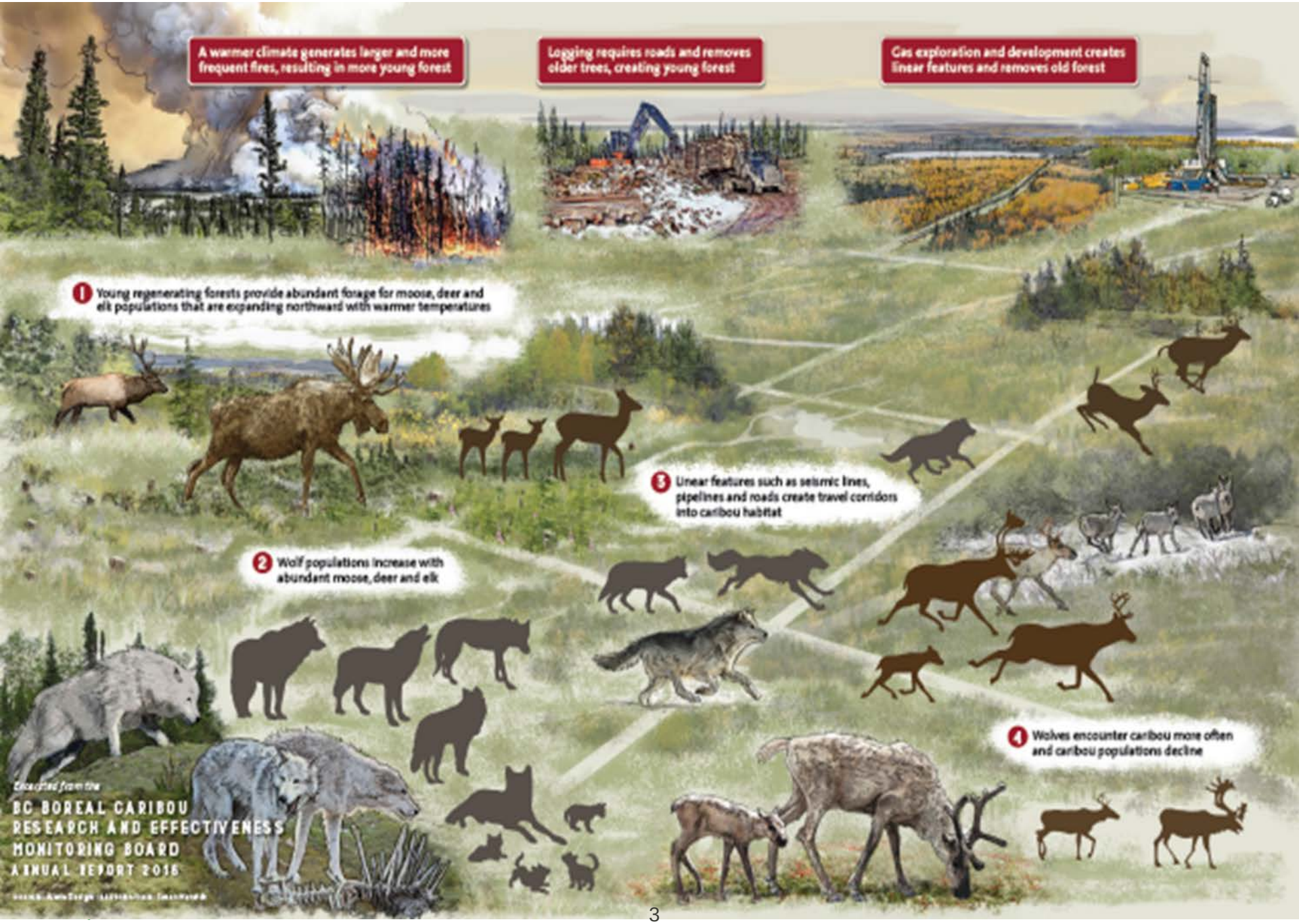
GOLDER

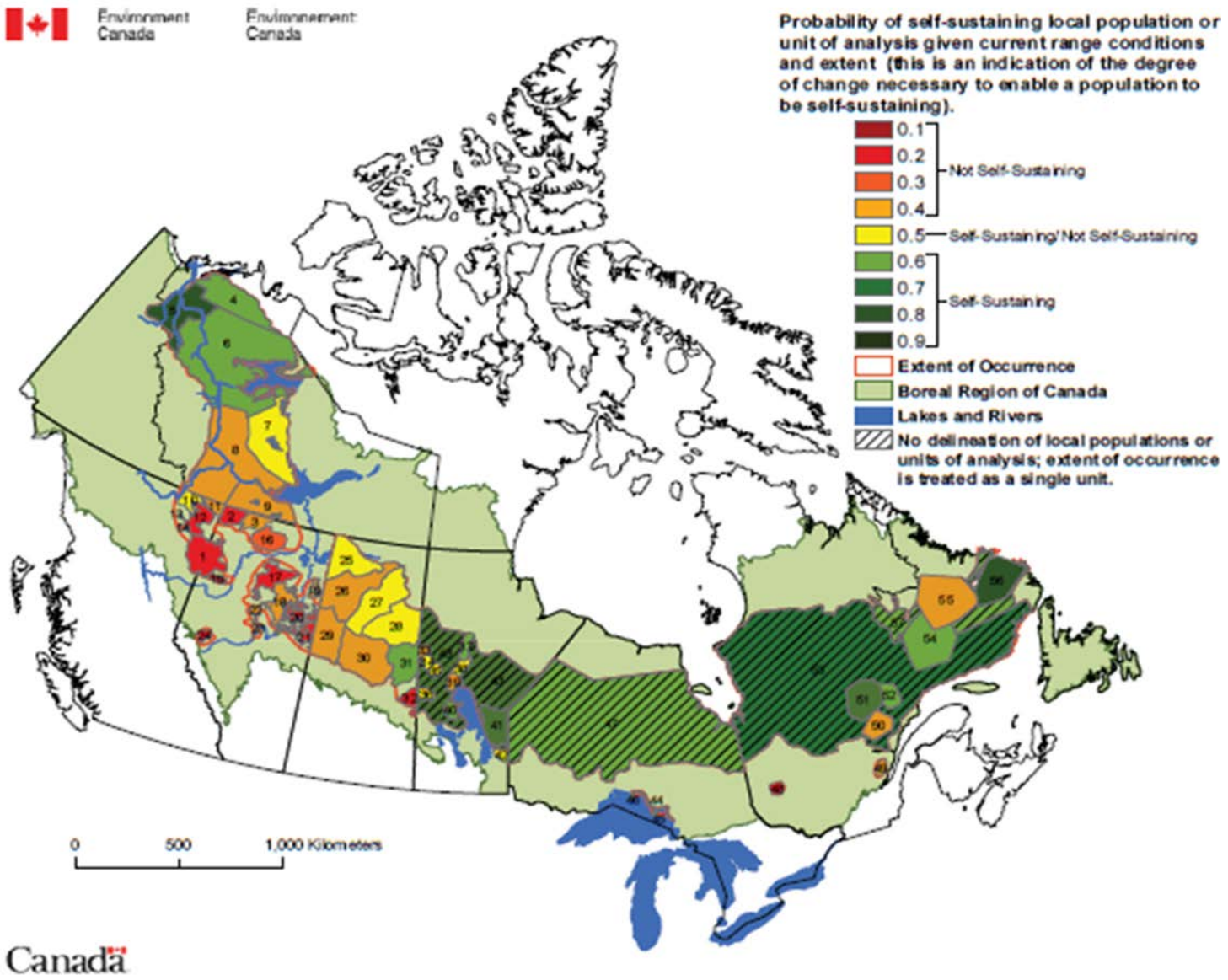
Collaborative Caribou Habitat Restoration at the Landscape Scale

PAULA BENTHAM

SERWC RESTORATION FOR RESILIENCY

FEBRUARY 2018


A warmer climate generates larger and more frequent fires, resulting in more young forest
Logging requires roads and removes older trees, creating young forest
Gas exploration and development creates linear features and removes old forest
1 Young regenerating forests provide abundant forage for moose, deer and elk populations that are expanding northward with warmer temperatures
2 Wolf populations increase with abundant moose, deer and elk
3 Linear features such as seismic lines, pipelines and roads create travel corridors into caribou habitat
4 Wolves encounter caribou more often and caribou populations decline
Adapted from the
BC BOREAL CARIBOU RESEARCH AND EFFECTIVENESS MONITORING BOARD
ANNUAL REPORT 2016

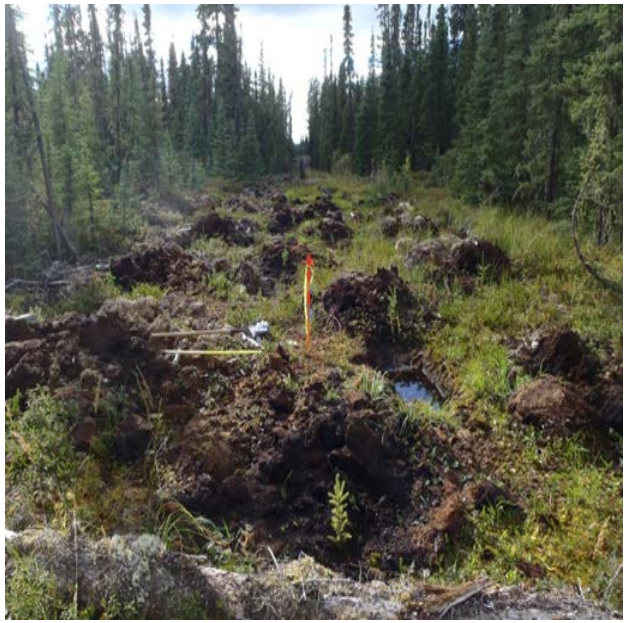

Environment Canada
Environnement Canada
Probability of self-sustaining local population or unit of analysis given current range conditions and extent (this is an indication of the degree of change necessary to enable a population to be self-sustaining).
0.1
0.2
0.3
0.4
Not Self-Sustaining
0.5
Self-Sustaining/Not Self-Sustaining
0.6
0.7
0.8
0.9
Self-Sustaining
Extent of Occurrence
Boreal Region of Canada
Lakes and Rivers
No delineation of local populations or units of analysis; extent of occurrence is treated as a single unit.
0
500
1,000 Kilometers
Canada

Habitat Restoration

DEFINED

- Functional Restoration: application of techniques on anthropogenic disturbances that deter predation, primary prey and human use in the near term, and support habitat recovery in the long-term

- Ecological Restoration*:* primary objective is to return a disturbance to a similar state of ecological function as before the disturbance *(Wilson 2015)*



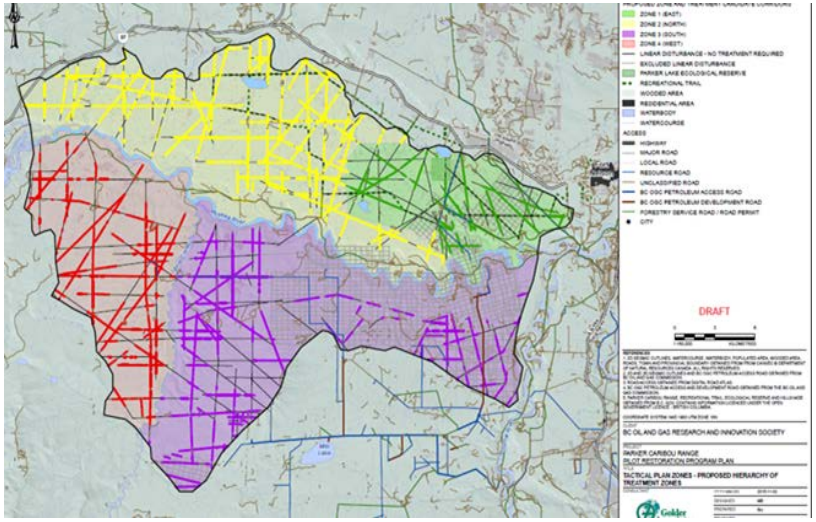
Stabilizing
0-5 Years

Recovering
6-50 Years

Sustaining
50+ Years

Parker Boreal Caribou Range Pilot Project

PLANNING 2015-2016



- Boreal Caribou Implementation Plan (2011)
  - Resource Review Areas
  - $5M over 5 Years – Research
  - BC Oil and Gas Research and Innovation Society (BC OGRIS) through Research and Effectiveness Monitoring Board (REMB)

- Zonation Approach for Multi-year implementation
- Entire Boreal Caribou Range (2015)
- Wildlife Monitoring (BACI design)
- Focus on local community and resources to implement the physical work

Not All Linear Disturbances are Equal

SEISMIC LINES ≠ CUTBLOCKS

- Natural Recovery
- Compaction
- Predator, Human Use / Game Trails
- Width, Orientation (light, moisture)

- MOISTURE, MOISTURE, MOISTURE
- Soil Mineral Layer
- Type of Disturbance (mulch management)
- Microsites
- Historical Seeding Practices

Parker Range Restoration Pilot

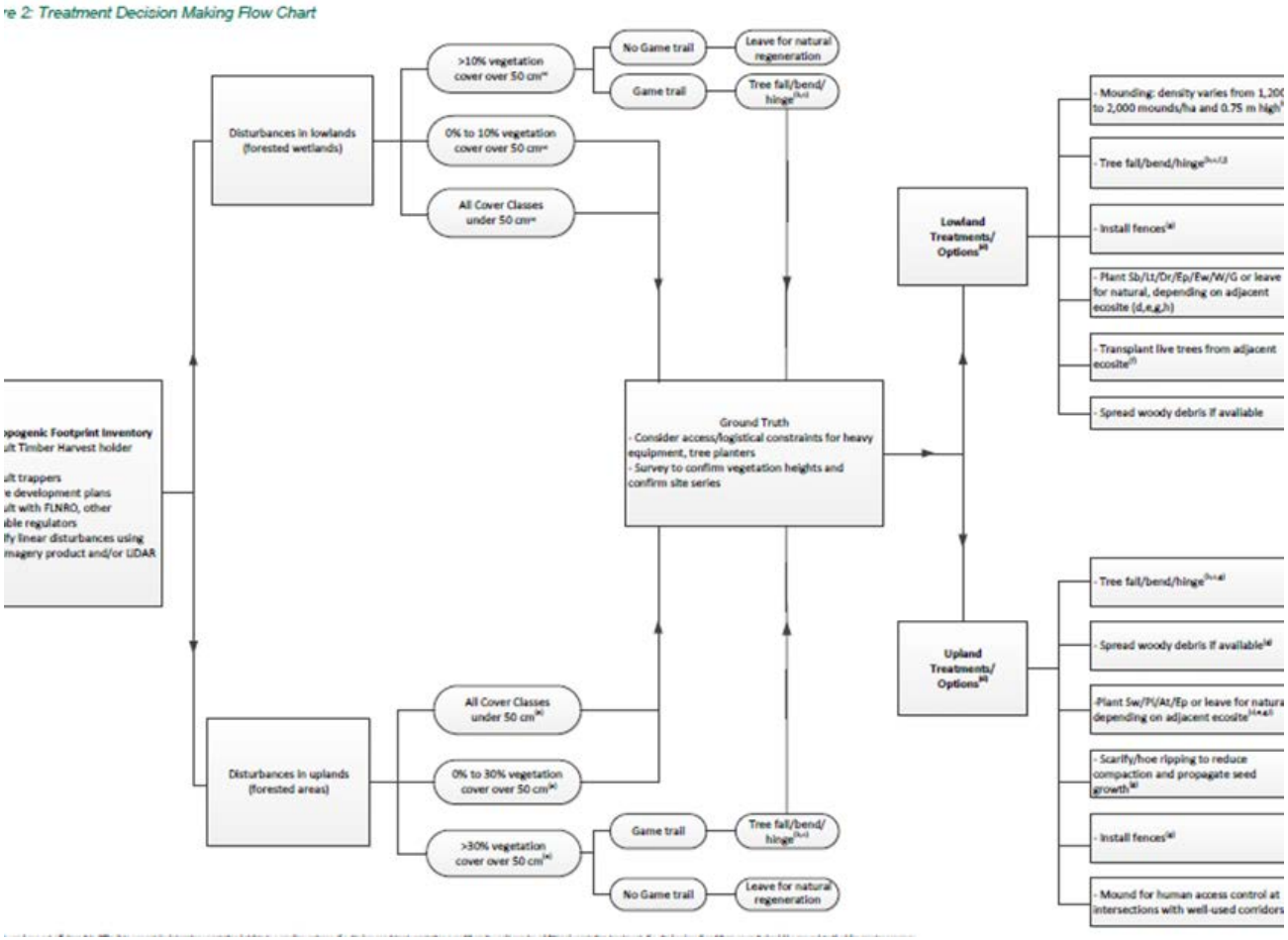
LINEAR DISTURBANCE INVENTORY

- Linear Disturbance Inventory Mapping
- 360 Imagery to capture extent and regeneration status of linear disturbances
- 1,040 km linear disturbances captured
- Field trothed

- Data fields by linear 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)

Decision Support Framework

TREATMENT OPTIONS



- Predator movements in relation to veg heights (e.g., Dickie 2015)
- Veg Heights
- Veg Cover
- Presence/Absence of game trail
- Minimize risk to natural veg and maximize use of $'s

Planning Parker Caribou Range

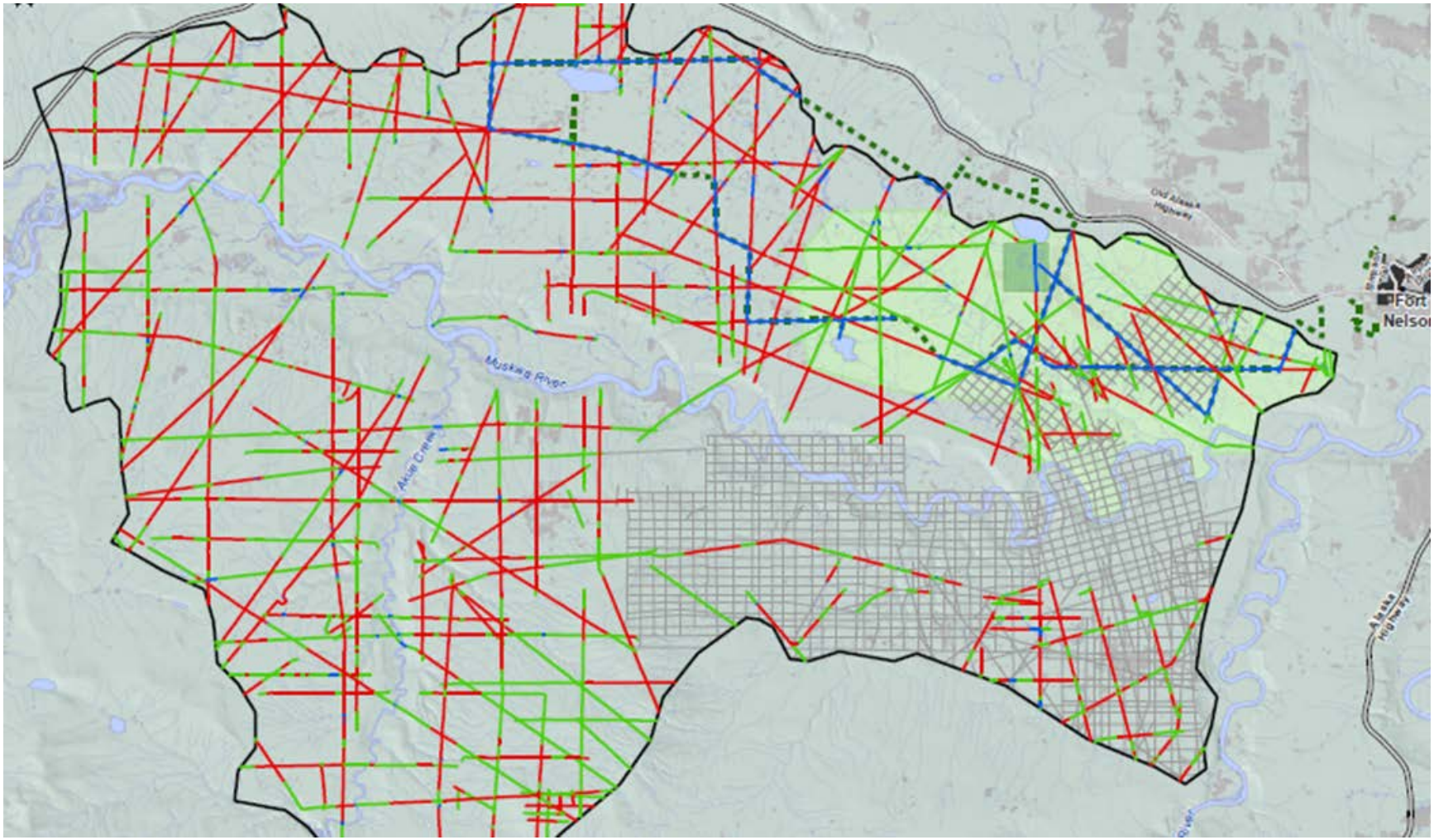
DISTURBANCE INVENTORY: PROGRAM PLAN

1,040 km linear footprint:

- 38% Leave for Natural
- 7% No Treatment
- 55% (569 km) Treatment Candidate

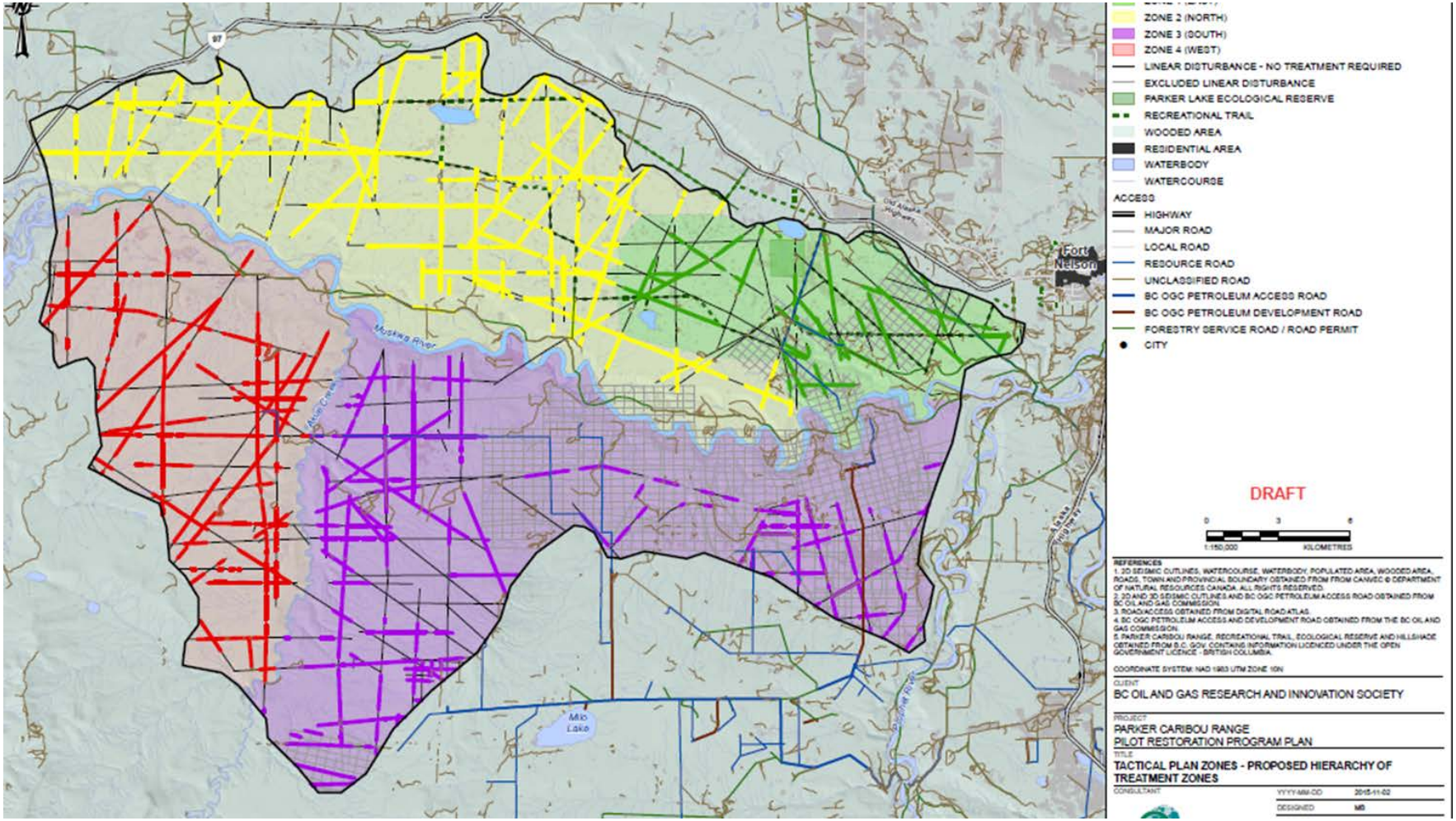
Landscape Scale

RESTORATION CANDIDACY



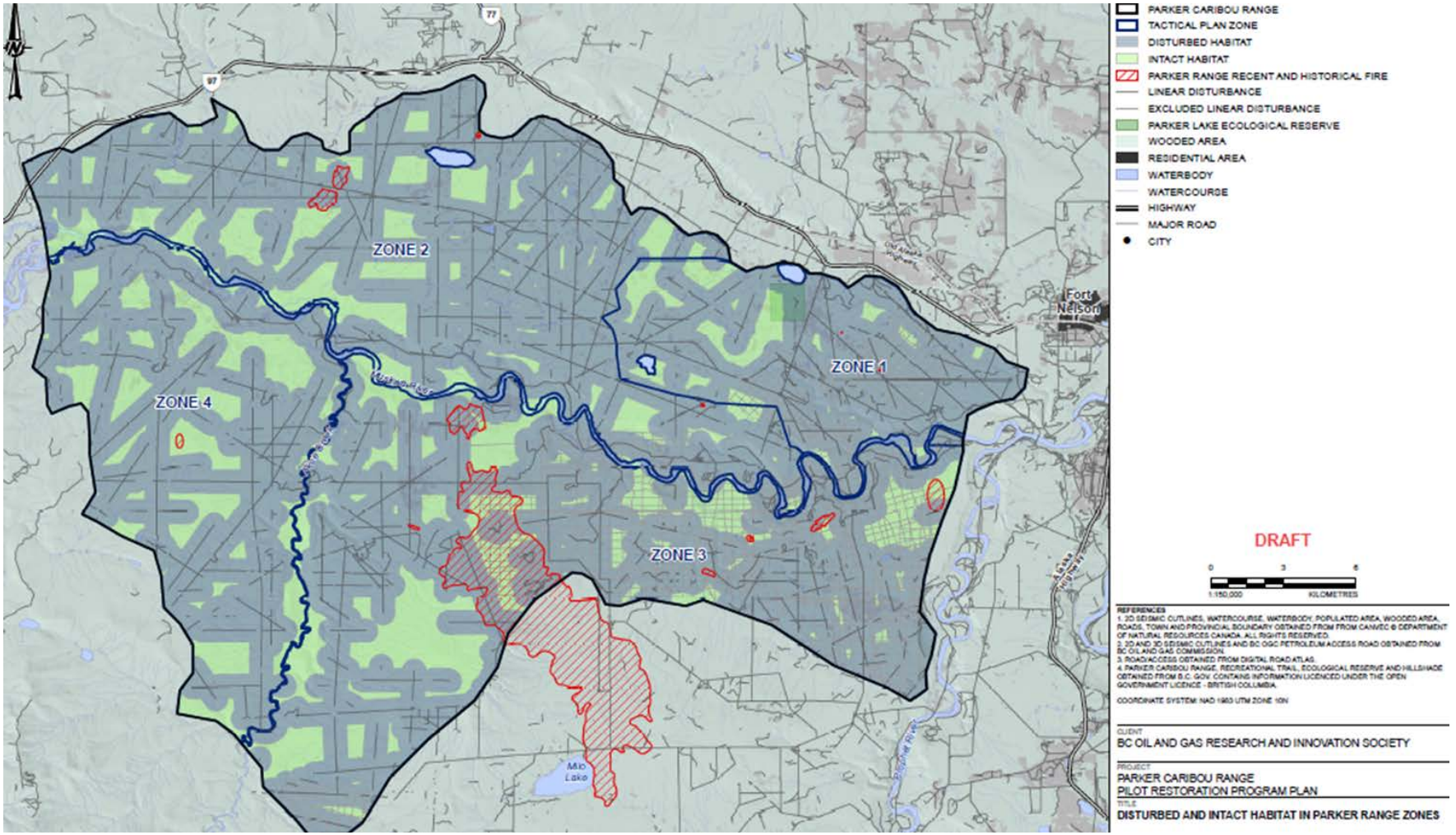
Landscape Scale

ZONES, PRIORITIES, ACCESS



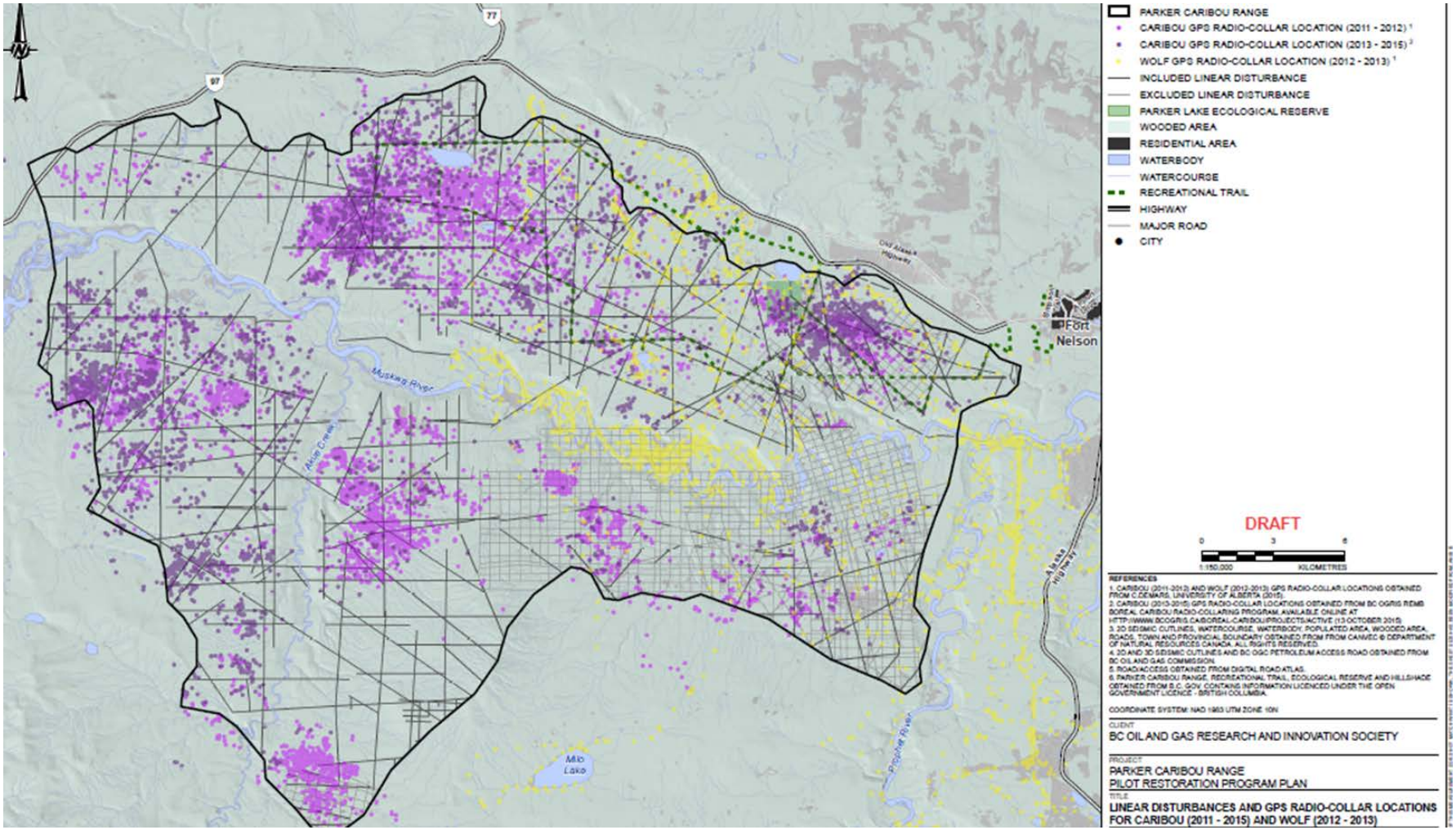
Landscape Scale

SETTING PRIORITIES



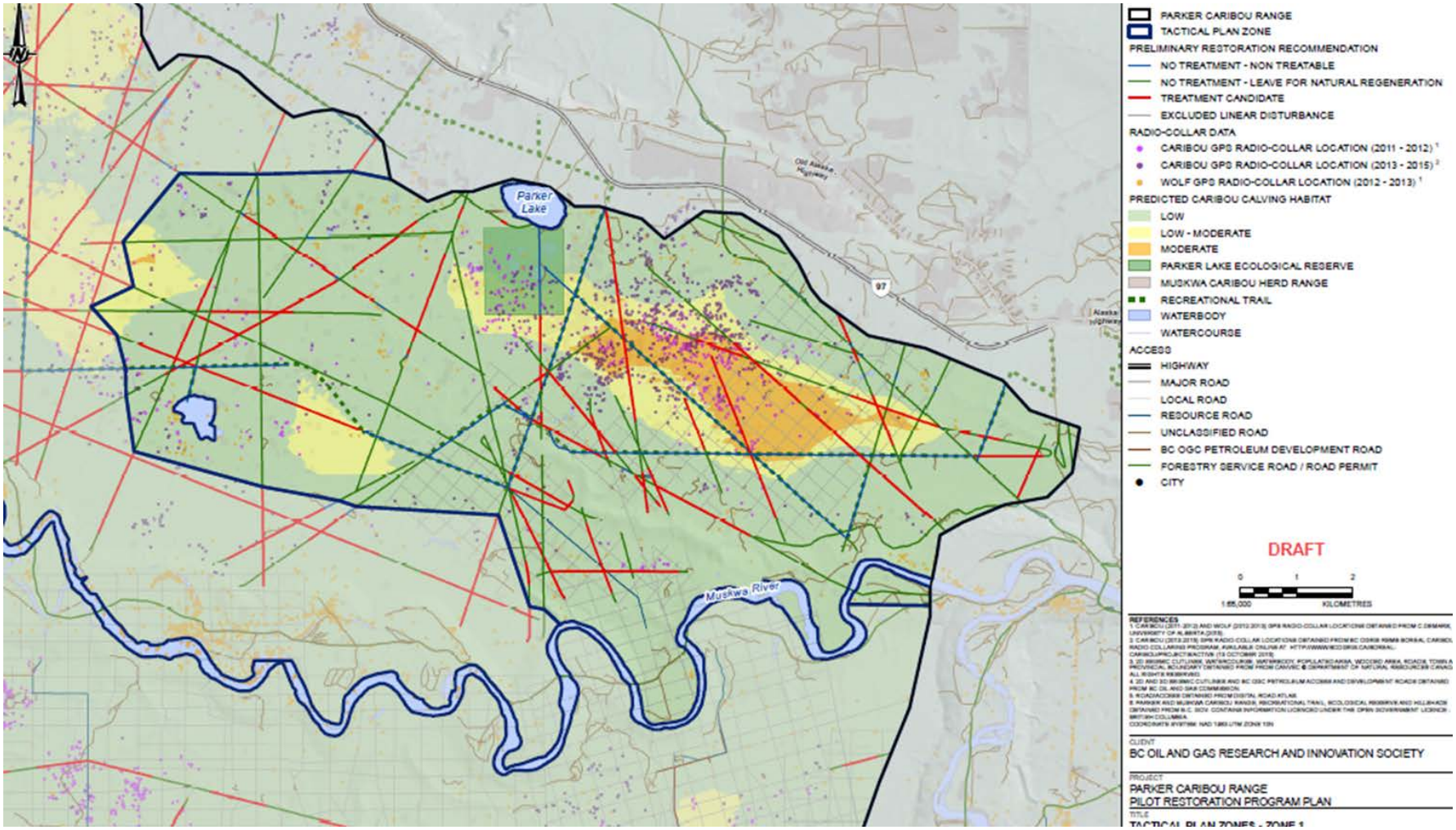
Landscape Scale

SETTING PRIORITIES



Landscape Scale

ZONE 1 IMPLEMENTATION



Zone 1 Implementation

PILOT PROGRAM, COLLABORATION

- Program Plan Advisory Team
  - Oil and Gas Commission
  - Ministry of Forests, Lands and Natural Resource Operations
  - CAPP / Oil and Gas Industry
  - REMB Technical Advisor
- Facilitated opportunities to integrate Aboriginal Businesses as core function in Implementation with objective of capacity building
- Municipality (open house)
- Trappers, Canfor
- Recreational Users
- Local businesses

Zone 1 Implementation

JANUARY – MARCH 2017

- Local Aboriginally Owned Contractor
- Fort Nelson First Nations Monitors
- Field assistance through FNFN Environmental Technicians
- Site Specific Health, Safety and Environment Plan

- 8 Week Field Implementation Program
- Access - tracked vehicles only
- 61 km’s of historical disturbance treated
- An additional 105 km were verified for Leave for Natural
- 23,220 seedlings (primarily black spruce) were planted using winter seedling planting techniques

Zone 1 Implementation

JANUARY – MARCH 2017

- Mounding with winter Sb Seedling Planting
- Hybrid spruce limited use (uplands in high potential Archy areas)
- Tree felling in uplands

- Time to train operators and field assistants
- Plans are plans, tweaking needed
- low impact seismic lines had same width attributes as traditional seismic lines and therefore were treated for access control
- Amendment process developed with FNFN and FLNR

Treatments

TREEFELLING

Treatments

MOUNDING AND PLANTING

Treatments

MOUNDING BERM AND TRENCH

Treatments

PLANTING FROZEN SEEDLINGS ON A BERM STYLE MOUNDING TREATMENT IN LOWLAND SITE

Treatments

TREEFELLING / MOUNDING / PLANTING

Treatments

USE OF COARSE WOODY DEBRIS / TREE FELLING

BC Caribou Restoration Monitoring Framework

1ST YEAR GROWING SEASON (2018)

Table 2: Recommended Evaluation Criteria, Indicators and Targets for 1st and 5th Growing Seasons

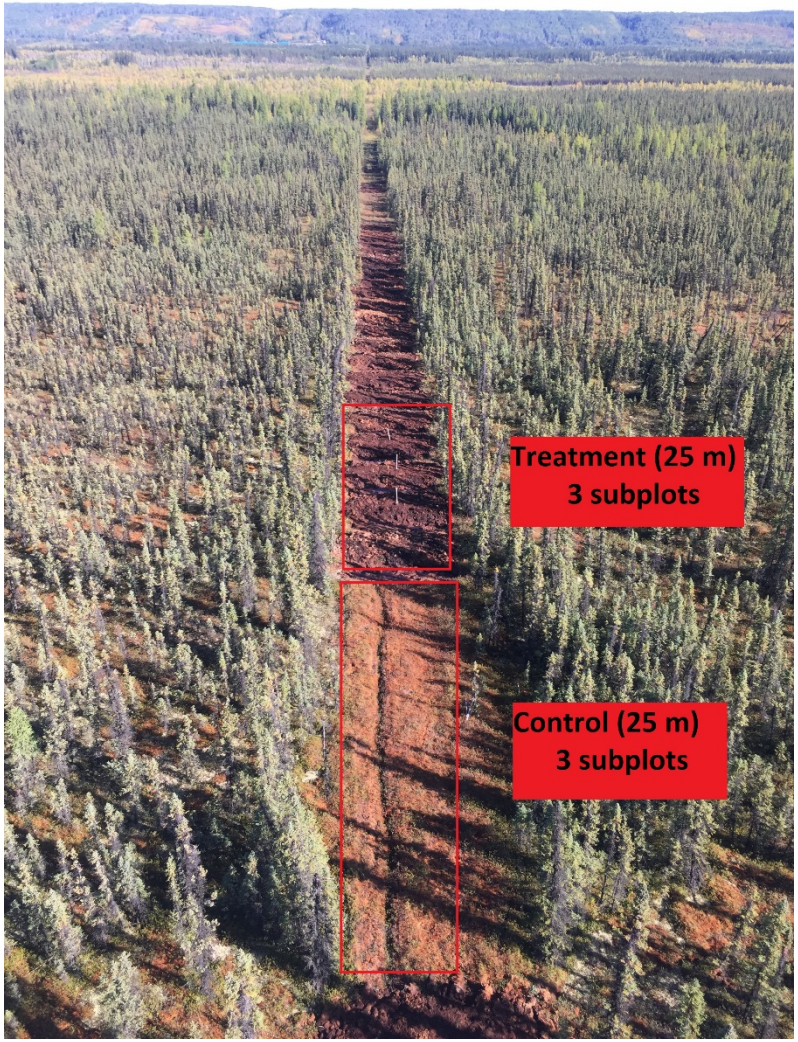
Restoration Objective	Restoration Unit	Evaluation Criteria	Indicator	1st Growing Season [1]	5th Growing Season[1]

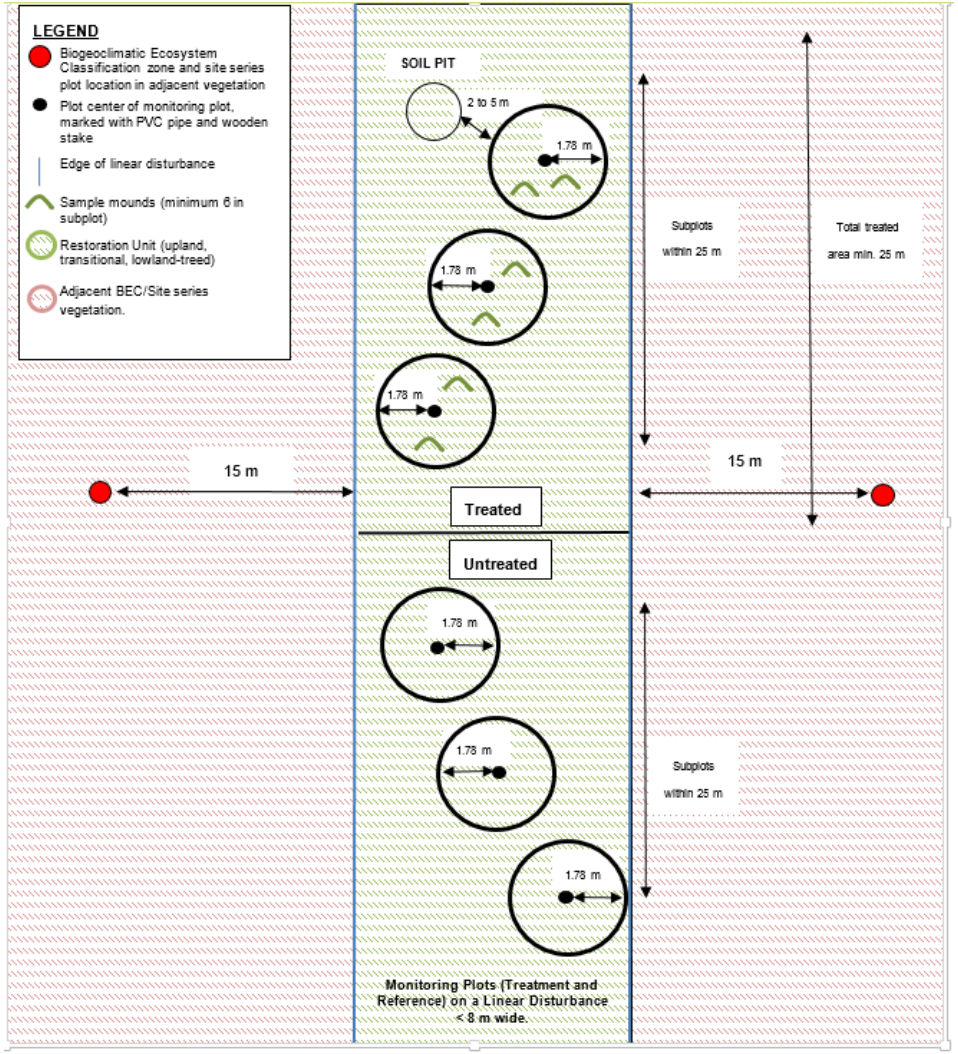
Vegetation Establishment	Upland and Transitional	• Density of live seedlings (stems/ha) of planted seedlings and naturally regenerating seedlings (i.e., from seed ingress or suckering)
		• Percent cover of live seedlings
		• Vigour of live seedlings
		• Vegetation community composition including percent cover and species present:
		  • Conifer
		  • Deciduous tree
		  • Palatable shrub
		  • Non-palatable shrub
		  • Herb/graminoid
		  • Non-vascular (mosses and lichens)
		  • Introduced (non-native, weed, invasive
			% of surviving planted or naturally re-established seedlings	At least 70% of seedlings/ ha surviving (when seedlings planted in winter[2, 3, 4]); at least 90% of seedlings/ha surviving (when seedlings planted in summer [4, 5])
				
				Identify any immediate issues such as seedling mortality due to poor seedling stock or desiccation; poor seed germination, and improperly placed or spread access control treatment implementation
					At least 50% of seedlings/ha surviving.
					
					Tree seedlings (planted and/or natural regeneration) demonstrate sustained growth trends (seedling height and leader growth) between 1st and 5th monitoring periods.

			Percent cover of targeted vegetation (conifer)	> 80% of surviving seedlings in treatment plot are considered well spaced. [6] *Identify any immediate issues with invasive species*	> 80% of surviving seedlings in treatment plot are considered well spaced.[6] Treatment and reference plots mimic adjacent stand type in community composition.[7]
			Evidence of chlorosis	No evidence of chlorosis *Identify any immediate issues such as seedling color or freeze desiccation*	No evidence of chlorosis.
			Density of targeted vegetation	Target of 1,200 stems/ha, with minimum 840 stems/ha from winter planting and 1080 stems/ha for summer planting (based on 70% and 90% survival, respectively) [8, 9]	Live seedling density of 1600-2,000 stems/ha (combined planted seedlings and/or natural regeneration) on sites not mounded.

http://www.bcogris.ca/sites/default/files/bcip-2016-02-restoration-monitoring-framework-final-dec151.pdf

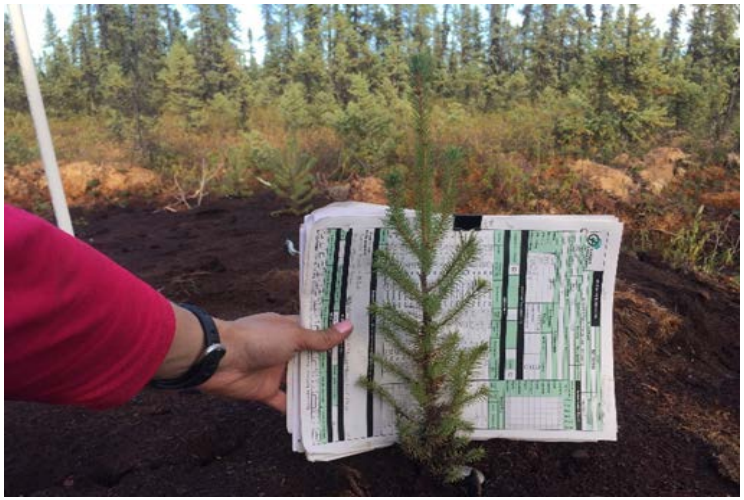
BC Caribou Restoration Monitoring Framework





BC Caribou Restoration Monitoring Framework

1ST GROWING SEASON, PAIRED PLOT DESIGN



- Met Monitoring Framework Targets
- 2,467 Stems / ha > 1200 stems/ha
- > 70% seedling survival target
- Leader growth ave 11 cm (0-23 cm)
- Good health and vigor; ungulate browse, clay mixing with mineral soil, subsistence/freeze thaw, planting temps
- No invasives, no human use limited wildlife use


2015-06-03 14:42:23 M 2/3 17°C
KIRBY63


2015-09-23 09:02:51 M 1/3

Parker Range Pilot Project

SUMMARY

- Landscape Level, Collaborative Habitat Restoration
  - 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 completed winter 2017
    - Zone 2 Implementation Plan ready; seedlings not sourced
- Monitoring for both wildlife response and vegetation trajectory response built into the Range Restoration Plan
- Pilot Program provides opportunities for Habitat Offsets
- Consider Indigenous Community Partnerships. Not just commercial opportunities only. Consider concept of the Land

Key Learnings

- High desire for engagement and collaboration within larger landscapes
- Early Engagement
- Focus: Priority Areas, Zonation Approach
- Have moved from discussions to on the ground action
- We have the toolbox; monitoring and research is underway
- Informal knowledge sharing
- No existing framework, policy, or guidelines for consistent approaches, monitoring or objectives

GOLDER

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- Steve Wilson (REMB)
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- **Canfor**
- **Fort Nelson Snowmobile Club**

Questions?

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