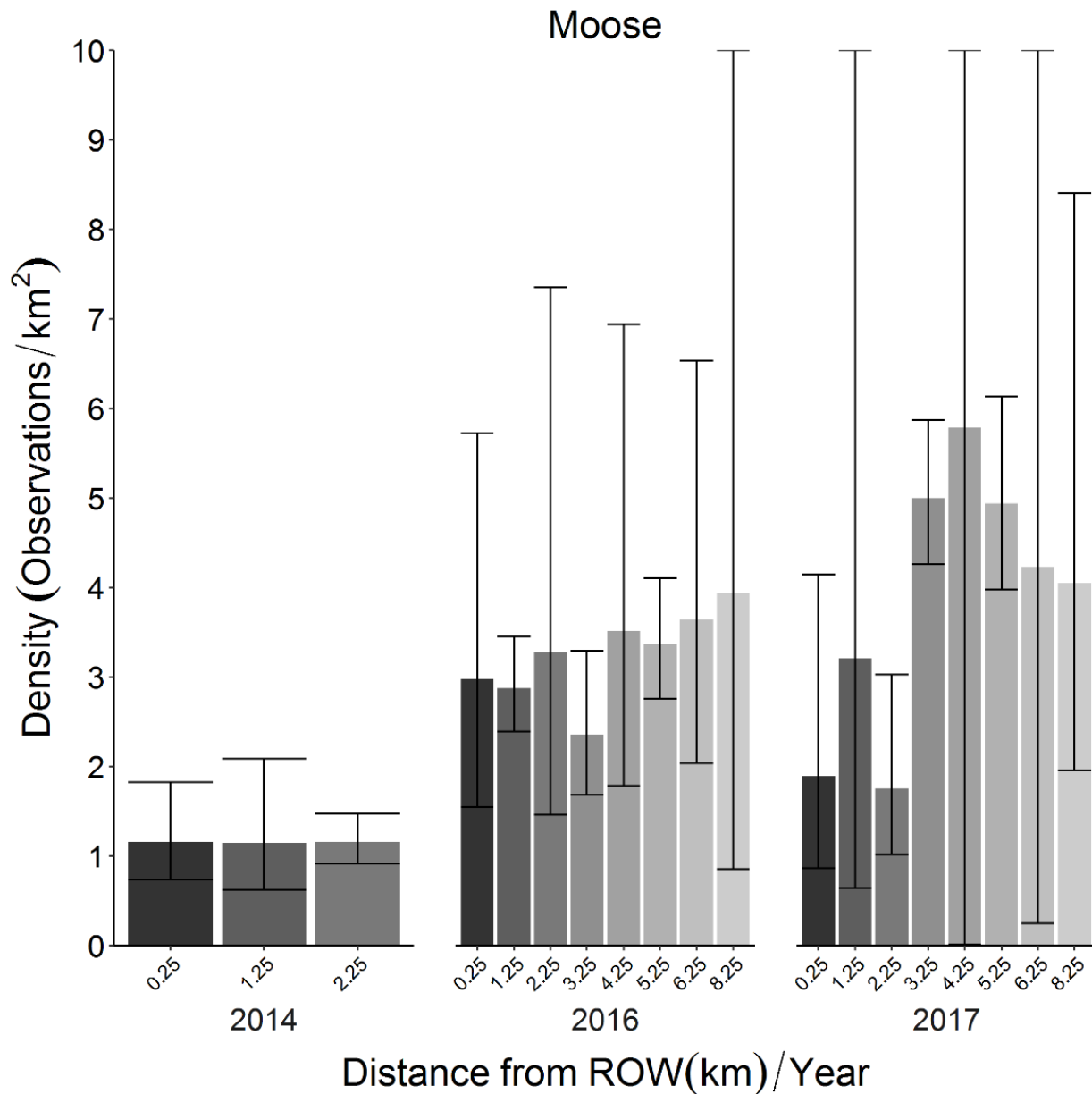




**Figure 5-6-14: Density of Gray Wolf Observations as a Function of the Distance to the Project ROW**

Estimated density and 95% confidence limits of gray wolf observations with distance from the ROW. For visualization purposes, upper confidence limits were constrained to 10 observations/km<sup>2</sup>.

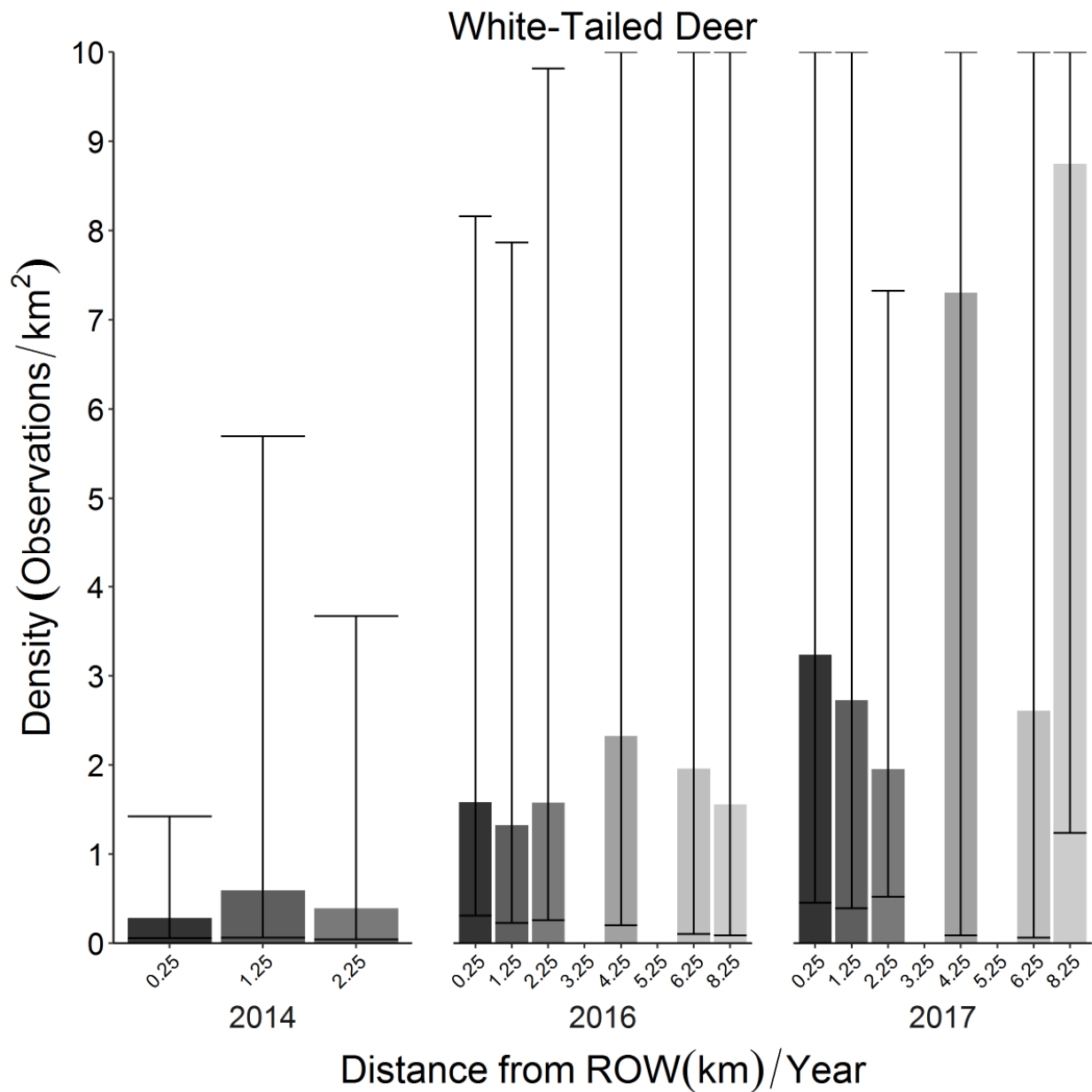




**Figure 5-6-15: Density of Moose Observations as a Function of the Distance to the Project ROW**

Estimated density and 95% confidence limits of moose observations as a function of distance from the ROW. For visualization purposes, upper confidence limits were constrained to 10 observations/km<sup>2</sup>.

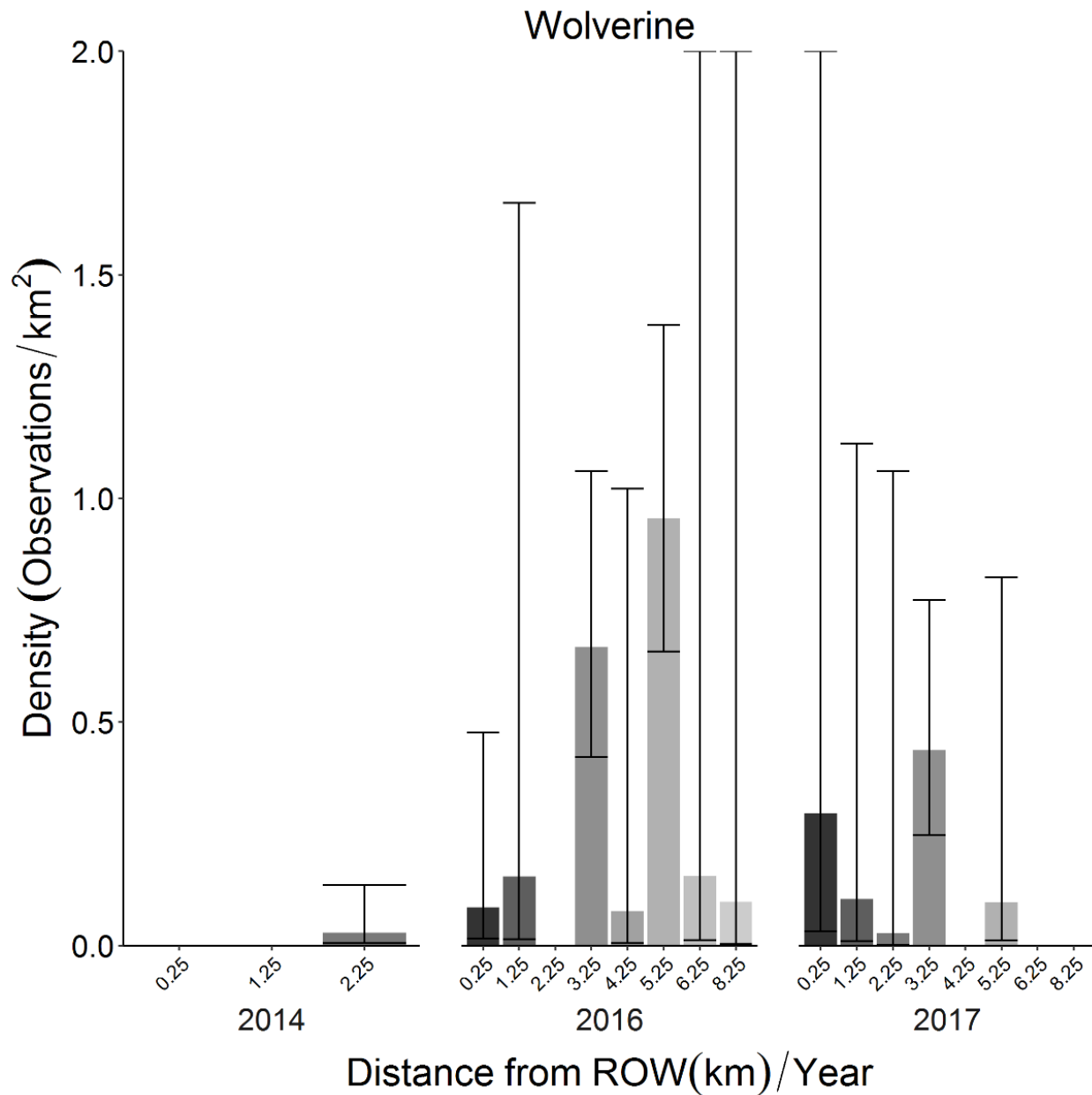




**Figure 5-6-16: Density of White-tailed Deer Observations as a Function of the Distance to the Project ROW**

Estimated density and 95% confidence limits of white-tailed deer observations with distance from the ROW. For visualization purposes, upper confidence limits were constrained to 10 observations/km<sup>2</sup>.





**Figure 5-6-17: Density of Wolverine Observations as a Function of the Distance to the Project ROW**

Estimated density and 95% confidence limits of wolverine observations with distance from the ROW. For visualization purposes, upper confidence limits were constrained to 10 observations/km².





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LEGEND

BPIII Transmission Line Route (labelled at segment divides)

AC Collector Lines

Ecozone Boundaries

Wolverine Occurrences, by year

W

2014

W

2015

W

2016

W

2017

NOTES:

- Background topographic map extracted from ESRI online basemap services
- Wolverine occurrence data is a combination of trail camera data, ground transect data, and aerial survey data.

Datum: NAD83  
Projection: UTM Zone 14N

**MANITOBA HYDRO BIPOLE III  
TRANSMISSION PROJECT**

**Wolverine Winter Distribution in  
Relation to the Project ROW during  
Construction, 2015 and 2016**

PROJECT N<sup>o</sup>: WX17393

FIGURE: 5-8-1

SCALE: 1:2,150,000

DATE: March 2018



## **6.0 ADAPTIVE MANAGEMENT**

Adaptive management is a core approach to implementation of the Bipole III Environmental Protection Plan (EPP) responsive to ongoing evaluation of predicted versus actual effects accessed through various long-term monitoring activities. Modifications to project activities are informed by assessment of mitigation effectiveness and/or detection of significant effects (after mitigation implementation) through each project phase, and are based on analysis of the monitoring program results.

The passive adaptive management approach is intended to identify where there may be data gaps and how to improve project mitigations (if warranted) and/or the monitoring program over time. This report is intended to provide such recommendations, as well as information for review by the regulatory authorities for informed input based on the monitoring program results.

### **6.1 Commitments Table**

The Bipole III Transmission Project predicted effects and commitments relevant to mammals monitoring are summarized in Table 6-1-1, and were derived from the Bipole III Transmission Project EIS, EPP (MB Hydro 2013), Biophysical Monitoring Plan (MB Hydro 2015), CEC Review / Report (CEC 2013), mitigation plans (MB Hydro 2014), associated technical reports, and EA License conditions.

### **6.2 Monitoring Recommendations**

Recommendations for Year 4 (2017/18) mammals monitoring based on results of analyses of mammal monitoring data sets from previous years are identified in Table 6-2-1. There are no recommendations to alter existing project mitigations to implement in Year 4.



**Table 6-1-1: Mammals Monitoring Commitments Registry – Bipole III Transmission Project**

Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
General	Project	Prevent/minimize adverse environmental impacts and enhance positive impacts; continually improve EMS; meet/surpass regulatory, contractual and voluntary requirements; consider interests and utilize knowledge of affected stakeholders.	MB Hydro Environmental Management Policy - improve environmental performance through annual review of environmental objectives/targets; document/report activities and environmental performance.	All project phases	Implemented, Ongoing
	Project	Provide framework for delivery, management and monitoring of environmental protection measures that satisfy corporate policies and commitments, regulatory requirements, environmental protection guidelines and BMPs and stakeholder input.	Environmental Protection Program.	All project phases	Implemented, Ongoing
	Project	Environmental monitoring - Monitor the project in accordance with pre-defined plans within passive adaptive management framework, including verification of accuracy of EIS predictions, effectiveness of mitigation measures and compliance with project approval terms and conditions.	Biophysical Monitoring Plan (BMP) and Annual Monitoring Report.	All project phases	BMP re-submitted January 2015, Implemented Annual Monitoring Reports were produced and submitted for Year 1 (2014/15) and Year 2 (2015/16).
Environmentally Sensitive Sites (ESS)	Bear / Wolf / Wolverine Dens; Ungulate Mineral Licks	Implement site specific environmental protection measures of any ESS potentially affected by Project construction.	Mitigated known sites during planned routing to avoid disturbance.	Construction	Completed
			Stakeholder consultation and ATK process to identify known sites.	Pre-construction and Construction	Completed
			Pre-construction surveys (MB Hydro Environmental Monitors and Environmental Consultants) to detect potential ESS conflicts.	Pre-construction	Completed
			Planned winter construction and minimized footprint to avoid sensitive denning periods (timing and buffer restrictions). Site-specific mitigation of any detected sites during construction.	Construction	Implemented, Ongoing – Construction to be completed in 2018



Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
Mammal VECs	Project (N1 – N4)	Avoid wildlife disturbance during sensitive periods (denning, calving) and/or sites (dens, mineral licks) using timing windows and disturbance buffers.	Monitor pre- and post-construction disturbance and operational phases for effects on mammal VECs and ESSs at appropriate spatial scale for duration of the monitoring period as outlined in the Biophysical Monitoring Plan and associated annual work plans.	Construction, Operation	Implemented, Ongoing
	Project	Mitigate mammal VEC-vehicle collisions during construction phase using speed limits and access controls.	MB Hydro Environmental Monitors - Monitor occurrence to determine if reduced speed limits or access control required.	Construction, Operation (up to 5 years or until suitable knowledge acquired)	Implemented, Ongoing
	Project	Mitigate habituation of wildlife to humans.	No feeding of wildlife by project personnel, proper food storage and waste disposal to avoid attracting wildlife.	Construction	Implemented, Ongoing
	Project (N1 - N4)	Monitor mammal VEC populations.	Monitor effects of project on mammal VECs within the project zone of influence for project-related change in population size and/or range occupancy.	All project phases per BMP	Implemented, Ongoing
Ungulate VECs	Project	Prevent effects of potential increased disease/parasite transmission within and among ungulate species within project zone of influence.	Monitor disease/parasite (i.e., <i>P. tenuis</i> ) occurrence prevalence for ungulate populations in the project area, including ingress of white-tailed deer along project ROW.	All project phases per BMP	Survey conducted February 2017; results are presented in this report
Boreal Woodland Caribou	Caribou ranges intersected by the project (P-Bog, N-Reed, Wabowden)	Mitigate sensory disturbance during calving and rearing in calving areas during construction.	Winter construction to avoid sensitive calving / rearing period.	Construction	Implemented, Ongoing – Construction will be complete in 2018
		Access management during construction phase – to mitigate sensory disturbance and functional habitat loss during construction.	Monitor human use of ROW on core summer and winter areas. Mitigate via access control methods (gates, slash-rollback, ditching, trenching, tree-planting, and accelerated revegetation) to limit recreational ATV/UTV/snowmobile use of the ROW in core winter areas and known/potential calving areas).	Construction	Implemented, Ongoing - Construction will be complete in 2018
		Mitigate sensory disturbance, functional habitat loss, and temporary range fragmentation during construction.	Locate ancillary access and staging areas to avoid core use areas and accelerate natural habitat recovery (tree planting) to establish natural low-growing vegetation (security	Construction	Implemented, Ongoing - Construction will be complete in



Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
			cover) to encourage movement across the ROW		2018
		Maintain landscape function to facilitate caribou movement within core winter range.	Develop natural vegetation corridors at strategic locations on the ROW by maintaining naturally low tree cover (Black Spruce and Larch Tamarack) in core winter range affected by the project.	Construction, Operation	Implemented, success evaluated and presented in the annual mammals monitoring reports
		Long-term monitoring of populations (recruitment, mortality, disturbance effects, range fragmentation, occurrence and distribution).	Satellite telemetry study (occupancy, mortality investigation)	Construction, Operation (4 years post-construction)	Implemented, Ongoing
			Aerial surveys (recruitment, occurrence and distribution), non-invasive genetic sampling (population estimation).	Construction, Operation (≤25 years or until sufficient knowledge acquired)	Implemented, Ongoing
		Monitor project related changes in predation risk and/or altered predator-prey dynamics. Mitigate project-related predation risk from wolves and black bear.	Monitor predator (wolf, black bear) occurrence in caribou ranges to determine changes in predator use of the ROW and increased predation (winter aerial surveys, IR camera traps, winter track transects, telemetry collar mortality investigations). Mitigate during construction using minimal disturbance techniques to maintain natural low vegetation cover, winter construction to limit disturbance and accelerate vegetation regeneration, and snow trail compaction to discourage movement efficiency and line of sight.	Construction, Operation (≥2 years post-construction pursuant to sufficient knowledge acquired)	Implemented, Ongoing
			Conduct late winter annual inspection of project infrastructure to avoid creating packed snow trails to facilitate predator use.	Operation	Pending
		Hunting Mortality – minimize and mitigate.	Prohibit hunting and firearm use by project personnel during construction.	Construction	Implemented, Ongoing
			Access control in winter core areas (in collaboration with MB Gov) during construction and operation.	Construction, Operation	Implemented, Ongoing



Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
Forest-tundra / Barren-ground Caribou	Cape Churchill, Pen Islands and Beverley-Qamanirjuaq Populations	Mitigate sensory disturbance/functional habitat loss.	Access control (cooperatively developed with MB Gov). Monitor proximity of populations during construction phase using existing telemetry collars (Cape Churchill and Pen Islands populations), local knowledge (all populations) and/or aerial surveys to assess numbers, concentrations and proximity to construction.	Construction	Implemented, Ongoing
		Hunter harvest – avoid excessive project related harvest during significant migration events.	MB Hydro work cooperatively with MB Gov to develop an Access Management Plan, hunting closures, hunter education. MB Hydro to prohibit hunting and use of firearms by project personnel in work camps to minimize caribou mortality.	Construction	Implemented, Ongoing
Moose	ROW (N1-N4) including site access roads Keewatinooow Converter Station Sensitive moose ranges (Tom Lamb WMA / GHA8, Moose Meadows / portion of GHA14 and Pine River / GHA14A/19A)	Mitigate sensory disturbance during calving and rearing in calving areas during construction.	Winter construction to avoid sensitive calving period and sensitive areas/habitats.	Construction	Implemented, Ongoing
		Access management during construction phase – to mitigate sensory disturbance and functional habitat loss during construction.	Monitor human use of ROW on core summer and winter areas. Mitigate via access control methods (gates, slash-rollback, ditching, trenching, tree-planting and/or accelerated revegetation) to limit recreational ATV/UTV/snowmobile use of the ROW in sensitive moose ranges. Decommission temporary construction access upon completion.	Construction	Implemented, Ongoing
		Pre-construction surveys to locate sensitive sites (i.e., mineral licks).	Concurrent with aerial wildlife surveys, baseline studies, ATK consultation and MB Hydro Environmental Monitor duties.	Pre-construction	Completed
		Hunting Mortality – minimize project-related contribution to hunting mortality	Prohibit hunting and firearm use by project personnel during construction. Monitor project access by hunters using remote IR cameras at major access points and along the ROW.	Construction, Operation (5 years post-construction pursuant to sufficient knowledge acquired)	Implemented, Ongoing
		Vehicle collision mortality	Access control (in collaboration with MB Gov).	Construction, Operation	Implemented, Ongoing
		Predation Risk: - Monitor project related changes in predation risk and/or altered	Monitor predator (wolf, black bear) occurrence in caribou ranges to determine changes in predator use of the ROW and	Construction, Operation	Implemented, Ongoing



Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
		predator-prey dynamics. - Mitigate project-related predation risk from wolves and black bear.	increased predation (winter aerial surveys, IR camera traps, winter track transects, telemetry collar mortality investigations). Mitigate during construction using minimal disturbance techniques to maintain natural low vegetation cover, winter construction to limit disturbance and accelerate vegetation regeneration, and snow trail compaction to discourage movement efficiency and line of sight.		
			Conduct late winter annual inspection of project infrastructure to avoid creating packed snow trails to facilitate predator use.	Operation	Pending
	Sensitive Moose Ranges	Habitat loss and fragmentation – avoid / minimize.	Apply minimal disturbance techniques via winter clearing, selective cutting, avoidance of unrequired shear-blading, removal of danger trees (>17 m tall) to reduce line of sight, impair predator and hunter use of ROW as a travel corridor, and facilitate wildlife movement across the ROW.	Construction	Complete
		Long-term monitoring of populations (recruitment, mortality, disturbance effects, range fragmentation, occurrence and distribution).	Monitor sensitive moose ranges using a combination of, aerial surveys (recruitment, population structure, abundance, occurrence and distribution), remote IR camera studies and/or winter ground transects.	Construction, Operation (≤25 years or until sufficient knowledge acquired)	Implemented, Ongoing
Elk	C1, N4	Mitigate construction–related disturbance effects.	Monitor elk-vehicle collisions, excessive harvest and disease risk (related to potential encroachment of white-tailed deer spread of <i>P. tenuis</i> ).	Construction	Implemented, Ongoing
White-tailed Deer	C1, N4, N3, N2	Monitor white-tailed deer distributions and prevalence of brainworm ( <i>P. tenuis</i> ) along the Bipole III transmission line.	Pellet collection for <i>P. tenuis</i> detection / prevalence. White-tailed deer ingress along ROW via annual species distribution/recruitment surveys in woodland caribou ranges, winter ground transect surveys, trail camera traps, multi-species aerial survey and deer distribution survey of <i>P. tenuis</i> surveillance blocks.	Construction, Operation (4 years post-construction)	Implemented, Ongoing



Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
Gray Wolf	C1, N4, N3, N2, N1	Monitor project-related changes in predator-prey dynamics (wolf use of the ROW).	Expand / enhance studies on wolf populations / distribution and predation of boreal caribou within the Project Study Area. Accomplished using occurrence/distribution surveys concurrent with caribou and moose aerial surveys, telemetry collar mortality investigations, as well as remote IR camera trap studies and winter ground transect survey conducted along the ROW.	Construction, Operation	Implemented, Ongoing
Black Bear	Project	Monitor incidents of human-bear encounters during construction, or from attractants (feeding, lack of proper food storage or waste disposal).	Document incidents and report annually; identify corrective actions.	Construction	Implemented, Ongoing
		Monitor project-related changes in predator-prey dynamics (black bear use of the ROW).	Conduct studies on black bear population, distribution and predation on boreal caribou in affected caribou ranges within the Project study area; accomplished via trail camera traps, and caribou telemetry collar mortality signal investigation.	Construction, Operation	Implemented, Ongoing
Furbearers	45 Registered Traplines	Monitor change in trapping harvest resulting from increased access or sensory disturbance from the Project.	Monitor annual furbearer harvest statistics obtained from MB Gov for each trapline Initiate community trapline monitoring program.	Construction, Operation (3 years post-construction)	Implemented, Ongoing
	Beaver	Minimize sensory disturbance.	Mitigate local effects of sensory disturbance by use of riparian buffers at ROW crossings during clearing and maintenance activities. MB Hydro environmental monitors to monitor ROW at water crossings (within 200 m buffer of ROW) for beaver presence.	Construction	Implemented, Ongoing
	American Marten	Minimize sensory disturbance.	Clear ROW during winter months to lessen disturbance of female marten and their young. Access control (restrict recreational and public access during construction), including routing to minimize loss of forest cover in marten habitat.	Construction	Implemented, Ongoing
		Minimize project-related harvest mortality.	Monitor trapper harvest.	Construction, Operation (3 years post-construction)	Implemented, Ongoing



Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
	Wolverine	Avoid disturbance of denning sites during construction phase.	Mitigate by clearing in wolverine range (>53°N Lat.) during winter when dens not active Mitigate any denning sites (if found).	Construction	Implemented, Ongoing
		Minimize project-related harvest mortality.	Monitor trapper harvest.	Construction, Operation (3 years post-construction)	Implemented, Ongoing



**Table 6-2-1: Bipole III Transmission Project - Mammals Monitoring Program Recommendations**

Wildlife VEC	Recommendation	Project Monitoring Commitment
Boreal Woodland Caribou	<b>Capture-Mark-Recapture (CMR) Sampling</b> using Non-invasive Genetic Survey (NGS) methods – repeat sampling in all monitored boreal woodland caribou study areas in Year 5 (2018/19) to monitor population performance (abundance trend, lambda, pregnancy rate) through each project phase (construction, operation); reassess sampling frequency after Year 5 (2018/19) analyses are completed.	Monitor periodically up to 25 years or until suitable knowledge is acquired
	Continue annual winter <b>Woodland Caribou Recruitment Surveys</b> (aided by telemetry relocations) and concurrently conduct <b>Ungulate-Wolf Winter Distribution Surveys</b> in all four monitored woodland caribou study areas to monitor for changes in mortality risk, population demography (i.e., calf recruitment, population structure), white-tailed deer ingress (P-Bog Range), and altered predator-prey dynamics.	Monitor recruitment annually for 3-4 years post-construction Monitor predator-prey dynamics for a minimum of 2 years post construction
	<b>Woodland Caribou Telemetry Study</b> - Continue to acquire boreal woodland caribou telemetry locations in each monitored caribou study area to evaluate behavioural responses to the Project, the effectiveness of vegetation leave areas, and to monitor adult female boreal woodland caribou survival rates and mortality sources through telemetry collar mortality investigations. Maintain an average sample of 20 collars/study area.	Monitor habitat effects continuously for 3-4 years post-construction
Forest-tundra and Barren-ground Caribou	Continue monitoring for proximity and concentrations of Pen Islands, Cape Churchill and Qamanirjuaq caribou to the Project ROW (construction segment N1) during the winter construction phase with respect to sensory disturbance via incidental reports from Project Environmental Monitors and Project staff, and via community consultation, and from MB Gov communications	Monitor annually during construction
Moose	Continue to acquire moose <b>population survey data</b> from MB Gov, MB Hydro, SK Gov and Riding Mountain National Park to track trends (population state and vital rates) of sensitive moose populations (i.e., Tom Lamb/GHA8, Moose Meadows, Pine River/GHA14A/19A) intersected by the ROW relative to adjacent reference populations and relative to past population performance.	Monitor up to 25 years or until sufficient knowledge is acquired
	Continue to collect <b>moose occurrence / range occupancy data</b> via <b>Ungulate-Wolf Distribution Survey</b> and <b>Multi-species Distribution Survey</b> to inform the predator-prey dynamics analysis, and to monitor for project-related changes in predation risk relative to the ROW.	Monitor range occupancy up to 25 years post construction or until suitable knowledge is acquired Monitor predator-prey dynamics and vital rates up to 5 years post-construction, or until suitable knowledge is acquired
	Continue to monitor functional habitat availability (effects of ROW on moose occurrence) from various survey data sets ( <b>Multi-species Aerial Survey, Ungulate-Wolf Distribution Survey, Remote Camera Trap Study, Winter Ground Track Transect Survey, MB Gov Moose Surveys of GHAs</b> intersected by the project).	Monitor annually up to 3 years post-construction
	Discontinue monitoring for presence of mineral licks potentially affected by the ROW construction. No mineral licks were detected via systematic surveys or incidental detection during project activities or from local knowledge with respect to potential effects from the project.	Assess for conflicts pre-construction and during construction
Deer and Elk	Continue to collect white-tailed deer and elk occurrence data via various methods ( <b>Ungulate-Wolf</b>	Monitor distribution during construction



Wildlife VEC	Recommendation	Project Monitoring Commitment
	<b>Distribution Surveys</b> in woodland caribou ranges, the <b>Multi-species Distribution Survey</b> of the Bipole III ROW, opportunistic surveys in <i>P. tenuis</i> surveillance blocks, <b>Winter Ground Track Transect Survey</b> , and <b>Remote Trail Camera Study</b> to monitor for ingress of white-tailed deer into woodland caribou ranges and potential mortality-risk to elk from hunter harvest as a consequence of project-related access.	and for 4 years post-construction
	<b><i>P. tenuis</i> monitoring</b> - Repeat the community ground-based deer pellet collection in Year 8 (2021/22) in both <i>P. tenuis</i> surveillance areas to assess potential of change prevalence of spiney-tailed larvae shed by deer proximate to the ROW (N2 and N3 construction segments).	Assess during construction and repeat 2-5 years post-construction
Wolf and Black Bear	Continue to collect wolf winter occurrence data via the annual <b>Ungulate-Wolf Distribution Survey</b> to monitor for landscape scale changes in predation-risk to woodland caribou and moose.	Monitor predator-prey dynamics during construction and up to 4 years post-construction
	Continue use of the Remote Camera Trap Study and Winter Ground Track Transect Survey to monitor for local scale changes in use of the ROW by wolf and black bear	Monitor predator-prey dynamics during construction and up to 4 years post-construction
Furbearers	<b>Winter Ground Track Transects</b> – Continue sampling winter transects having remote trail cameras deployed (n = 40 transects in N1-N4 construction segments), and opportunistically sample >10 additional transects (selected at random, subject to available budget) to improve statistical power for analyses of additional furbearer species (i.e., ermine/weasel, fox, wolf, lynx and red squirrel). Some furbearer species (i.e., black bear, coyote, mink, muskrat, otter, beaver, wolverine) cannot be effectively sampled in winter because they are locally rare in the survey area, are wide ranging, hibernate, or are semiaquatic. As of Year 2, sampling effort was at a sufficient level for fisher/marten and hare to assess occurrence as a function of distance from the project.	Monitor barrier effects of the ROW up to 3 years post-construction
	<b>Remote Camera Trap Study</b> – Continue annual sampling to collect occurrence data at local scale	Monitor barrier effects of the ROW up to 3 years post-construction
	<b>Wolf and Wolverine</b> - Continue collecting occurrence data for wide ranging/rare fur-bearers via winter aerial survey efforts concurrent with the <b>Woodland Caribou Recruitment Survey</b> , <b>Winter Ground Track Survey</b> , <b>Remote Trail Camera Study</b> , and <b>Multi-Species Aerial Survey</b> to inform evaluation of Project effects at local and landscape scales.	Monitor predator-prey dynamics during construction and up to 4 years post-construction
	<b>Wolverine, Black Bear, Wolf ESS detection</b> – Continue passive monitoring to detect dens and rendezvous sites during winter construction.	Mitigate any ESS detected during Construction
	<b>Fur Harvest Statistics</b> - Continue to collect fur harvest statistics from MB Gov and the MB Hydro <b>Community Trapline Harvest Study</b> to monitor for changes in furbearer harvest amounts and harvest rates in traplines interacting with the ROW.	Monitor changes in in trapping mortality up to 3 years post-construction
Human Access	Continue use of the Remote Trail Cameras along the ROW and at major project access points to monitor seasonal use of the ROW by local resource users.	Monitor during construction and up to 5 years post-construction



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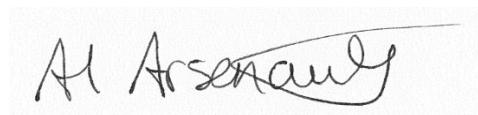
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## 8.0 CLOSURE

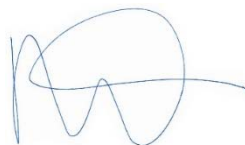
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The findings of this report were prepared in accordance with generally accepted professional scientific principles and practice. No other warranty, expressed or implied, is given. The findings of this report are based on data acquired from specific survey designs specifically applied in the Bipole III Mammals Monitoring Program, information provided by the proponent, information provided by the Government of Manitoba, and from publically available information sources.

Prepared by:

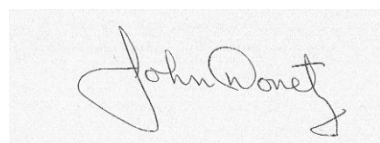


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