Oct 31/12
AM

Bipole III- Manitoba Hydro

MOOSE

Manitoba Hydro

wildlife

Joro Consultants

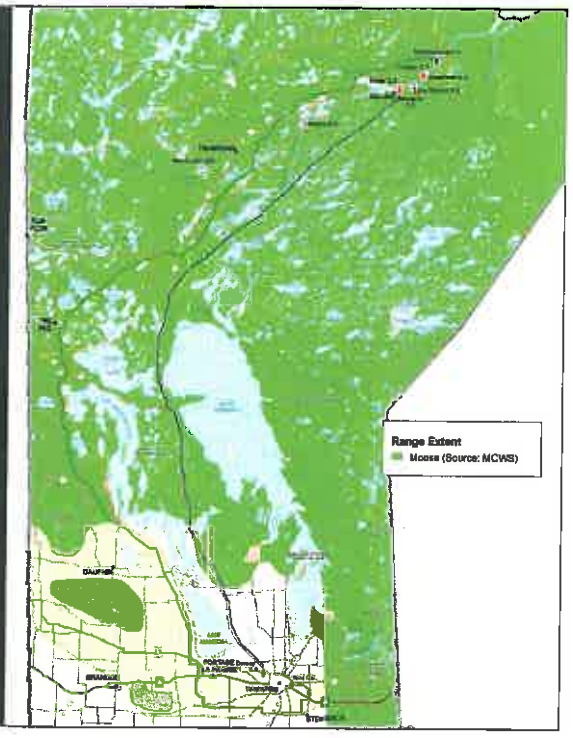
Outline

- Moose as a VEC
- Life history of moose
- Overview of moose management
- Alternate route evaluation
- Evaluation of the FPR
- Conclusions

Moose as a VEC

- Moose are important for rights-based and recreational hunting
- Important to First Nations and Metis for personal and community sustenance and cultural enhancement
- Important ecological role
  - Moose habitat reflects habitat needs for 80% of boreal forest wildlife

- Moose range in Manitoba



Moose

- Variety of habitat requirements over their home range (10-40 km^{2+})
  - Winter and summer cover
  - Winter and summer food (aquatics)
  - Reproductive
  - Important sites (mineral licks)

Moose

- Winter and summer cover
  - Dense coniferous and deciduous forest providing protection from elements and predators for escape
  - Late winter cover important
  - Lowlands/wetlands important during summer
- Winter and summer food (aquatics)
- Reproductive
- Important sites (mineral licks)

Moose

- Winter and summer cover
- Winter and summer food (aquatics)
  - Young deciduous and mixed forest providing high quality and abundant browse – aspen, willow, hazel, dogwood, maple etc.
  - Aquatic feeding areas important for lactation, antler growth, building reserves for winter, cooling and relief from insects
- Reproductive
- Important sites (mineral licks)

Moose

- Winter and summer cover
- Winter and summer food (aquatics)
- Reproductive
  - Dense habitat with escape routes, islands and peninsulas important, bogs, wetlands
- Important sites (mineral licks)

Moose

- Winter and summer cover
- Winter and summer food (aquatics)
- Reproductive
- Important sites (mineral licks)
  - Where found, used extensively to supplement mineral needs of moose and other ungulates

Factors affecting moose populations

- Habitat
- Hunting
- Predation
- Weather
- Disease and parasites

Factors affecting moose populations

- Habitat
  - Interspersion of food and cover (proximity)
  - Quality and abundance of browse
  - Prefer disturbed habitats, respond to new growth from fires and forest harvest and renewal
  - Response from forest fire can last 20 + years then habitat degrades
  - Mature mixed forests (white spruce/aspen) with riparian areas offer long lived high quality year round habitat (shrub associations)
- Hunting
- Predation
- Weather
- Disease and parasites

Factors affecting moose populations

- Habitat
- Hunting
  - Moose population response to harvest (hunting) can be positive and negative
    - Bull only, calf/bull
    - Any moose
    - Licensed hunters – historical regulation
    - Rights Based – unregulated - closures
    - Access density across moose range linked to decline
- Predation
- Weather
- Disease and parasites

Factors affecting moose populations

- Habitat
- Hunting
- Predation
  - Predation can affect adult and calf survival
    - In combination with high hunting pressure can further impact populations
    - Habitat fragmentation can increase predation (access, size of patches, distance to cover)
      - Unknown to extent predation affecting populations in Manitoba
    - Predation by wolves and bears (calves) can also result in low calf recruitment
- Weather
- Disease and parasites

Factors affecting moose populations

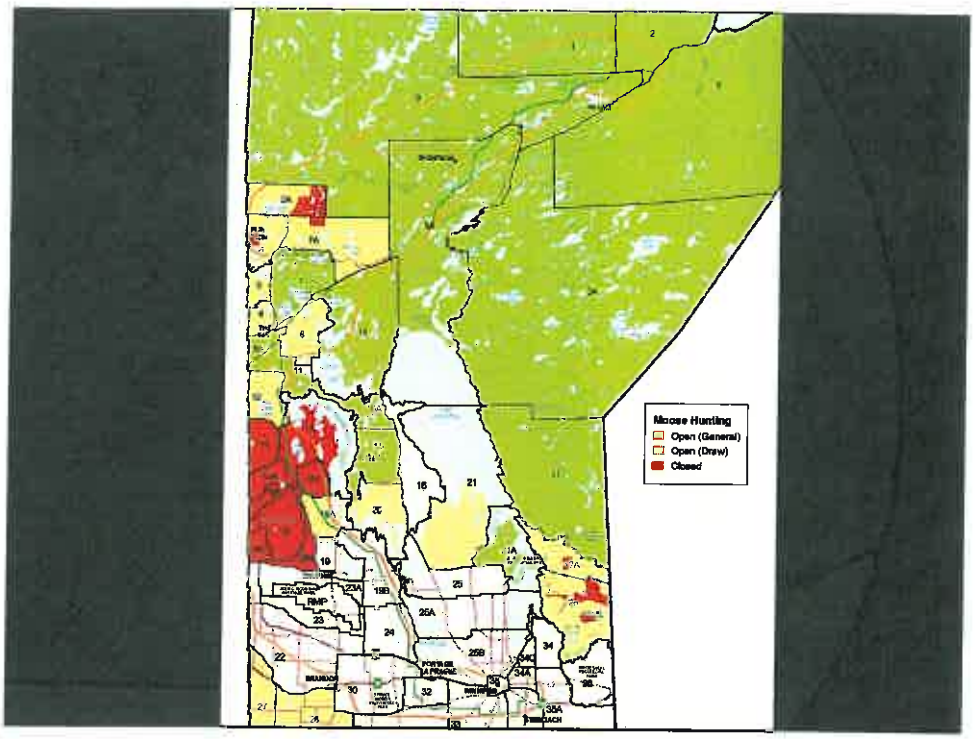
- Habitat
- Hunting
- Predation
- Weather
  - Snow accumulations can alter habitat availability and vulnerability to predators
- Disease and parasites

Factors affecting moose populations

- Habitat
- Hunting
- Predation
- Weather
- Disease and parasites
  - MCWS has not had reports of brainworm or CWD in western Mb.
    - Giant liver fluke
    - Winter ticks

MCWS Moose Management

- Manitoba Conservation (MCWS) is the responsible authority on moose management and hunting
  - Manitoba allocation policy,
    - Conservation
    - Rights based hunting
    - Residents
    - Non residents - outfitters
  - Forest management guidelines used to increase benefit.



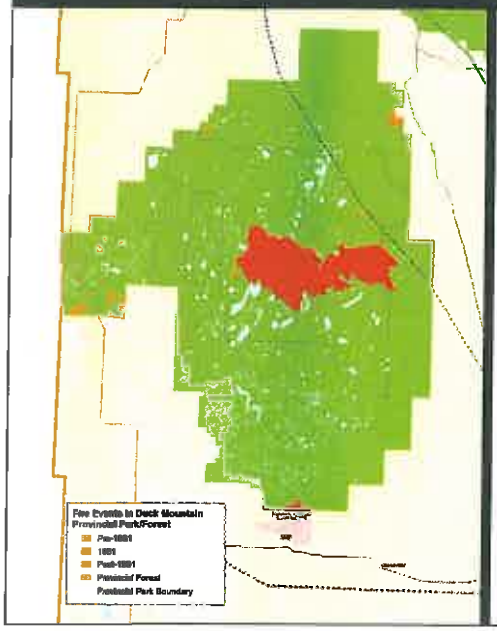
MCWS Moose Management

- Conduct moose surveys periodically
- Consultation with Rights-Based Communities on moose hunting closures
  - GHAs 13, 13A, 14, 14A, 18, 18A, 18B and 18C have been temporarily closed to rights-based-hunting
- Enforcement
  - Addition of two new natural resource officers
  - Increased signage indicating hunting closures
- Wolf Management
  - Extended seasons province wide
  - Increased bag limits in some GHAs
  - Trapper incentives
  - Conducting wolf surveys

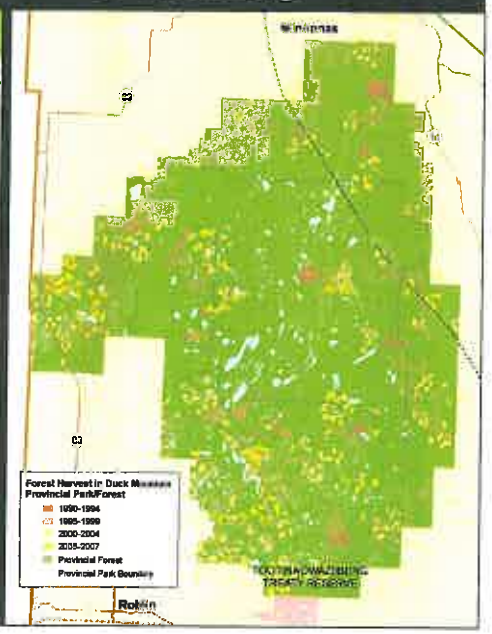
MCWS Moose Management

- Access Control
  - Restricting access and closing roads.
- Established various advisory committees
  - Developing long term moose recovery strategies with rights based hunters and Stakeholders.

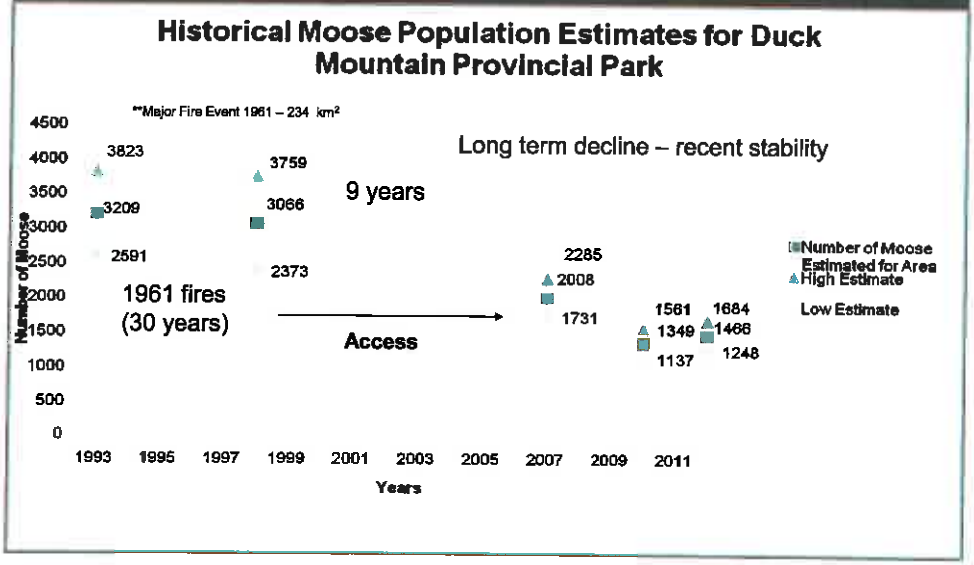
Fire



Forestry



Historical Data: Duck Mountains Provincial Park



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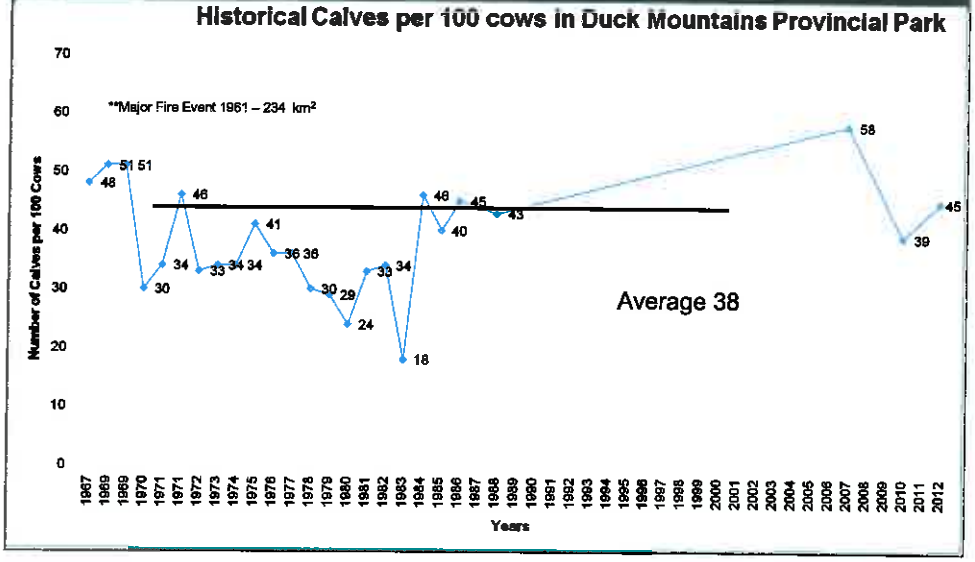
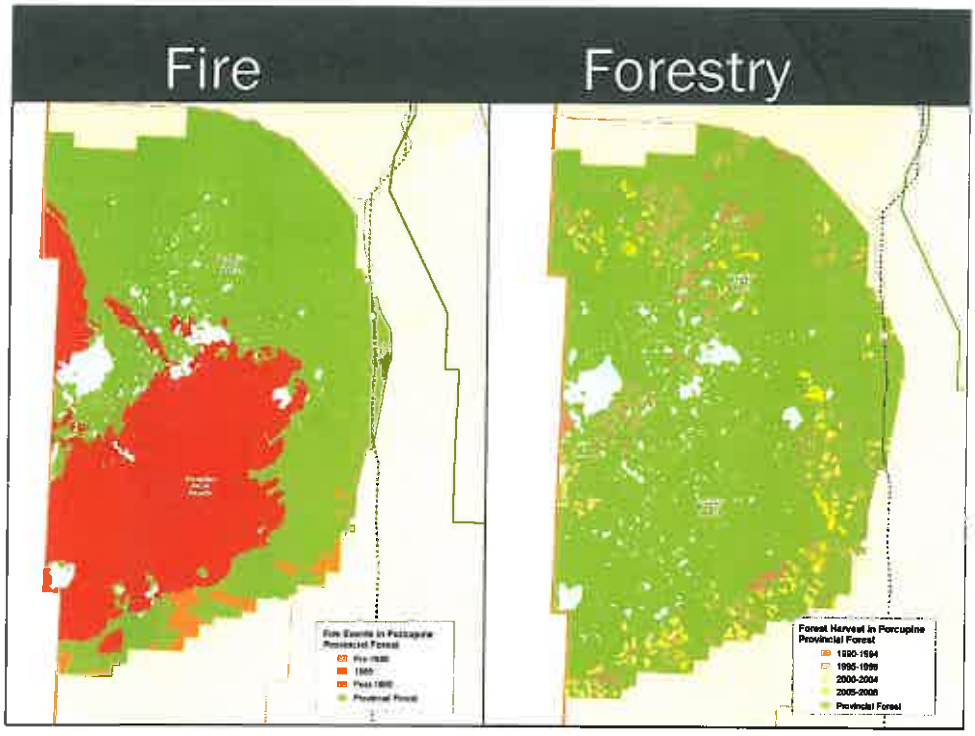
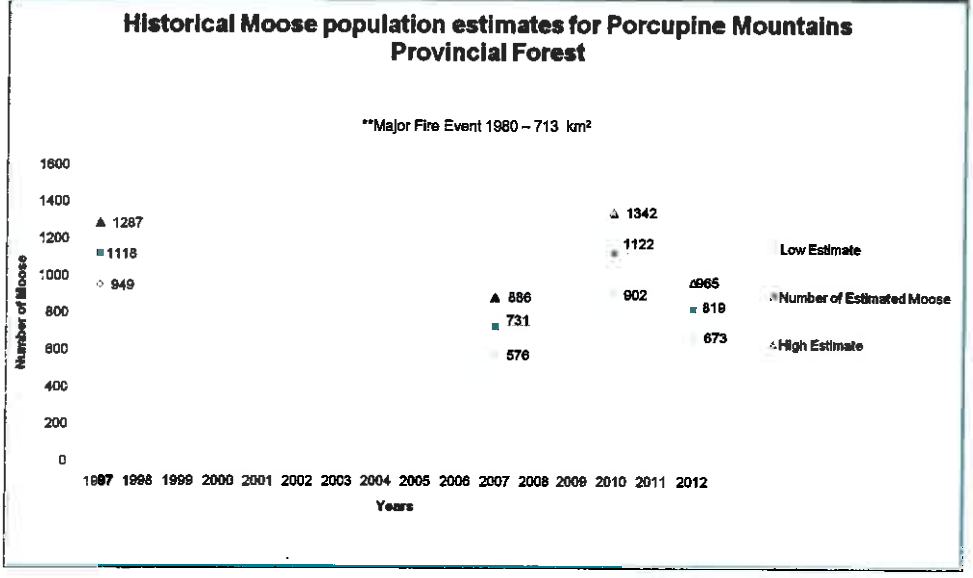
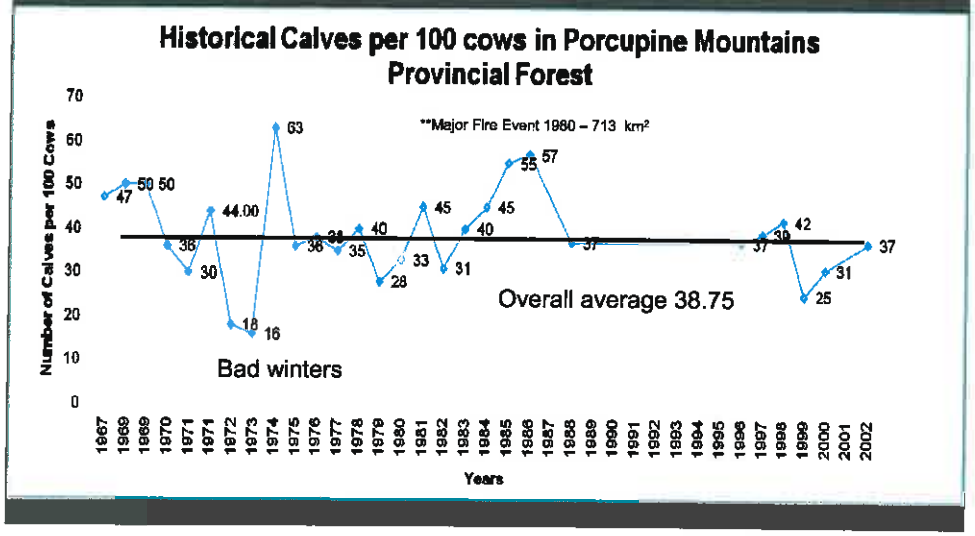


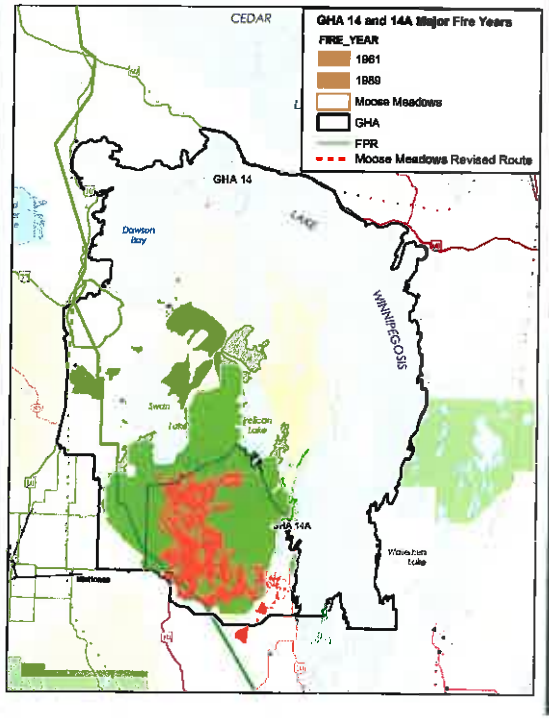


Historical Data: Porcupine Mountains Provincial Forest

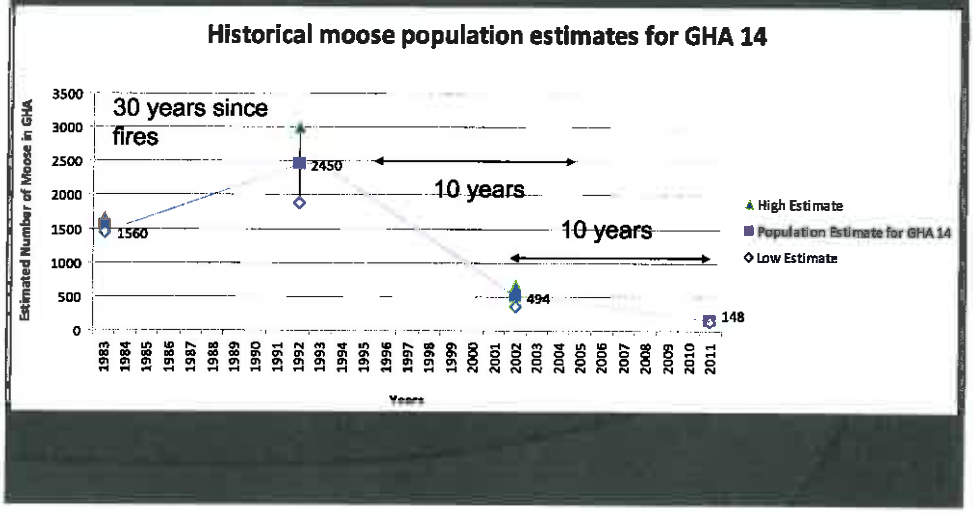


Historical Data: Porcupine Mountains Provincial Forest

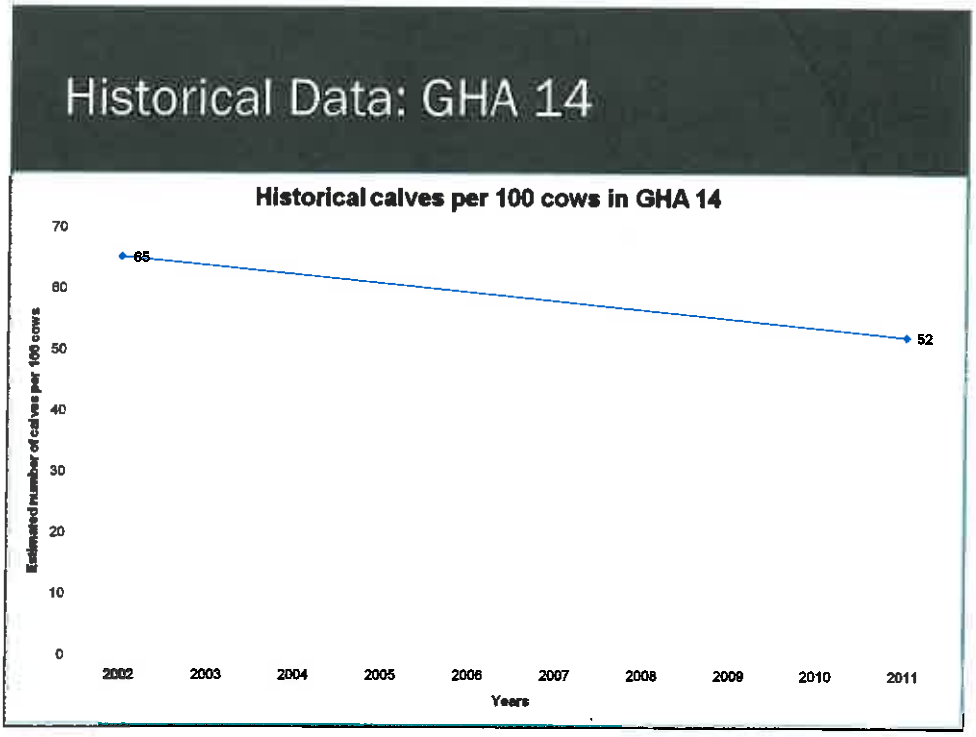




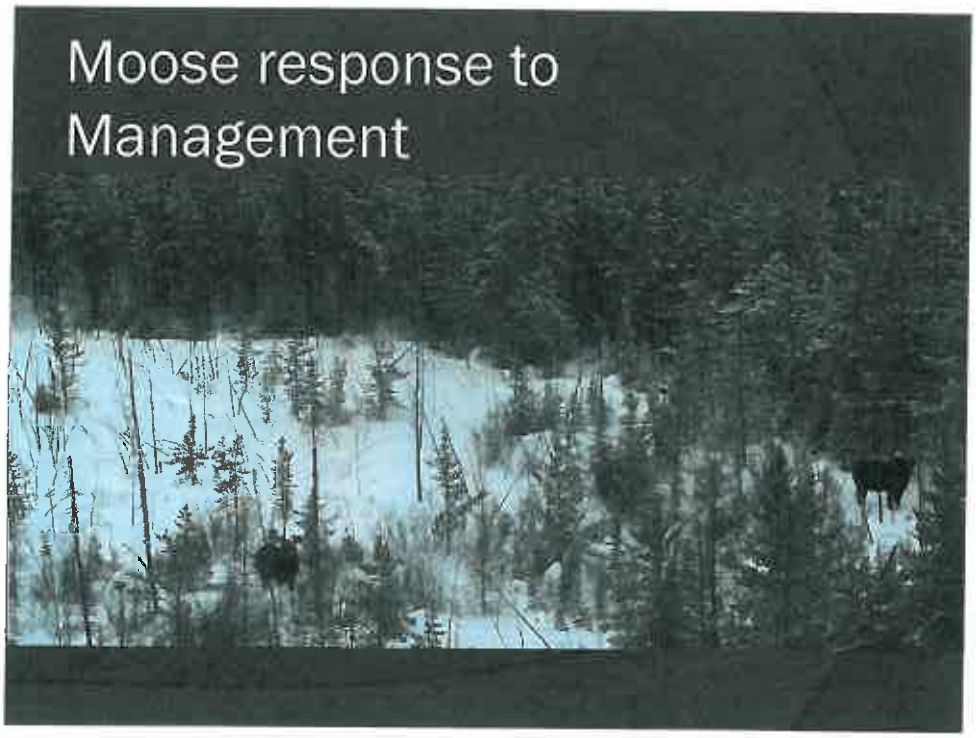
Historical Data: GHA 14



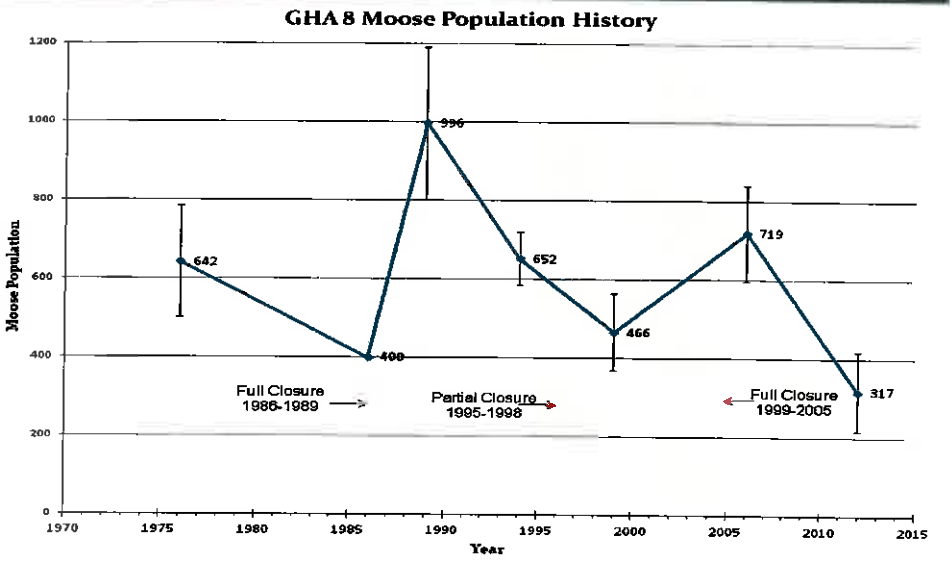
Historical Data: GHA 14



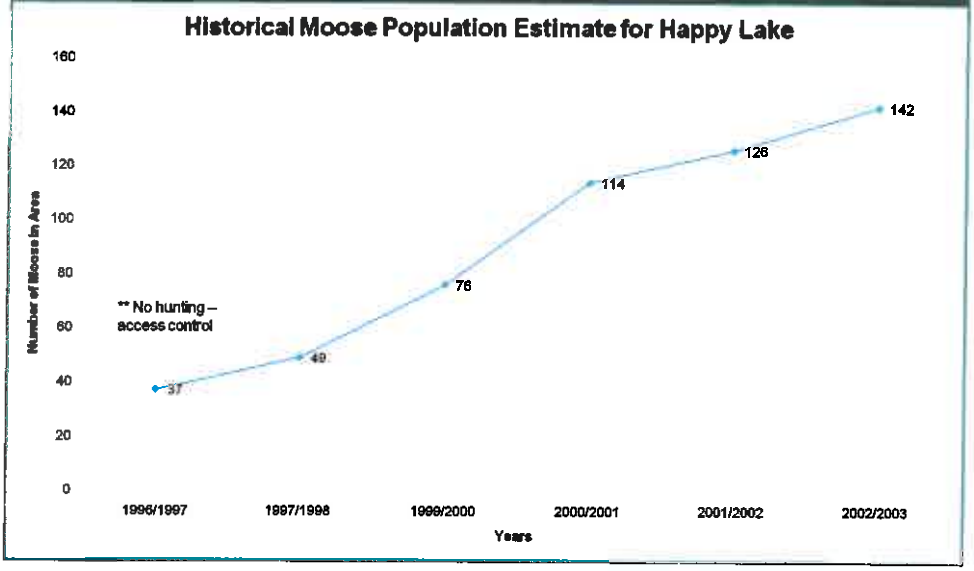
Moose response to Management



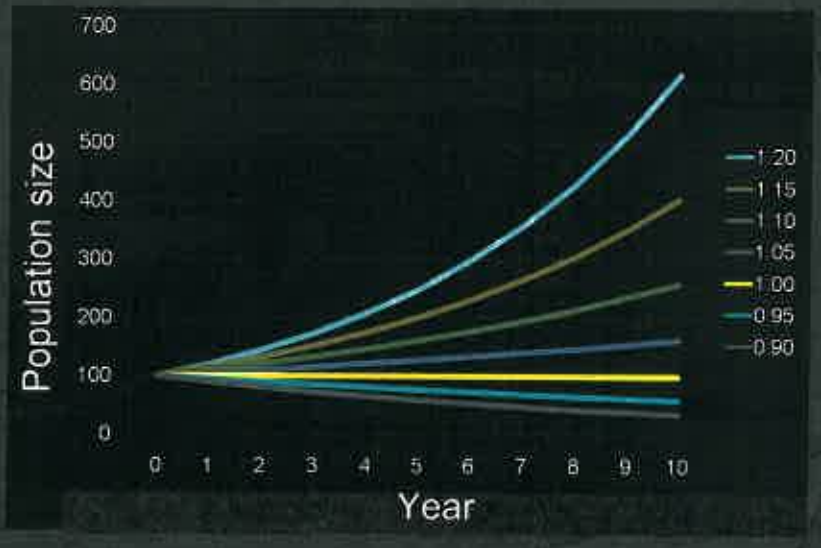
Voluntary Closures GHA 8 The Pas

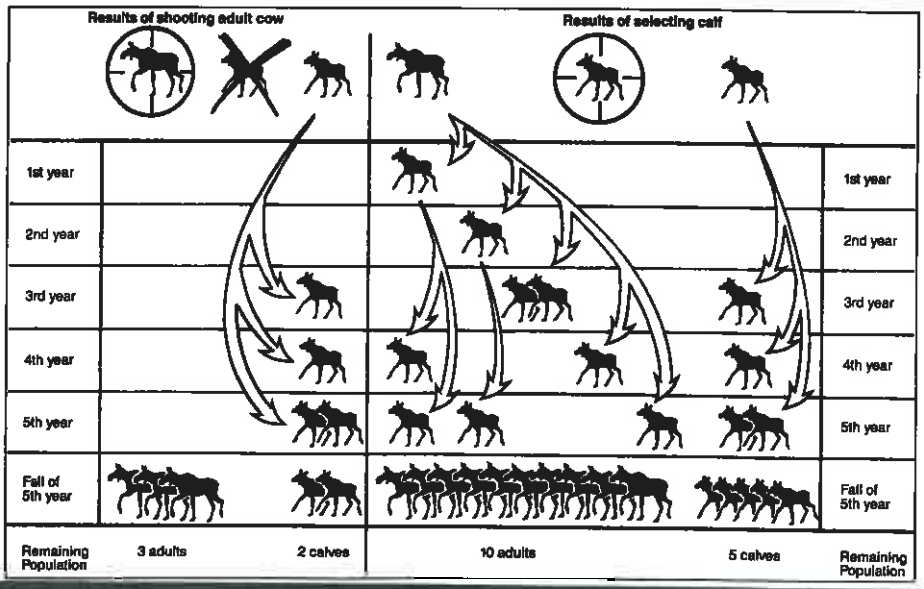


Hunting and Access Closures
Happy Lake – Eastern Manitoba



Potential population growth at various rates





Summary

- Moose have large home ranges compared to area impacted by BPIII ROW
- Many components to moose habitat
- Moose responded to disturbance

Summary

- 5 year increase in Duck Mountain moose population – Decline from 20 year high
- Slight decrease Porcupine moose population – slightly lower than 20 year high
- Cow calf ratios are within historic averages
  - Suggests females in good condition
  - Adequate number of bulls
  - Demonstrates potential for quick population response if hunting closures are successful

Summary Continued

- GHA 14 – 14-A - 20 year declining trend
- Recent MCWS identification of critical nature of concerns for this area.
- Re-routing has occurred in this area (to be discussed in the following sections)

Bipole III –Potential Effects Used in the Evaluation of Alternative Routes

- Habitat Loss
  - Sensory disturbance/fragmentation
- Hunting - Access overharvest
- Predation
- Increase in Parasites and disease

Evaluation of Alternative Routes

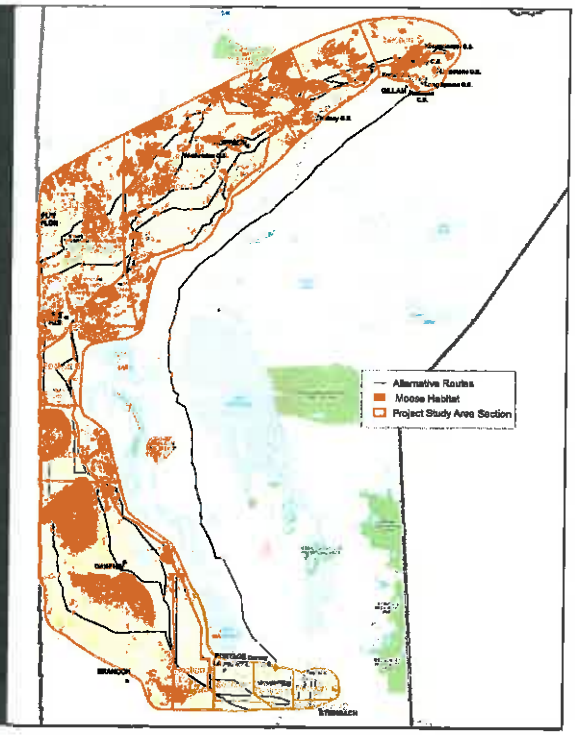
- Field data
- Desktop studies
  - Literature
  - Government information
  - Habitat modeling
- Aerial Surveys

Evaluation of Alternate Routes

- Habitat Loss
- Habitat Modeling
  - High quality winter habitat availability within ecodistricts to determine if habitat was constraining or limiting.
    - Winter most critical (access and hunting concerns)
  - Modelled habitat, in 3 mile Local Study Area, assisted in determining potential environmental effects and focus mitigation efforts

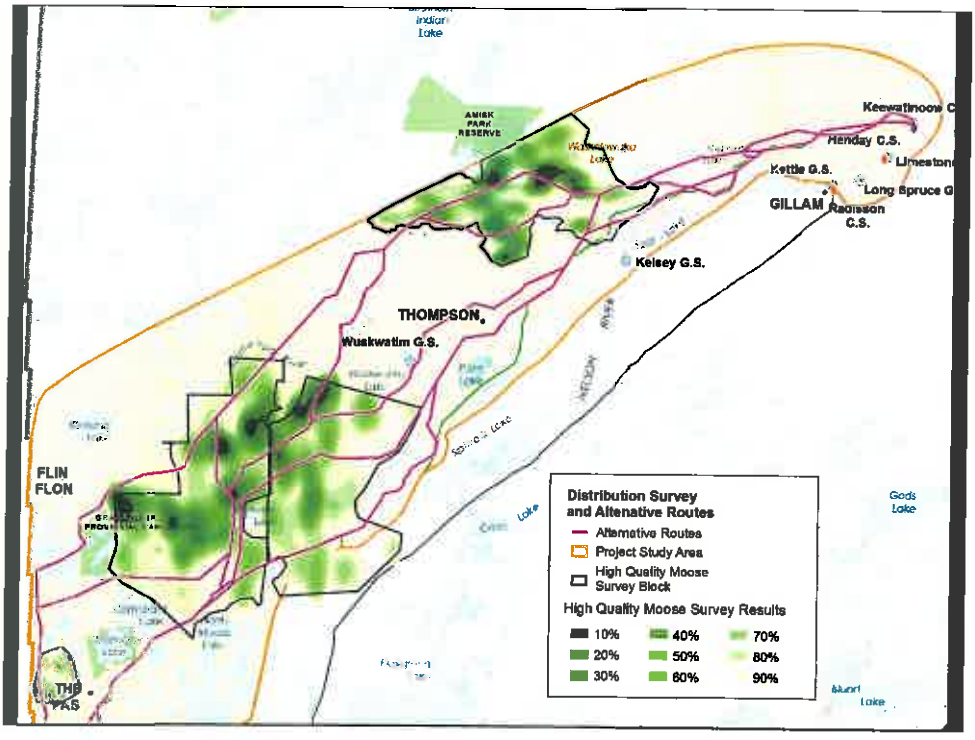
Evaluation of Alternate Routes

- Modeling High Quality Habitat



Evaluation of Alternate Routes

- Aerial Surveys – To identify routes and segments of concern.
  - Northern Project Study Area High Quality Moose Habitat and Winter Aerial Survey Areas:
  - South of Red Deer Lake, known information regarding the importance of the Duck Mountains, Porcupine Hills and GHA 14.
    - Intensive surveys for boreal woodland caribou conducted in 2010 and 2011 in GHA 14 (few moose observed).



Evaluation of Alternate Routes

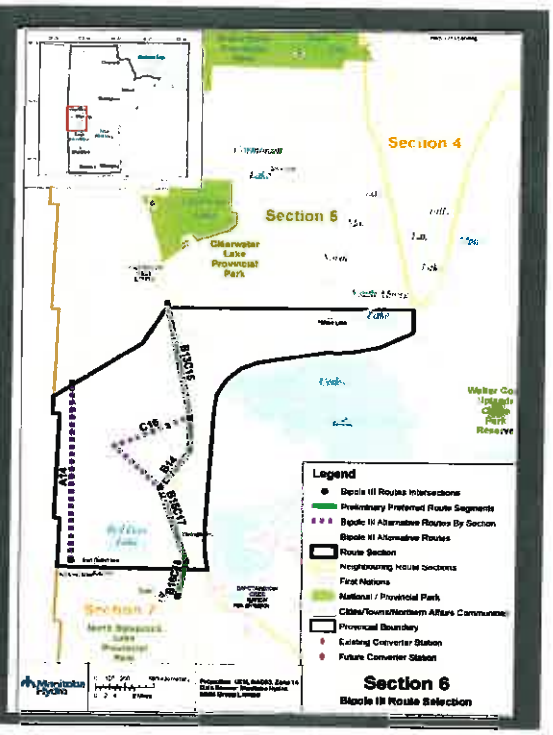
- Routing Considerations
  - Minimize effects through avoidance
  - Parallel existing features where possible
  - Avoid core/ high quality habitat areas
  - Avoid known wintering areas

Assessment of Alternate Routes

- Ranking of the different sections
  - Route Selection Matrix (RMS) assessed the 13 sections using 27 factors and gave a rank of High, Medium or Low (in some cases, Very High also applied)
  - Moose incorporated into overall Mammal ranking

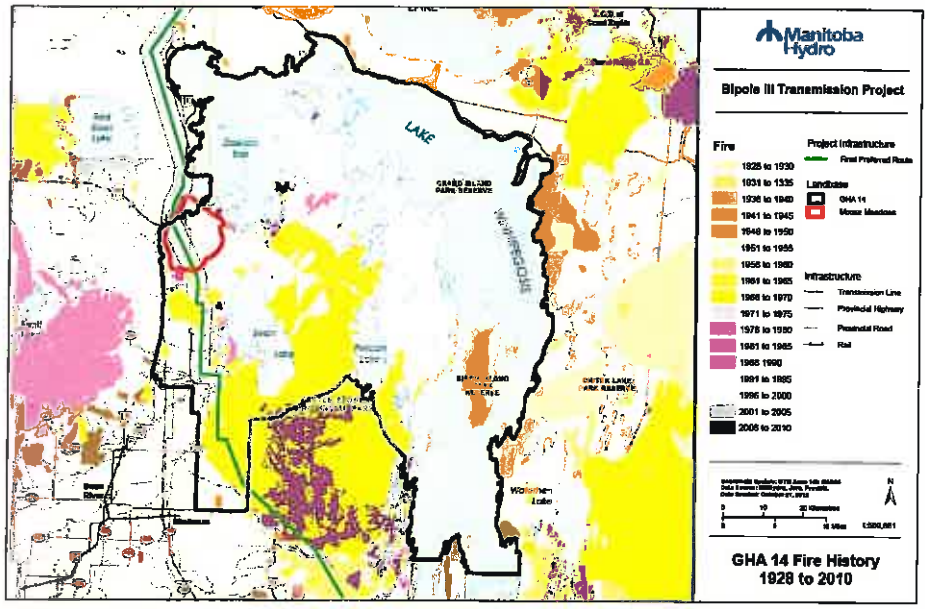
- E.g.) Overall Section 6 was ranked medium for 5/6 segments within the mammals component

SECTION	SEGMENT	Vegetation	Forestry	Birds	Mammals
6	A14	M	L	L	M
6	B14	M	L	L	M
6	B13C15	M	L	L	M
6	B15C17	M	M	L	M
6	B16C18	M	M	L	L
6	C16	M	M	L	M

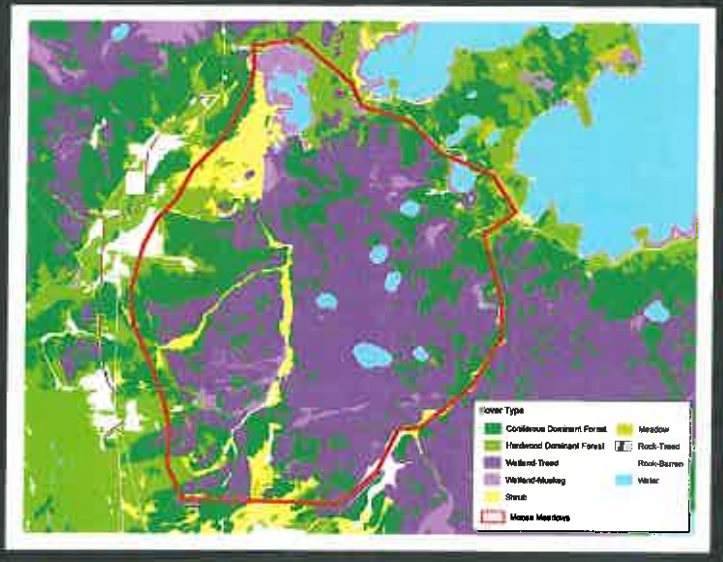


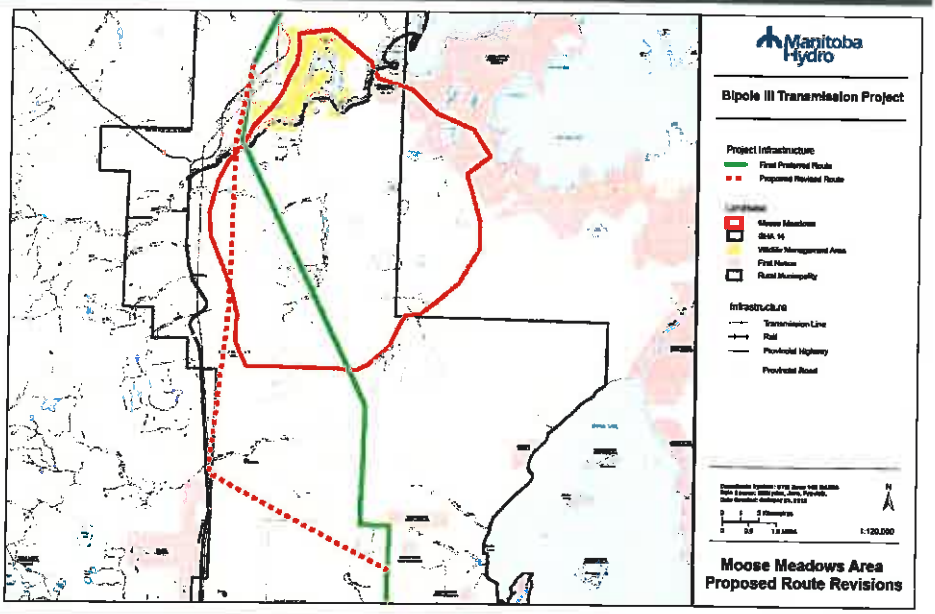
Evaluation of the FPR

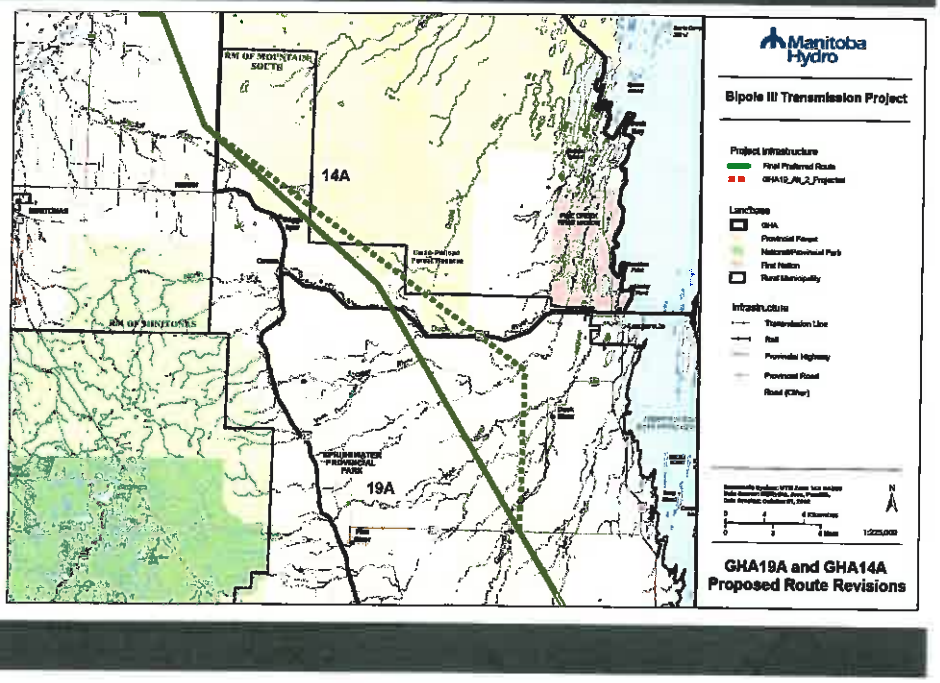
- Amount of habitat alteration small in comparison to availability
- Moose Model
  - The Study Area contains 1,099km² of high quality moose habitat
  - Only 22km² (<2%) would be affected
- Moose Meadows (GHA 14/Section 7)
  - This route avoids high moose populations in the Porcupine Provincial Forest
  - As of August 31, 2012, changes to the FPR have been suggested by EAB for sections in GHA 14A and 19A
  - New routes developed in cooperation with MCWS in these areas



Moose Meadows




Manitoba Hydro
Bipole III Transmission Project
Project Infrastructure
Infrastructure
Moose Meadows Area
Proposed Route Revisions


Manitoba Hydro
Bipole III Transmission Project
Project Infrastructure
14A
19A
GHA19A and GHA14A
Proposed Route Revisions

Evaluation of the FPR

- Routing provided overall mitigation through avoidance (The Pas, Snow Lake, Limestone Lake)
- Parallels existing linear features
- Minimized amount of un-fragmented habitat

Evaluation of the FPR

- Habitat Loss
  - Based on the total life requirement area for moose, the FPR represents a small amount of potentially affected habitat
  - Habitat is not lost but altered and kept at an early stage of development. Will be converted from "cover" to "food"
  - Protection of riparian areas will not result in any alteration to these habitats
  - PSA 1,099 km^2 high quality habitat – FPR only 2% of this

Evaluation of the FPR

- Sensory Disturbance
  - During construction (winter) moose may be displaced temporarily
  - Higher energy costs to moose as a result of displacement (minor)
  - Displaced into poorer habitats (not expected) as habitat not limiting

Evaluation of the FPR

- Increased harvest of moose outside of closed areas due to hunting closures
  - Red-Deer Lake to The Pas FPR parallels existing access
  - Parallels Wuskwatim transmission Line – Rail Line
    - Increased pressure on moose in adjacent areas due to hunting closures will have little effect as areas are currently accessible

Evaluation of the FPR

- Effects of increased predation as a result of linear development
  - Limited evidence in literature of increased predator effects as a result of transmission line ROW:

    Wolf use of linear corridors
    - Evidence from wolf collaring (preference for young forest and water (frozen lakes and rivers)

Evaluation of the FPR

- Parasites and disease
  - WT deer abundant south of Red Deer Lake
  - Habitat limiting for deer north of Red Deer Lake
  - FPR follows existing disturbance corridors
  - No reports from MCWS of Brainworm in moose or elk in western Manitoba

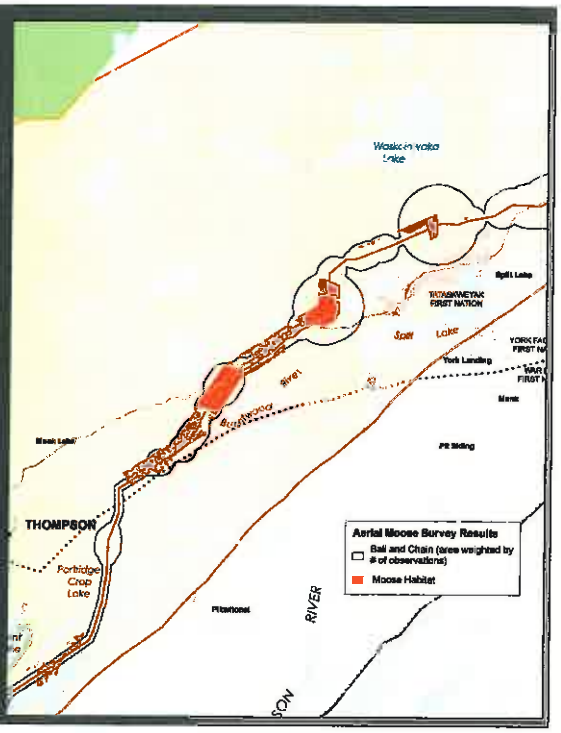
Incorporation of ATK

- Much overlap of traditional areas, broad delineations of moose use areas
- Information supports parameters for modeling
- Importance of moose evident throughout project area
- North populations are healthy
- Western populations of concern

Mitigation

- The majority of negative effects on moose habitat and populations in the Project Study Area was mitigated during the planning and routing process;
- Access management
- Avoid critical calving/parturition periods;
- Riparian management;
- Establish buffers around mineral licks; and
- Natural regeneration providing forage in ROW.

- Environmental Protection Planning
  - Example of relative moose density and high quality habitat along FPR to focus riparian management other potential prescriptions



Cumulative Effects

- Recognition of other projects, now and into the future
  - Forestry, mining, hydro transmission and generation, roads
- Additional habitat alteration and minor loss.
- Access and hunting closures
- Requires monitoring

Effects of route changes on other species

- Revised routes in Wabowden, GHA 14 and 19 assessed
- Conclusions of EIS have not changed

Conclusions

- Moose habitat requirements are diverse (winter, summer, calving, aquatics, mineral licks)
- Large home ranges compared to FPR
- Young forest
- Disturbed and fragmented areas preferred

Conclusions

- The area of the ROW is a small part of the annual life cycle requirement
- Moose will forage near and on ROW's
- Summer use less concern
- FPR avoided known important wintering areas
- New info from MCWS being used in re-routing (Moose Meadows)

Conclusions

- Effects from increased hunting not expected due to FPR paralleling existing linear development where access already exists

Conclusions

- Predicted residual effects are based on results of studies, proposed mitigation, monitoring and adaptive management.
- Residual effects considered not significant.

Questions