

Putting Collaborative Caribou Habitat Restoration into Practice at the Range Scale

Presented by: Paula Bentham

REMB Research Workshop

November 29, 2016

Fort St. John, BC





RESTORATION PILOT PROGRAM PLAN

- Program Plan designed to:
 - apply habitat restoration over an entire boreal caribou range
 - identify barriers, solutions and costs to guide future programs
 - Incorporate lessons learned
 - Build collaborative approach with Team Charter as guidance





RESTORATION PILOT PROGRAM PLAN

Science Based Approach

- Predicted low levels of development in this range
 - Opportunity to test habitat restoration on a landscape level
 - Before-After-Control-Impact (BACI) Wildlife Monitoring (Matrix)
 - Long term vegetation monitoring plots

Multi-Year Approach

- Spread costs over multiple years
- Opportunity to assess mitigation efficacy of implementing a combination of passive and active restoration strategies
- inform considerations and costs of habitat restoration within other boreal caribou ranges in BC and elsewhere
- inform authorization process

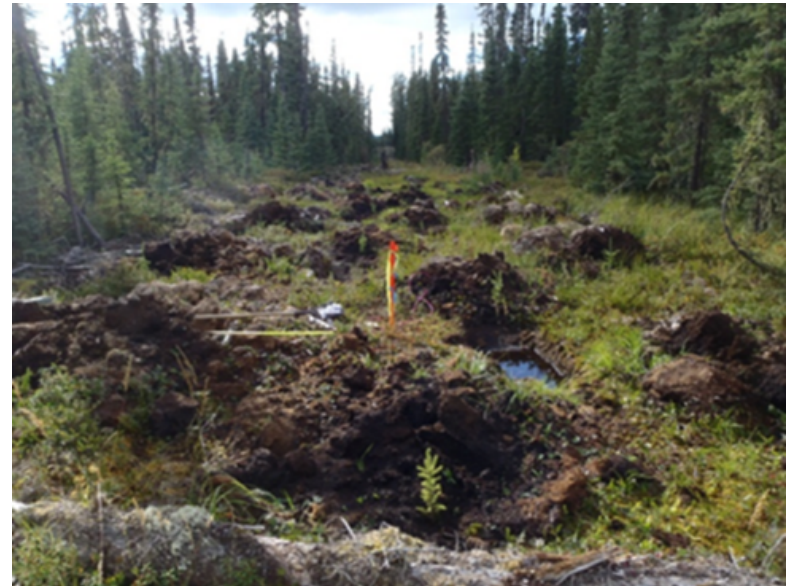


RESTORATION PILOT PROGRAM PLAN

Objective

Transition low quality boreal caribou habitat into higher quality habitat

- reduce the benefits to predators and their primary prey
- establish vegetation trajectory to increase boreal caribou habitat intactness



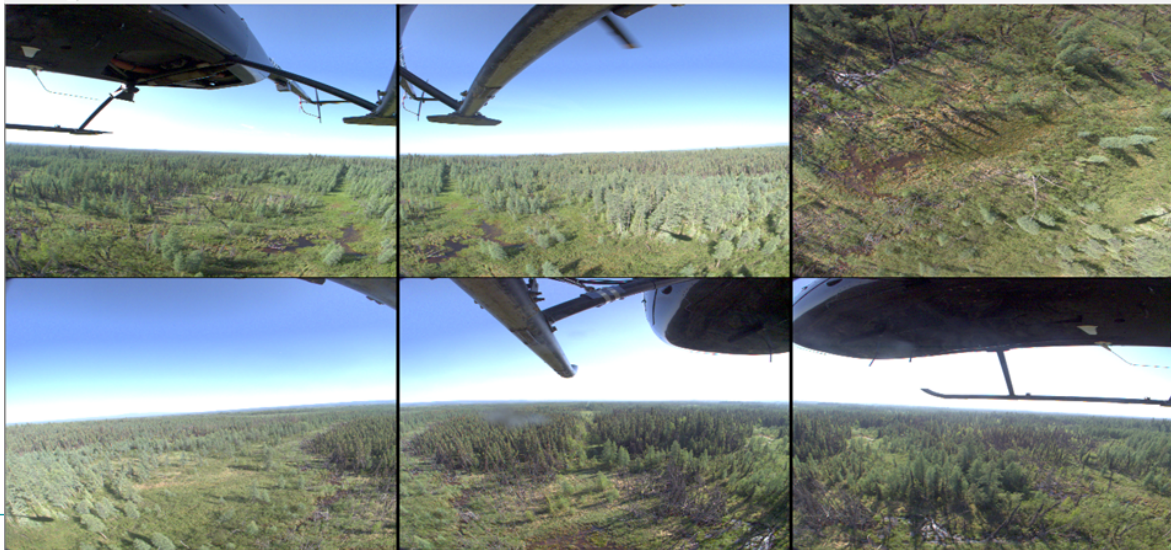


RESTORATION PILOT PROGRAM PLAN

Linear Disturbance Mapping Inventory (2015)

Determine the extent and regeneration status of linear disturbances

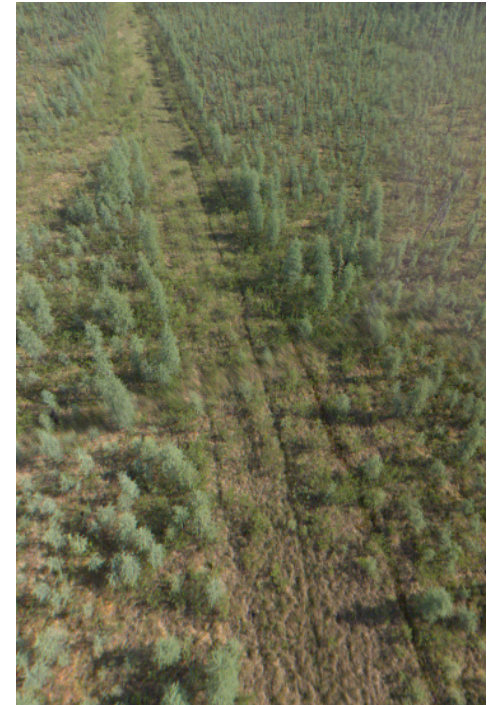
- Sources for mapping linear corridor dataset
 - Publically available government layers and reference aerial imagery
- Vieworx for Ladybug® 360 imagery capture
 - 1,040 km of linear disturbances were captured





RESTORATION PILOT PROGRAM PLAN

- Created database for capturing vegetation classification attributes of linear disturbance features within linear segments
- Data fields for linear inventory by segment:
 - site type (upland, mineral wetland, organic wetland)
 - dominant woody vegetation species
 - vegetation cover (%)
 - vegetation height class (0-50cm, 50-100cm, 100cm+)
 - presence of game trail
 - linear corridor width (m)
- Ground truthed, QA/QC protocol





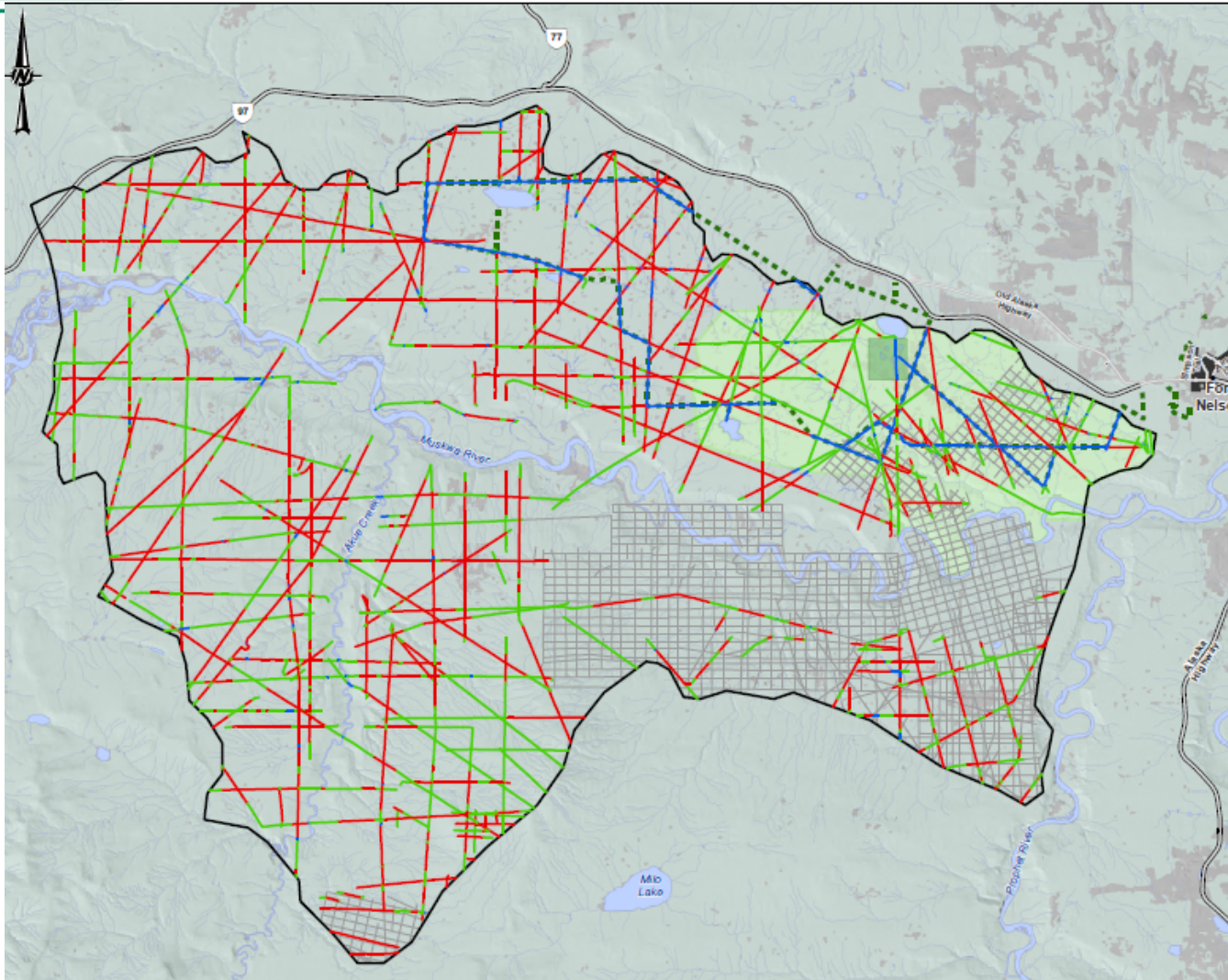
RESTORATION CANDIDACY

Treatment Selection Mapping Results

- **No Treatment** – 76 km (7% of linear disturbances)
 - Any linear disturbance that may have an active disposition or protective notation
- **Leave for Natural** – 394 km (38% of linear disturbances)
 - Restoration candidacy decision support process developed
 - Wetland with >10% vegetation cover, consistently equal to or over 50 cm in height with no game trail present
 - Upland site with >30% vegetation cover, consistently equal to or over 50 cm in height with no game trail present
- **Candidate Restoration Treatment** – 569 km (55%)
 - 'Active'
 - 'Passive'



RESTORATION CANDIDACY

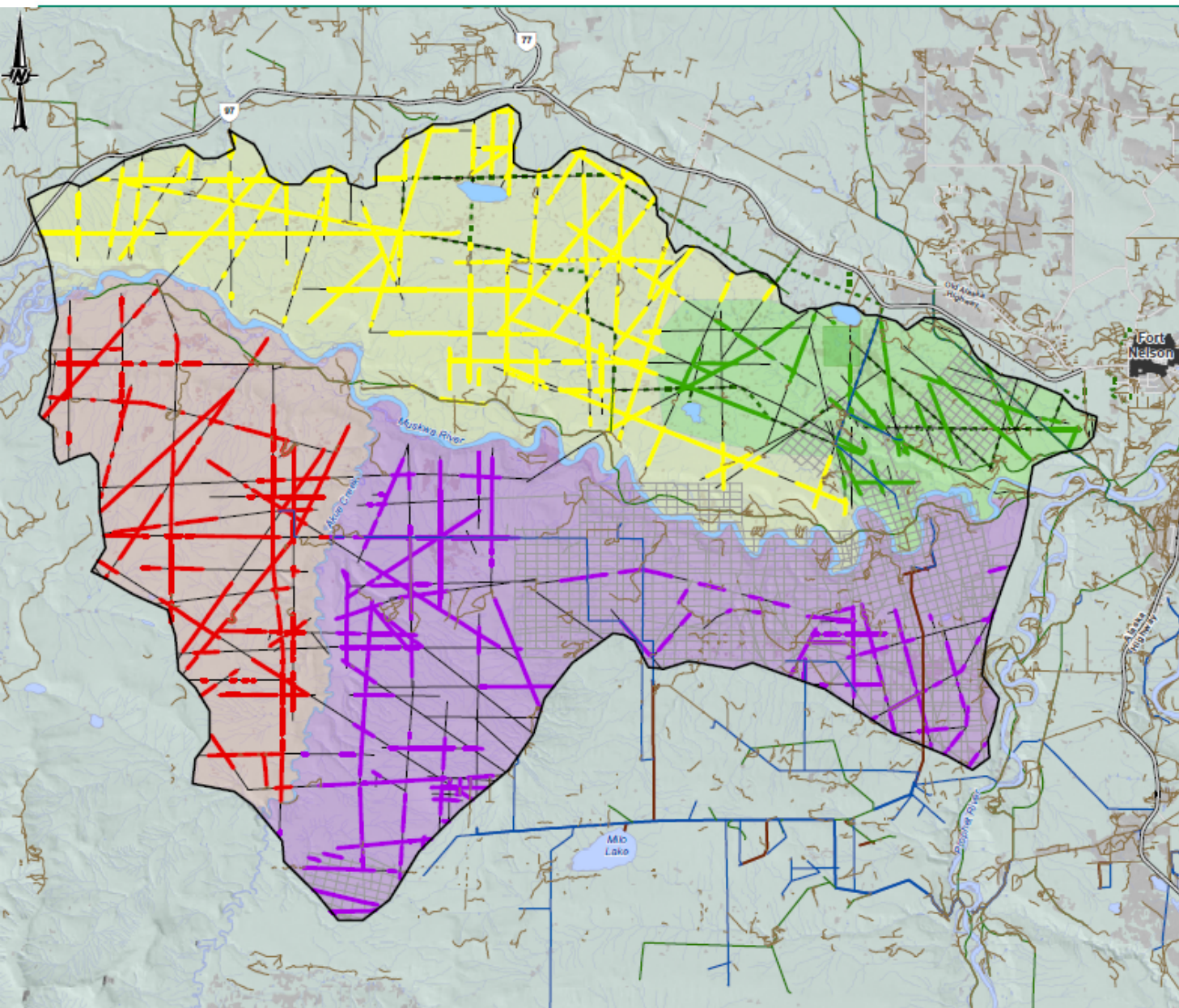




IMPLEMENTATION TACTICAL PLAN

Focused designated treatment zones split by major hydrology, with hierarchy of treatment priority based on ecological, logistical, and economic criteria:

- Treatment priority class optimization calculated by ranking treatment segments based on combination of weighted variables including:
 - Probability of Regeneration (POR) ranking -% vegetation cover, vegetation height, soil moisture (wetness)
 - Usage Factors (presence/absence of game trail, presence/absence of atv trail, distance to high grade road)
 - Caribou calving areas
 - Wolf usage
 - Caribou usage
 - % change of habitat intactness
- Implementation treatment area/amount with budget objectives; and
- Access into the zone area (s) [economic and logistical considerations]



- LEGEND**
- PARKER CARIBOU RANGE
 - PROPOSED ZONE AND TREATMENT CANDIDATE CORRIDORS
 - ZONE 1 (EAST)
 - ZONE 2 (NORTH)
 - ZONE 3 (SOUTH)
 - ZONE 4 (WEST)
 - LINEAR DISTURBANCE - NO TREATMENT REQUIRED
 - EXCLUDED LINEAR DISTURBANCE
 - PARKER LAKE ECOLOGICAL RESERVE
 - RECREATIONAL TRAIL
 - WOODED AREA
 - RESIDENTIAL AREA
 - WATERBODY
 - WATERCOURSE
 - ACCESS**
 - HIGHWAY
 - MAJOR ROAD
 - LOCAL ROAD
 - RESOURCE ROAD
 - UNCLASSIFIED ROAD
 - BC OGC PETROLEUM ACCESS ROAD
 - BC OGC PETROLEUM DEVELOPMENT ROAD
 - FORESTRY SERVICE ROAD / ROAD PERMIT
 - CITY

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REFERENCES

1. 3D SEISMIC OUTLINES, WATERCOURSE, WATERBODY, POPULATED AREA, WOODED AREA, ROADS, TOWN AND PROVINCIAL BOUNDARY OBTAINED FROM CANVEC © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
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4. BC OGC PETROLEUM ACCESS AND DEVELOPMENT ROAD OBTAINED FROM THE BC OIL AND GAS COMMISSION.
5. PARKER CARIBOU RANGE, RECREATIONAL TRAIL, ECOLOGICAL RESERVE AND HILLSHADE OBTAINED FROM B.C. GOV. CONTAINS INFORMATION LICENCED UNDER THE OPEN GOVERNMENT LICENCE - BRITISH COLUMBIA.

COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

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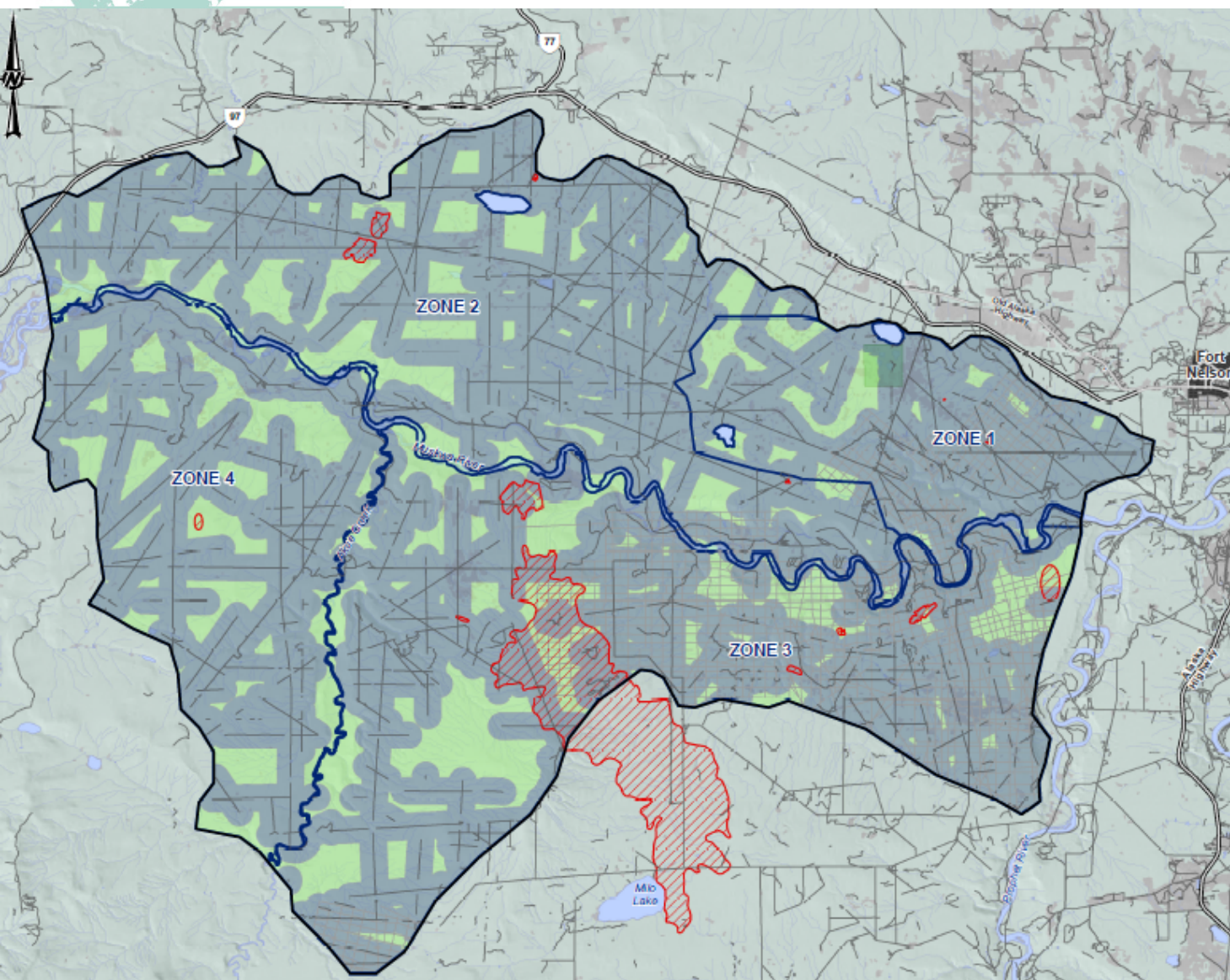
PROJECT
PARKER CARIBOU RANGE
PILOT RESTORATION PROGRAM PLAN

TITLE
TACTICAL PLAN ZONES - PROPOSED HIERARCHY OF TREATMENT ZONES

CONSULTANT	YYYY-MM-DD	2015-11-02
DESIGNED	MB	
PREPARED	RH	
REVIEWED		
APPROVED		

PROJECT NO. 1524678 CONTROL 5000 REV 0 FIGURE 05





LEGEND

- PARKER CARIBOU RANGE
- TACTICAL PLAN ZONE
- DISTURBED HABITAT
- INTACT HABITAT
- PARKER RANGE RECENT AND HISTORICAL FIRE
- LINEAR DISTURBANCE
- EXCLUDED LINEAR DISTURBANCE
- PARKER LAKE ECOLOGICAL RESERVE
- WOODED AREA
- RESIDENTIAL AREA
- WATERBODY
- WATERCOURSE
- HIGHWAY
- MAJOR ROAD
- CITY

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REFERENCES

- 2D SEISMIC OUTLINES, WATERCOURSE, WATERBODY, POPULATED AREA, WOODED AREA, ROADS, TOWN AND PROVINCIAL BOUNDARY OBTAINED FROM CANVEC © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
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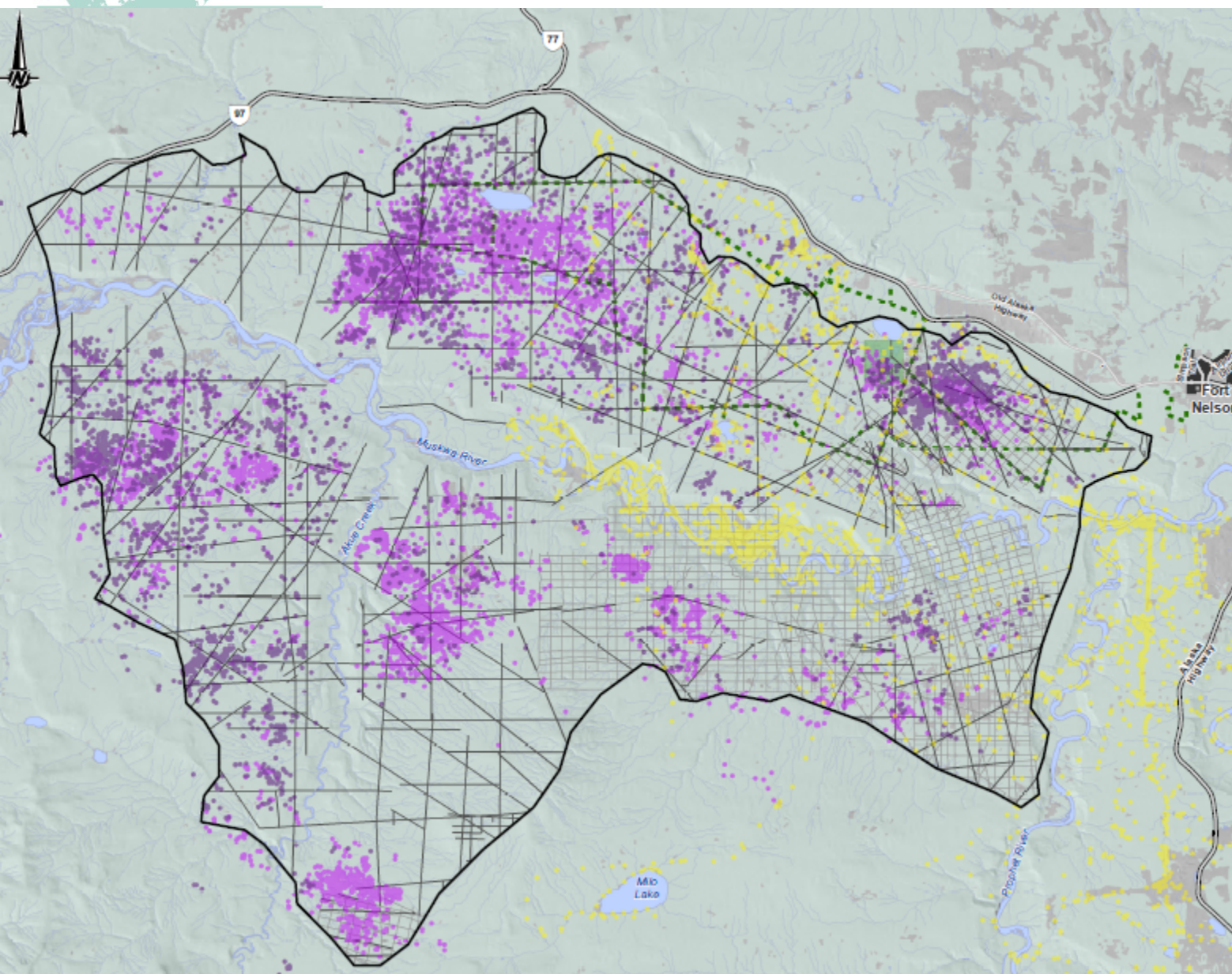
COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

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PROJECT
PARKER CARIBOU RANGE
PILOT RESTORATION PROGRAM PLAN

TITLE
DISTURBED AND INTACT HABITAT IN PARKER RANGE ZONES

CONSULTANT
YYYYMM-DD 2015-11-02



LEGEND

- PARKER CARIBOU RANGE
- CARIBOU GPS RADIO-COLLAR LOCATION
- WOLF GPS RADIO-COLLAR LOCATION (2012-2015)
- INCLUDED LINEAR DISTURBANCE
- EXCLUDED LINEAR DISTURBANCE
- PARKER LAKE ECOLOGICAL RESERVE
- WOODED AREA
- RESIDENTIAL AREA
- WATERBODY
- WATERCOURSE
- RECREATIONAL TRAIL
- HIGHWAY
- MAJOR ROAD
- CITY

Fort Nelson

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1:150,000 KILOMETRES

REFERENCES

1. CARIBOU (2011-2012) AND WOLF (2012-2015) GPS RADIO-COLLAR DATA FROM C. DENNIS, UNIVERSITY OF ALBERTA (2015).
2. CARIBOU (2013-2015) GPS RADIO-COLLAR LOCATIONS OBTAINED FROM BOREAL CARIBOU RADIO-COLLARING PROGRAM AVAILABLE ONLINE [HTTP://WWW.BCOFR.CA/BOREAL-CARIBOU/PROJECTS/ACTIVE](http://www.bcofr.ca/boreal-caribou/projects/active) (15 JAN 2016).
3. 3D SEISMIC OUTLINES, WATERCOURSE, WATERBODY, POPULATED AREAS, TOWN AND PROVINCIAL BOUNDARY OBTAINED FROM BC GOV. OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
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BC OIL AND GAS RESEARCH AND INNOVATION

PROJECT

PARKER CARIBOU RANGE
PILOT RESTORATION PROGRAM PLAN

TITLE

LINEAR DISTURBANCES AND GPS RADIO-COLLAR LOCATIONS
FOR CARIBOU (2011 - 2015) AND WOLF (2012 - 2015)

CONSULTANT

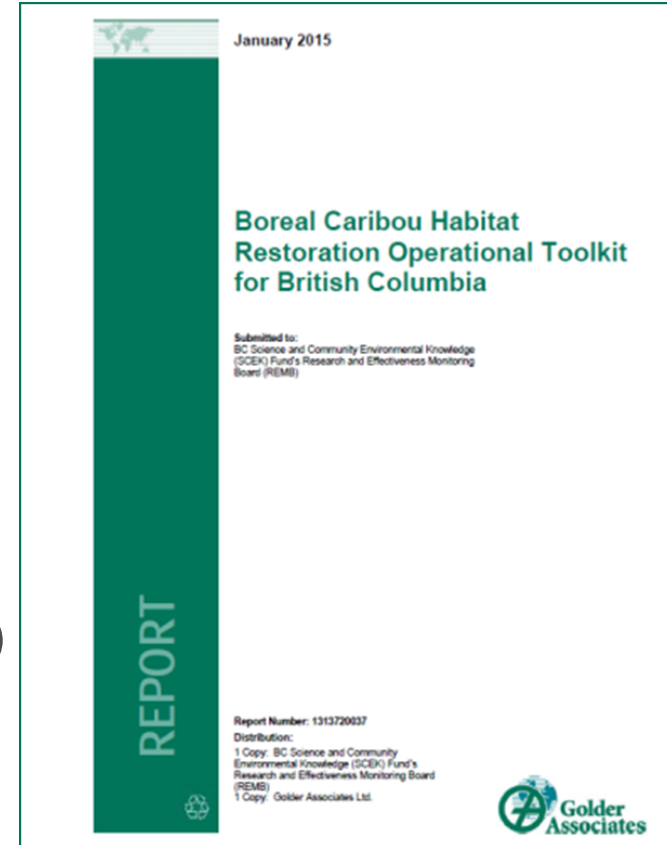
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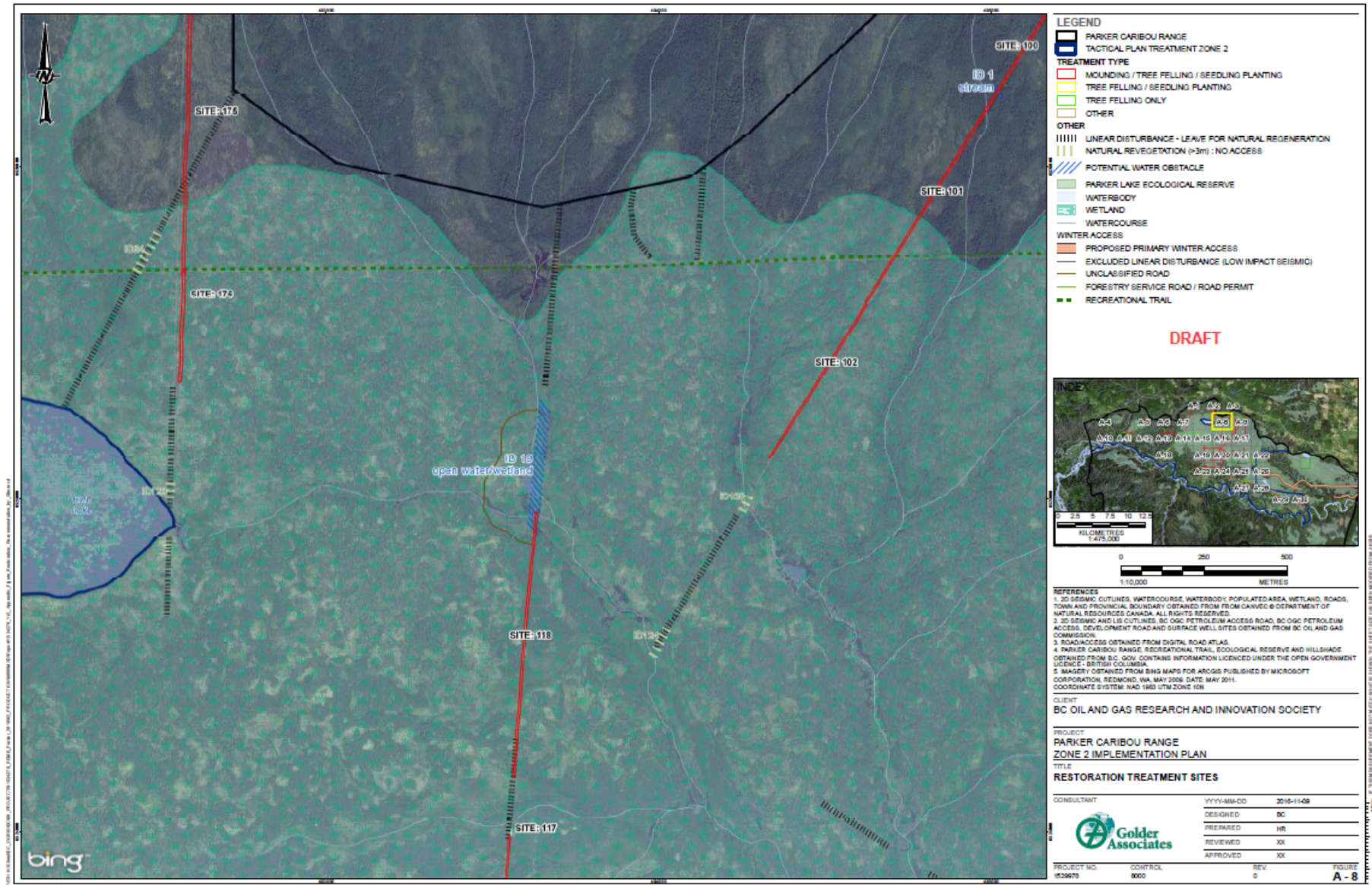




YEARLY IMPLEMENTATION PLAN

- Ground-truth potential restoration segments
- Treatment prescription guided by the Boreal Caribou Habitat Restoration Toolkit Treatment Matrix
- Authorizations
- Archeological requirements
- Access management plan including watercourses
- Seed and/or seedling requirements, (for winter planting, sourced 13-16 months prior)
- Costs, contractor securement, Health and Safety Plan, Logistics
- YEAR 1 Implementation Plan (2017)
- YEAR 2 Implementation Plan (draft)







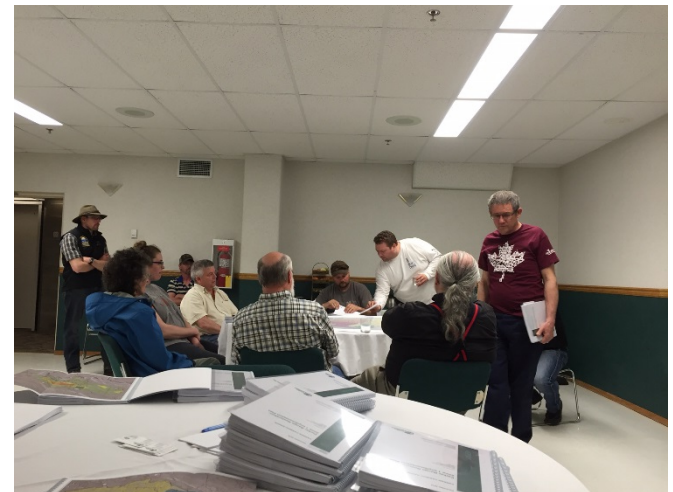
Authorization Process & Access Considerations

- No authorization process specific to permitting the implementation of caribou habitat restoration programs in BC on legacy seismic lines
 - authorization by MFLNRO through *Forest and Range Practices Act*
 - *Forest Licence to Cut*
 - *First Nations consultation is led by FLNRO*
 - Oil and Gas Commission has option to apply *Interim Operating Practices for Oil and Gas Activities in Identified Boreal Caribou Habitat in British Columbia* and Section 19 of the *Environmental Protection and Management Regulation* (EPMR) contains Operator Requirement “Areas to be Restored” whereby oil and gas operators must restore operating areas as soon as practicable
- Heritage Inspection Permits and Archaeological Overview Assessment (mitigate risk to Archaeological resources)
- First Nations consultation led by MFLNRO
- Public Consultation, Trapper Notification
- Watercourse Crossing Plan and Environmental Management Plan
- Road Use Agreements, Pipeline Crossing Agreements



Collaborative Approach

- Program Plan Advisory Team:
 - Oil and Gas Commission (OGC)
 - Ministry of Forests, Lands and Natural Resource Operations (MFLNRO)
 - CAPP / Oil and Gas Industry
 - REMB Technical Advisor
- Facilitating opportunities to integrate involvement of Aboriginal Peoples and Businesses as a core function in the execution of the multi-year Program Plan
- Trappers
- Snowmobile Club
- Local businesses





Variability in Treatments, Site Types and Expected Responses





Restoration Monitoring Framework

Project vs. Program Level

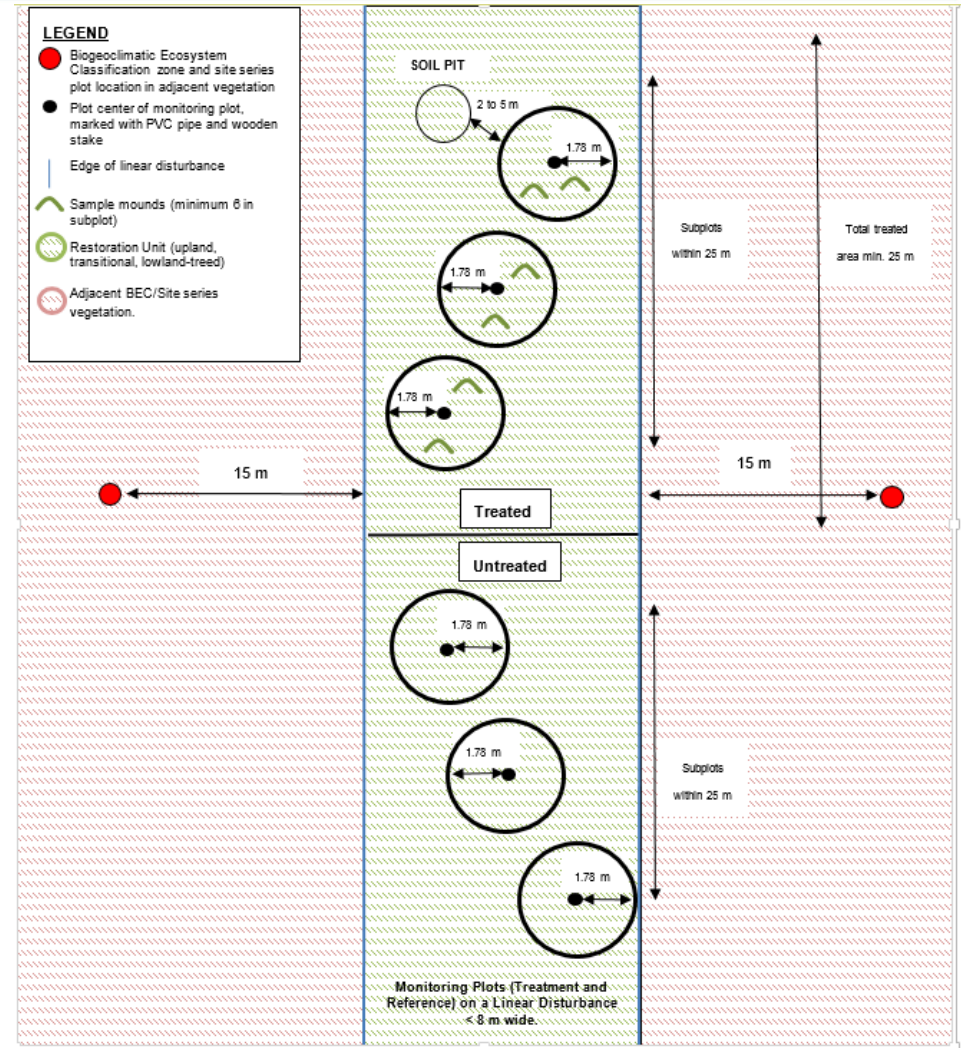
	Monitoring Category	Objective ¹
Project-level	Compliance	To determine if restoration treatments are being implemented according to project requirements after one and up to five growing seasons.
Program-level	Effectiveness	To determine if restoration treatments are meeting pre-determined recommended targets for native vegetation growth and access control after five, ten and fifteen year growing seasons.
Program-level + Wildlife monitoring ¹	Validation	To determine if restoration treatments are accelerating the natural revegetation process by providing habitat that can support self-sustaining caribou populations without predator control, thereby making the Program restoration treatments worthwhile to achieve caribou habitat goals. ¹

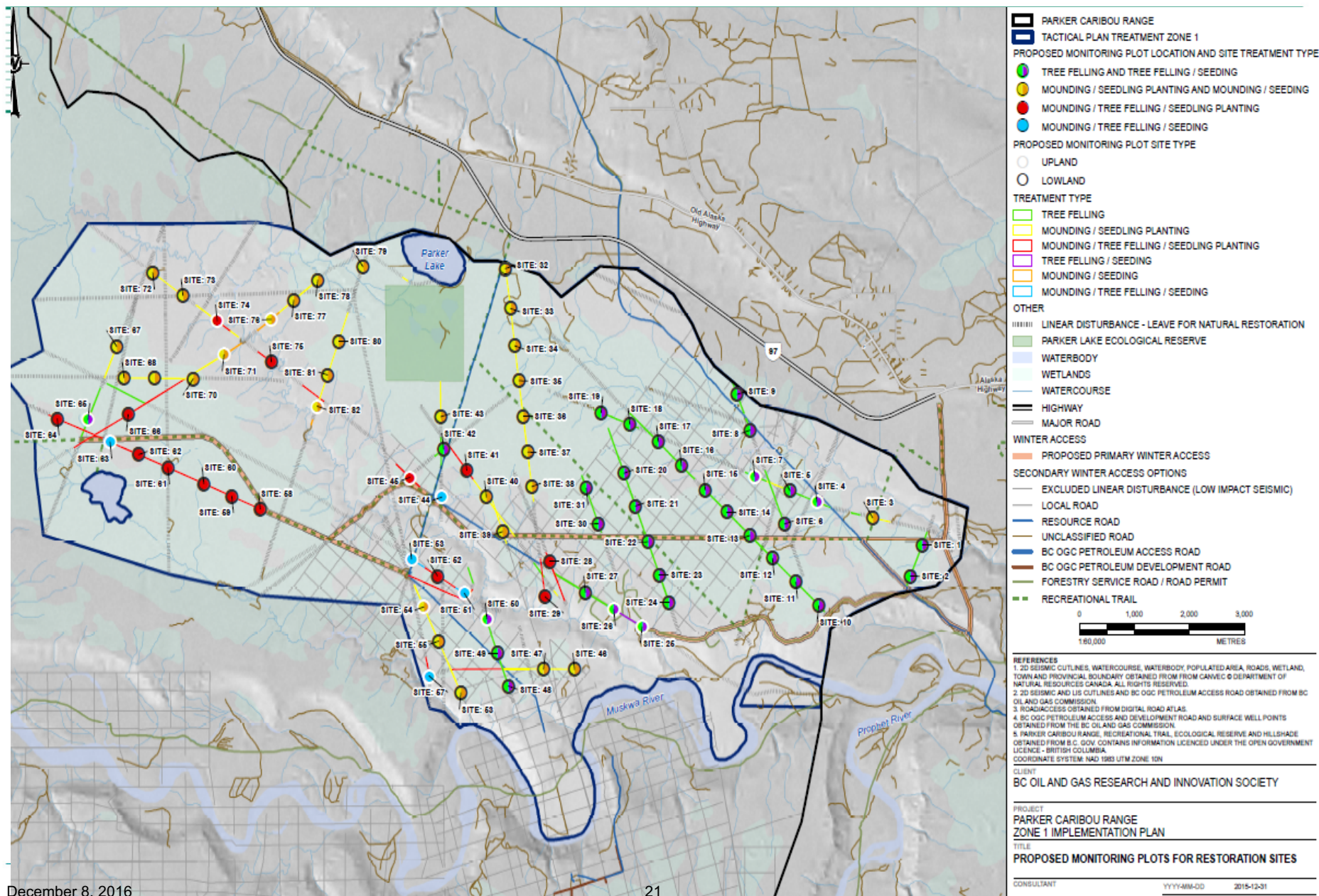
1. Planted and natural ingress of native vegetation response



Project-Level Monitoring

- Collect indicator data (e.g., survival, % cover, density, evidence of chlorosis, height and leader growth, access)
- Follow consistent:
 - Sampling design
 - Plot establishment
 - Field procedures
 - Data collection / data sheets
- Paired plot design with naturally regenerating reference plots
- Data evaluated for each target
- Data submission





December 8, 2016



Major Outcomes

- Informed Authorization Process for Habitat Restoration in BC
 - Landscape Level, Collaborative Habitat Restoration Program
 - 1st in Canada to target an entire boreal caribou range
 - Parker Range Program Plan is complete
 - Zones 1 and 2 Implementation Plans
 - Zone 1 Implementation Jan-March 2017
 - Zone 1 contractors are all local, Aboriginal owned, Fort Nelson First Nation Technician and Observer to start to build knowledge/capacity
 - Monitoring Design set up for both Habitat Response and Wildlife Response, prior to treatment implementation
 - BACI wildlife monitoring can inform site specific treatment locations/considerations. Could also inform active vs. passive treatment options
 - Local community engagement
-



Next Steps to Address Knowledge Gaps

- Restoration Toolkit is based on past projects in Alberta. Lacks:
 - Indigenous Communities Meaning of “Land”. Example, restoration toolkit could take a more holistic approach. From an indigenous perspective, the concept of ‘land’, and reclamation of land, is much broader than existing standards based on western science. ‘Land’ is comprised of 4 elements that need to be considered within reclamation or habitat restoration for caribou: Physical elements, Mental elements, Emotional elements, Spiritual elements.
 - Indigenous Communities need to be considered beyond commercial opportunities
 - Engage Indigenous communities in opportunities to support achievement of the Implementation Plan
- Lack of implementation and monitoring results for BC on conventional seismic
- Use of Amphibious vehicles for treatments (extends how much / yr, reduced cost)



Boreal Caribou Implementation Plan

- Landscape Level, Collaborative Habitat Restoration Program
 - 1st in Canada to target an entire boreal caribou range
 - Parker Range Program Plan is complete, inventory, 360 photos
 - multi-year Program Plan to execute; with 4 Zones
 - Zone 1 Implementation winter 2017
 - Zone 2 Implementation Plan ready February 2017; seedlings not sourced
 - Funding not secured to complete the implementation
- Pilot Program provides opportunities for Habitat Offsets
- Consider Indigenous Community Partnerships. Not just commercial opportunities only. Implications for Zones 3 and 4.



Acknowledgements

- BC OGRIS
- Program Plan Advisory Team:
 - Lisa Helmer, Ben Rausher (OGC)
 - Megan Watters, Mary Viszlai-Beale, Jeanine Hudson (FLNRO)
 - Shawn Williams (Nexen, Industry Representative)
 - Steve Wilson (Technical Advisor REMB, Liaison with Ministry of Environment)
- Tim Vinge, Cassidy van Rensen, Alberta Environment and Parks
- Craig DeMars, University of Alberta
- Ducks Unlimited
- Canfor
- Fort Nelson Snowmobile Club
- Fort Nelson First Nation, Prophet River First Nation

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<http://www.bccogris.ca/boreal-caribou/projects/complete>

pbentham@golder.com

