



Adaptation in Action in the Harrop – Procter Community Forest

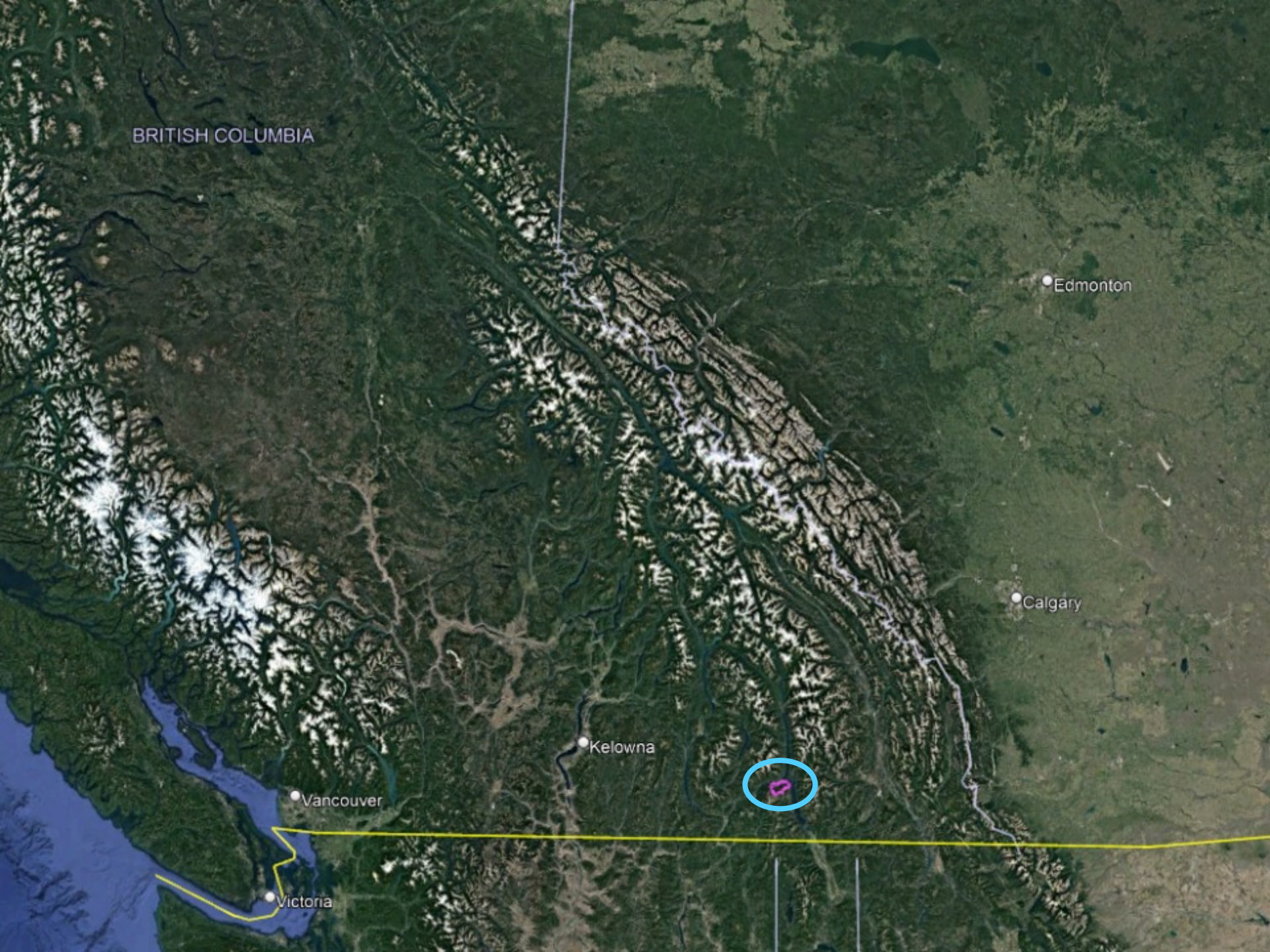
BCCFA conference

June 12, 2024

Erik Leslie, RPF

Forest Manager, Harrop-Procter Community Co-op





BRITISH COLUMBIA

Edmonton

Calgary

Kelowna

Vancouver

Victoria





Kootenay Lake

Nelson





Resilient?



2017 wildfire

2003 wildfire

Harrop Creek

WHY THIS PROJECT?

Lots of talk, not enough action

Disconnect between
climate adaptation theory
and management actions
on the ground

Need real-world
management examples



Adaptation: generalities → specifics

- ‘Promote resilience’
- ‘Enhance landscape diversity’
- ‘Partial cut dry sites’
- What? How?
- Species and age targets?
- Priorities? How?



Overview of project

Risk assessment—*Where* do we prioritize management actions?

Operations strategy—*How* do we manage for adaptation?

Harvest rates / AAC—*How fast* do we adapt?



Risk Assessment

Prioritize areas for adaptation actions

- *Focus on next 20 to 40 years*

RISK = Probability x Consequence

Probability of: *Consequence to:*

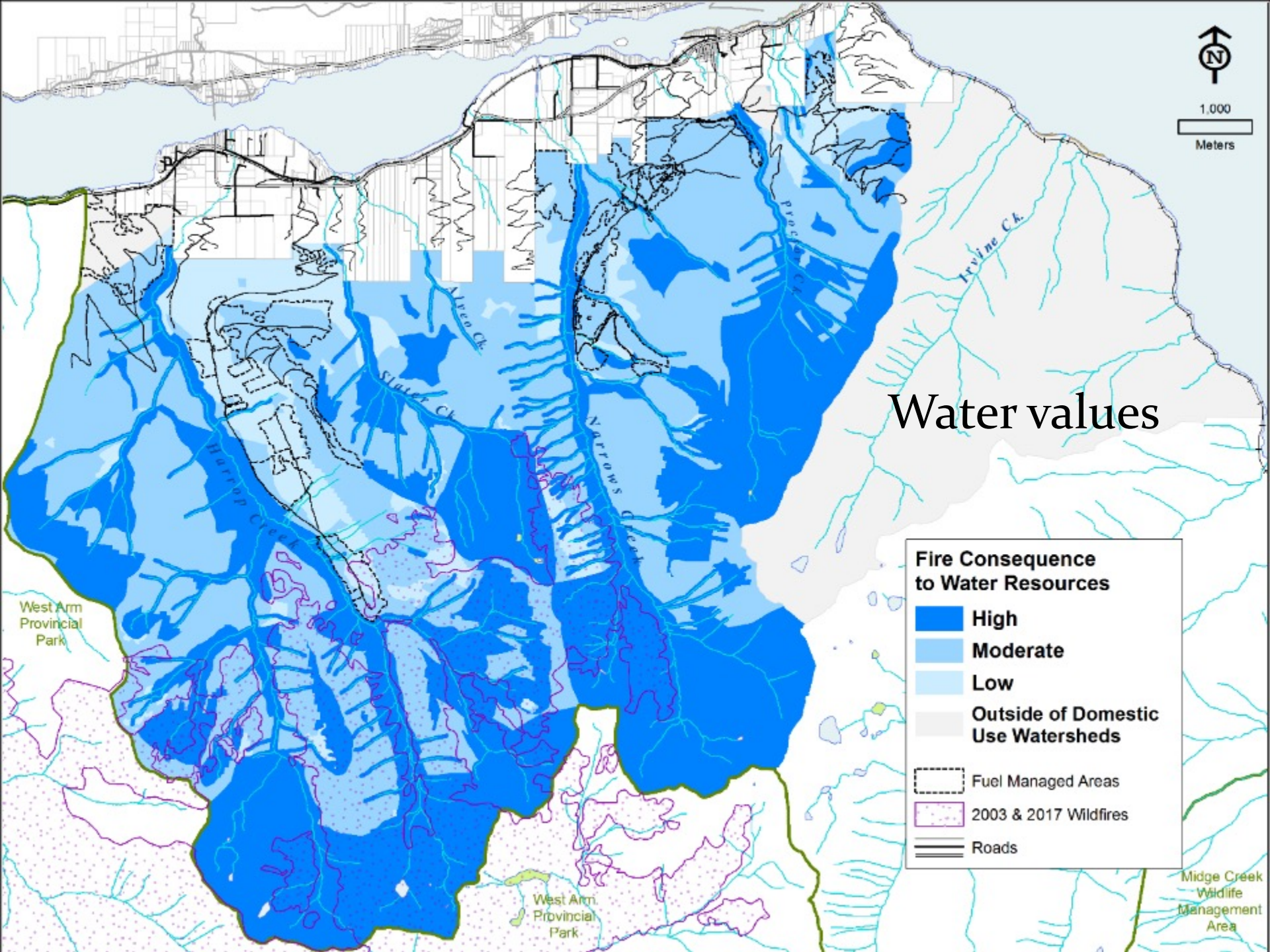
- Fire
- Drought
- Homes
- Water
- Biodiversity
- Timber

RISK MATRIX					
		Fire Consequence			
		High	Moderate	Low	Very_low
Fire Probability	Extreme	Extreme	High	High	Low
	High	High	High	Moderate	Low
	Moderate	High	Moderate	Moderate	Low
	Low	Moderate	Moderate	Low	Low
	Very Low	Moderate	Low	Low	Low

Consequence mapping: Values

- Homes
- Water
- Biodiversity
- Timber





Water values

Fire Consequence to Water Resources

- High** (Dark Blue)
- Moderate** (Medium Blue)
- Low** (Light Blue)
- Outside of Domestic Use Watersheds** (Grey)

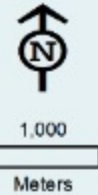
Legend:

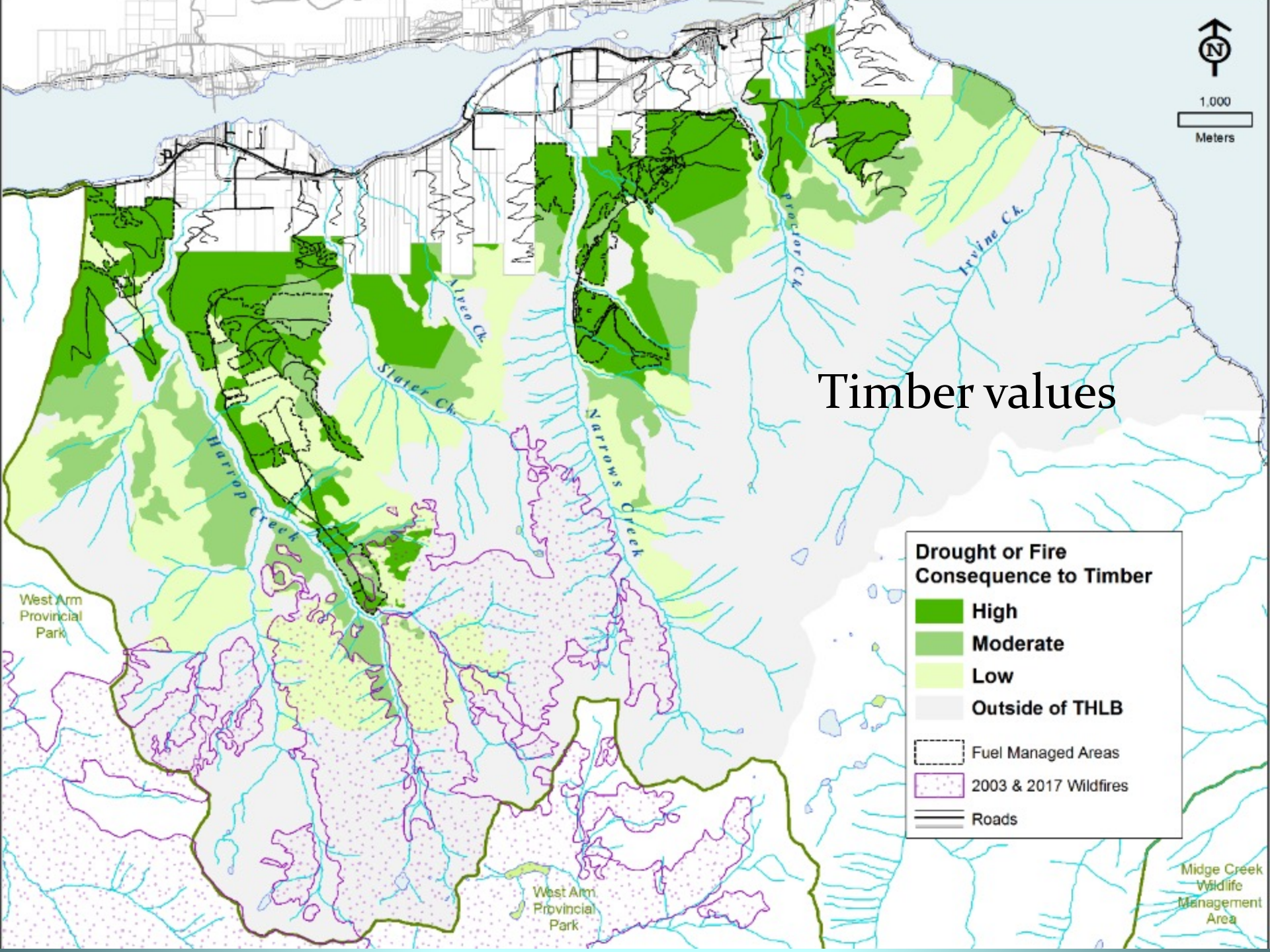
- Fuel Managed Areas (Dashed line)
- 2003 & 2017 Wildfires (Dotted/Pink area)
- Roads (Black line)

West Arm Provincial Park

West Arm Provincial Park

Midge Creek Wildlife Management Area





Timber values

Drought or Fire Consequence to Timber

- High** (Dark Green)
- Moderate** (Medium Green)
- Low** (Light Green)
- Outside of THLB** (Grey)

Fuel Managed Areas (Dashed line)

2003 & 2017 Wildfires (Dotted purple)

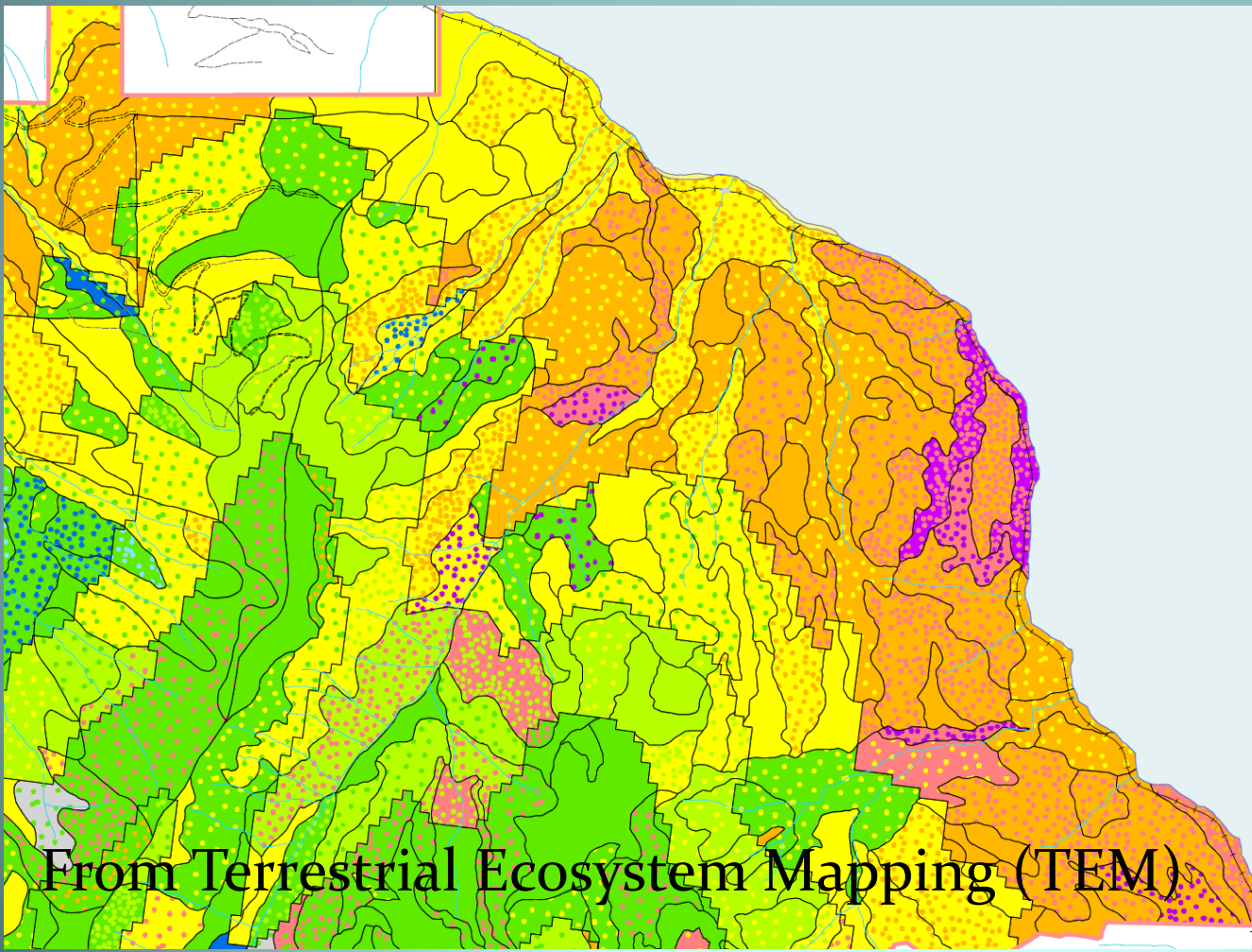
Roads (Black line)

West Arm Provincial Park

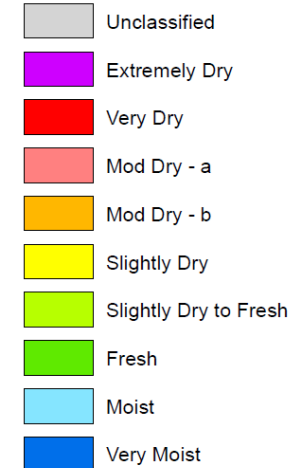
West Arm Provincial Park

Midge Creek Wildlife Management Area

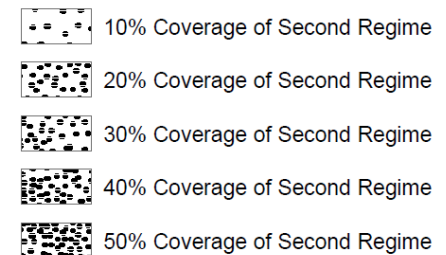
Probability of fire and drought: *Actual Soil Moisture Regime (ASMR)*



Absolute Moisture Regime



The presence of and proportion of a second ASMR regime in any TEM polygon is shown by color themed dot pattern:



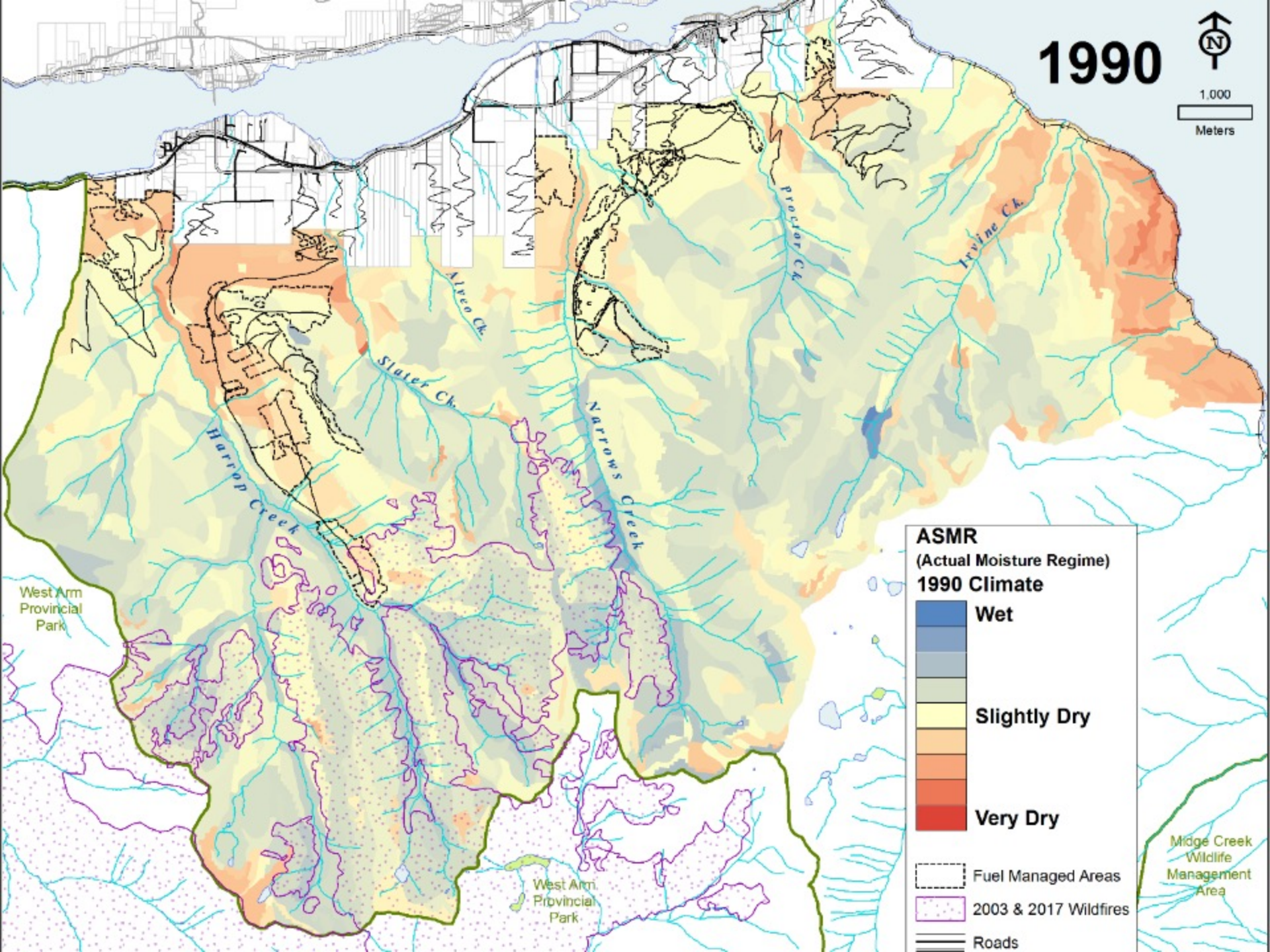
From Terrestrial Ecosystem Mapping (TEM)

1990

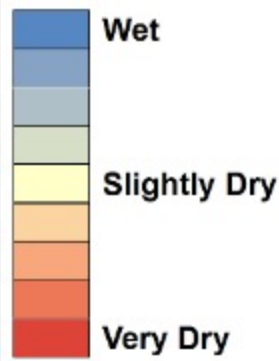


1,000

Meters



ASMR
(Actual Moisture Regime)
1990 Climate



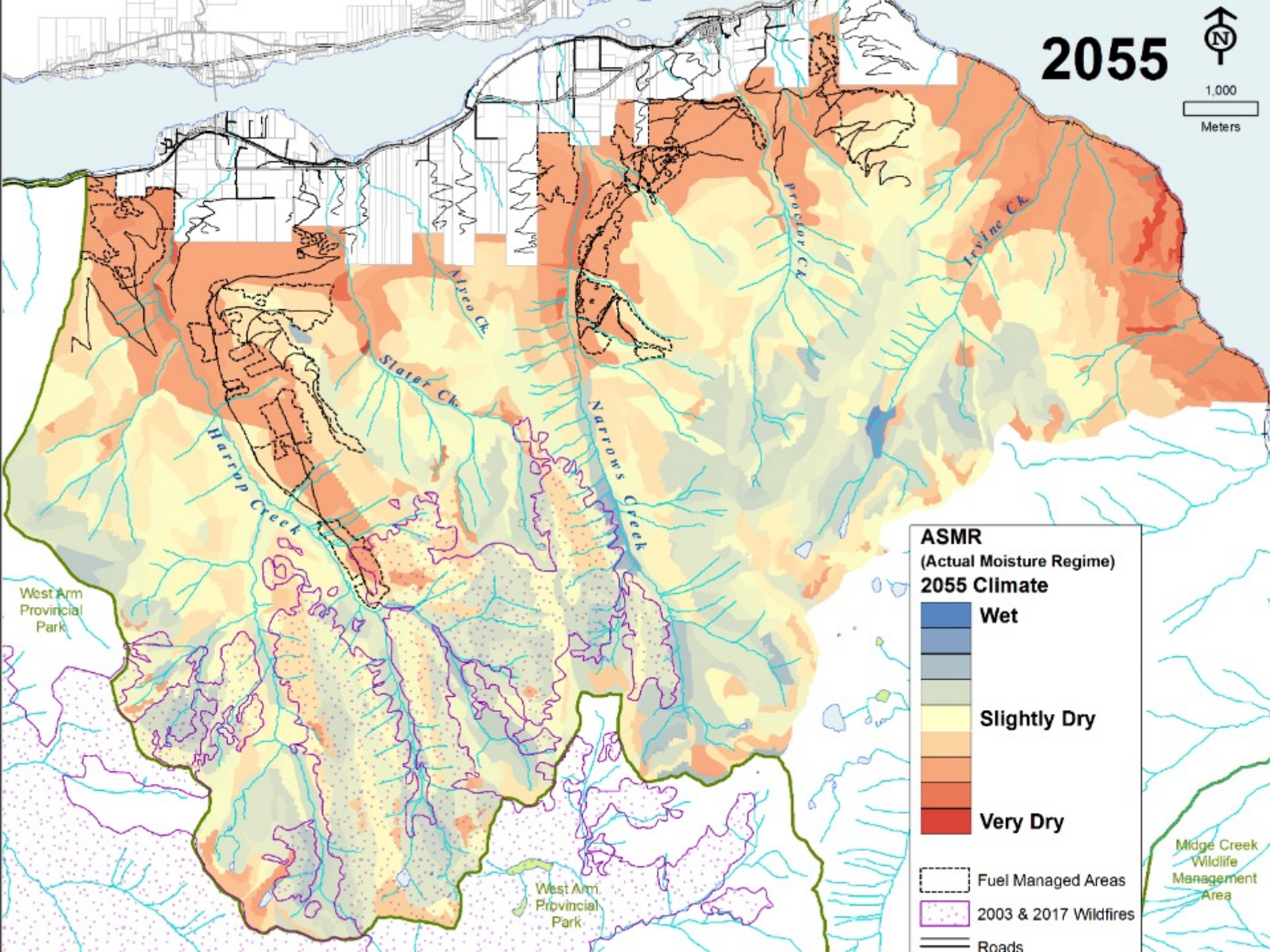
2055



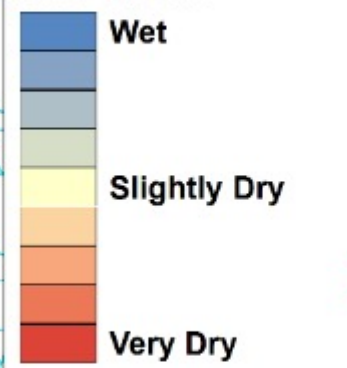
1,000



Meters



ASMR
(Actual Moisture Regime)
2055 Climate



- Fuel Managed Areas
- 2003 & 2017 Wildfires
- Roads

West Arm
Provincial
Park

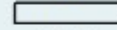
West Arm
Provincial
Park

Midge Creek
Wildlife
Management
Area

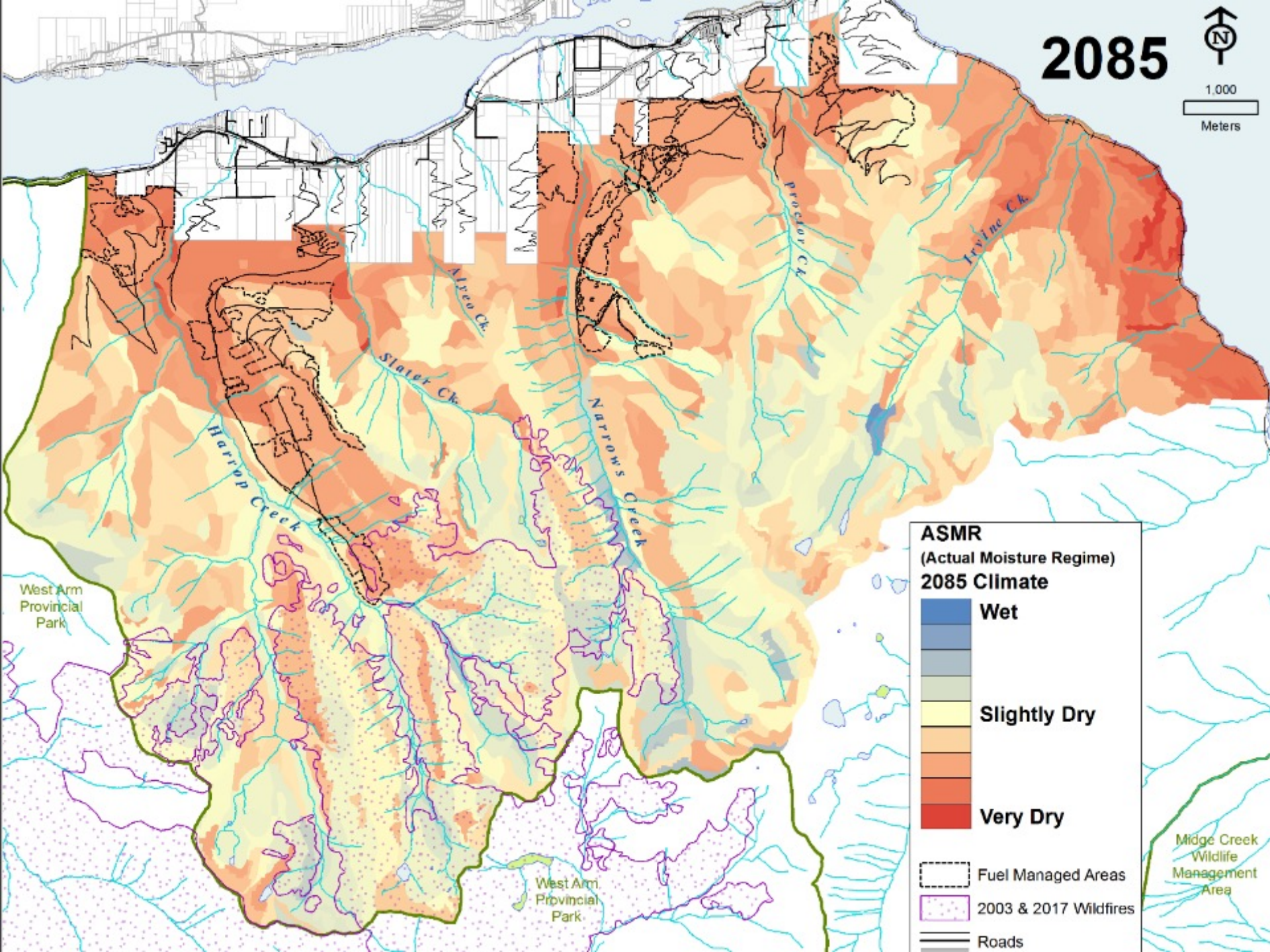
2085



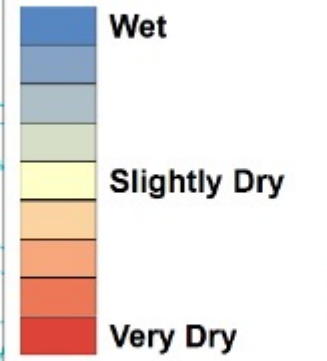
1,000



Meters



ASMR
(Actual Moisture Regime)
2085 Climate



- Fuel Managed Areas
- 2003 & 2017 Wildfires
- Roads

West Arm
Provincial
Park

West Arm
Provincial
Park

Midge Creek
Wildlife
Management
Area

Harrop
Creek

Slater
Ck.

Algeo
Ck.

Narrows
Creek

Proctor
Ck.

Irvine
Ck.

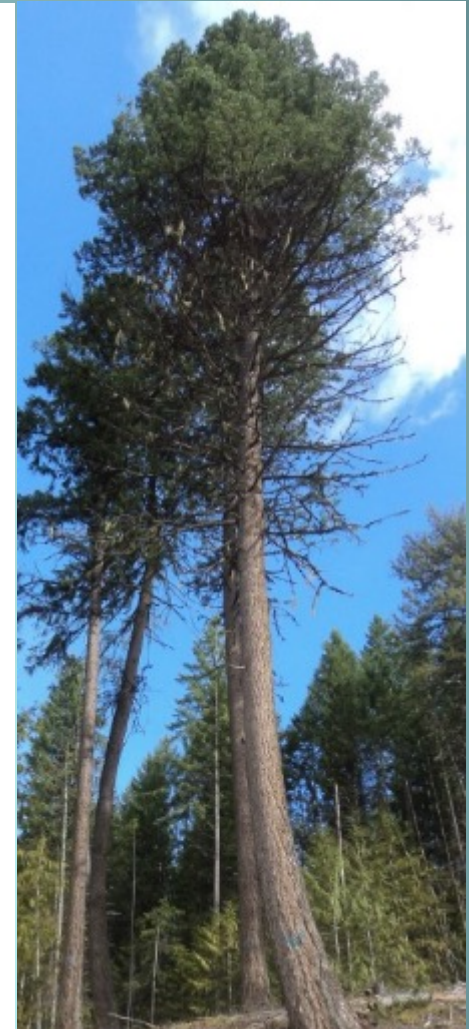
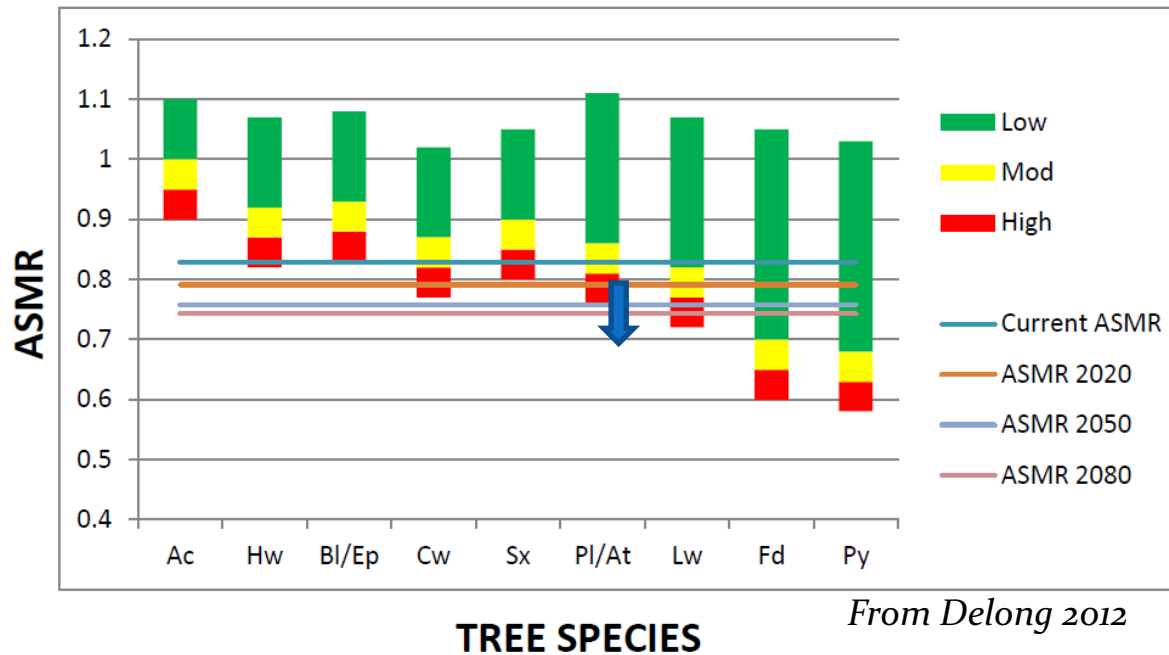
Drought probability: ASMR limits

BEC ICH dw 1
RSMR 4

Bigeoclimatic Unit
Relative Soil Moisture Regime
Actual Soil Moisture Regime

Values

Current ASMR	ASMR 2020	ASMR 2050	ASMR 2080
0.83	0.79	0.76	0.74



See current work of Future Forest Ecosystem Centre

Fire probability

Fire probability: likelihood of high severity fire

Did not use provincial algorithm

Fuel_Load	ASMR			
	A_DRY	B_MOD	C_MOIST	D_WET
a Extreme	a Extreme	a Extreme	a High	d V Low
a_High	a Extreme	a High	b Mod	d V Low
b Moderate	a High	b Mod	C Low	d V Low
c Low	b Mod	C Low	C Low	d V Low
d Very Low	d V Low	d V Low	d V Low	d V Low

Adjust fuel load/ ASMR rating based on

- Slope
- Percent dead pine/ balsam

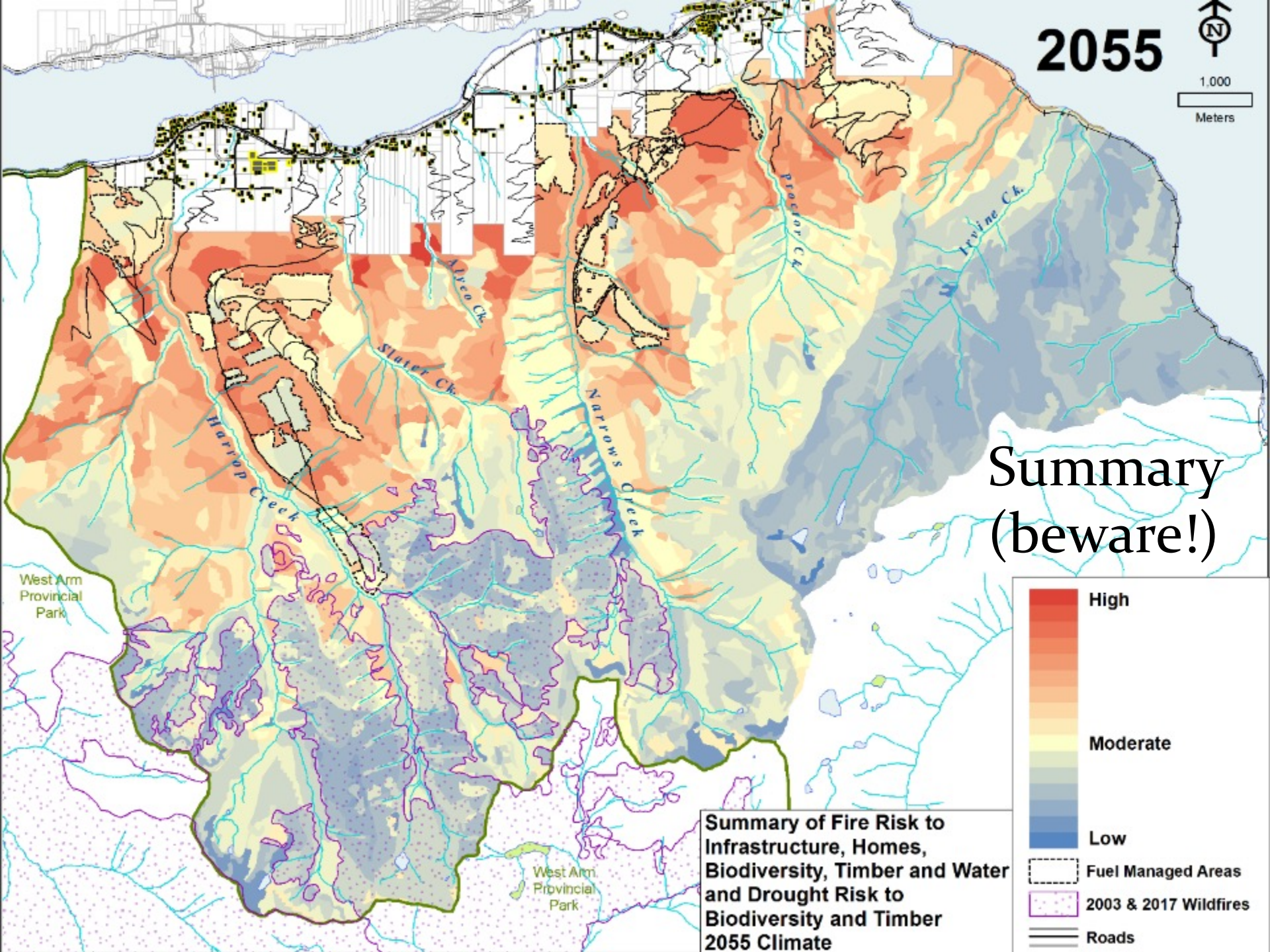


2055

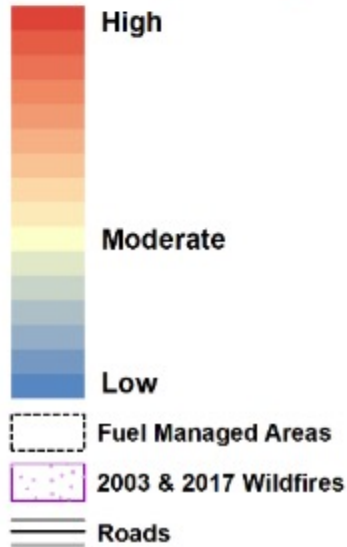


1,000

Meters



Summary
(beware!)



Summary of Fire Risk to Infrastructure, Homes, Biodiversity, Timber and Water and Drought Risk to Biodiversity and Timber 2055 Climate

Risk assessment conclusions

Highest risk areas

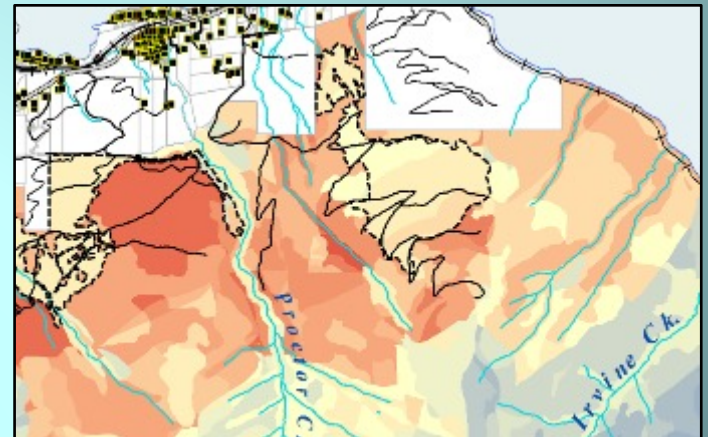
Homes: Untreated WUI (except moist sites)

Water: Headwaters areas with high fire likelihood

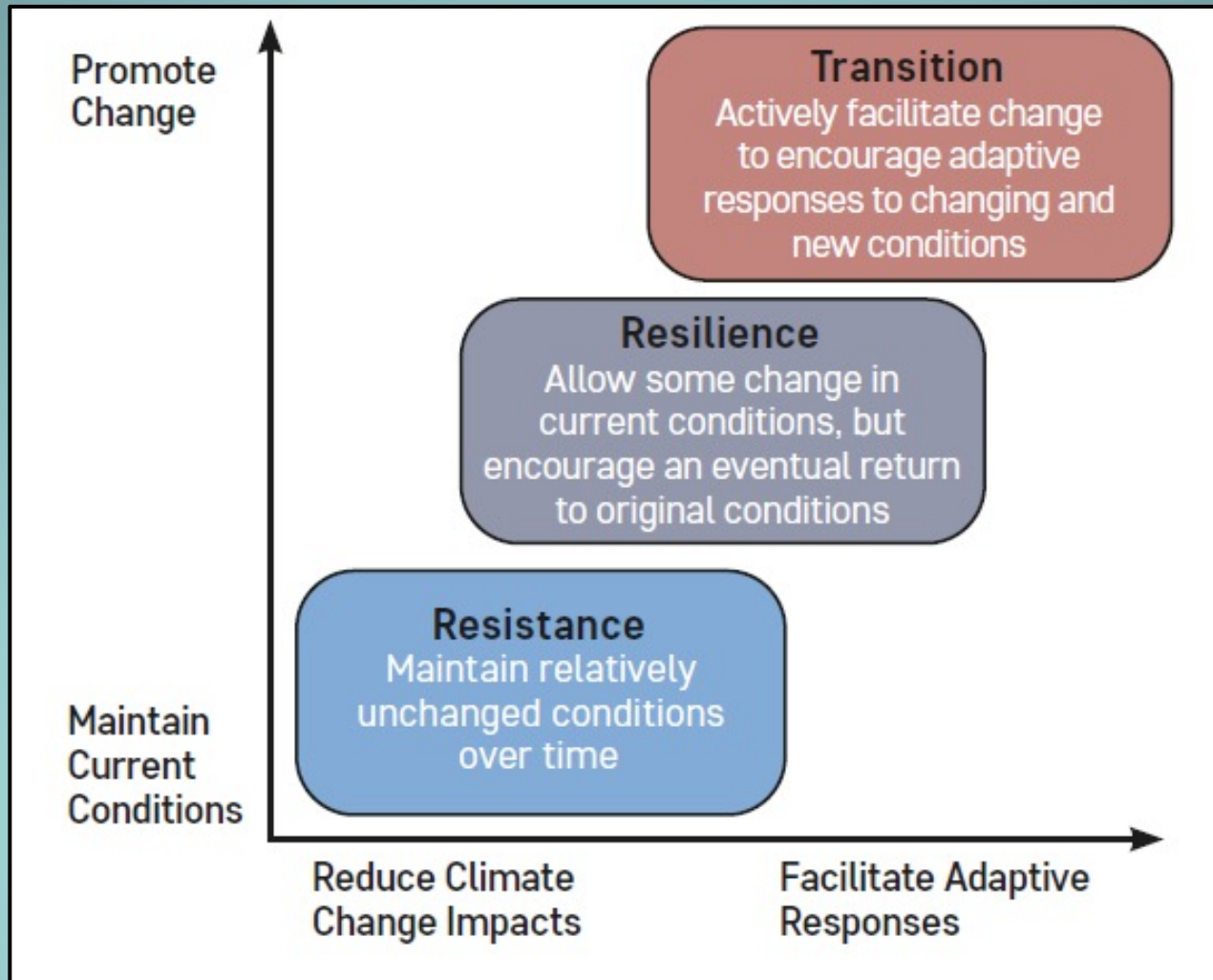
Biodiversity: Old forests on drier sites

Timber: Cedar / hemlock on drier sites

Triage—need to prioritize



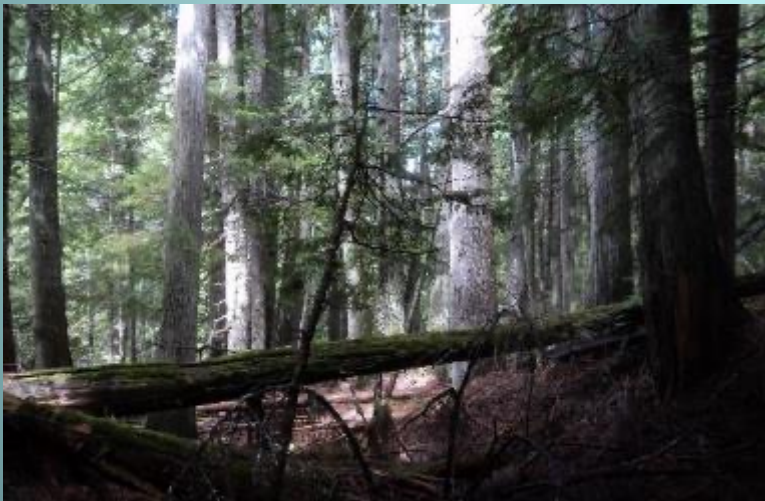
Adaptation options - concept



Adaptation options - examples

Resistance

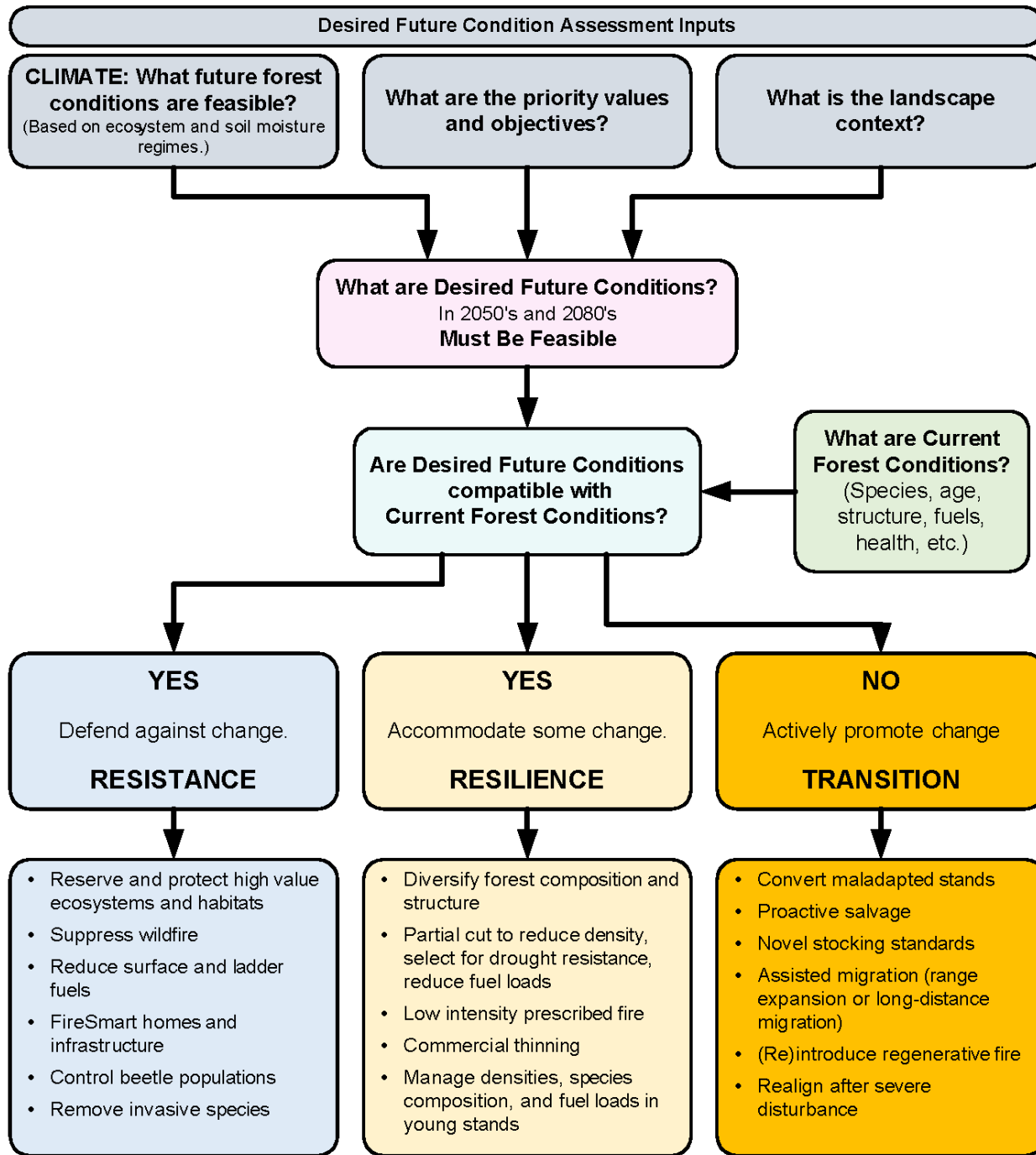
- Construct fuel breaks
- Protect old forests & riparian (hold carbon)
- Connectivity—reserves



Transition

- Transform forest structure
- New stocking standards
 - Ponderosa pine, deciduous
- Connectivity—treatments





Strategy: Promote landscape diversity

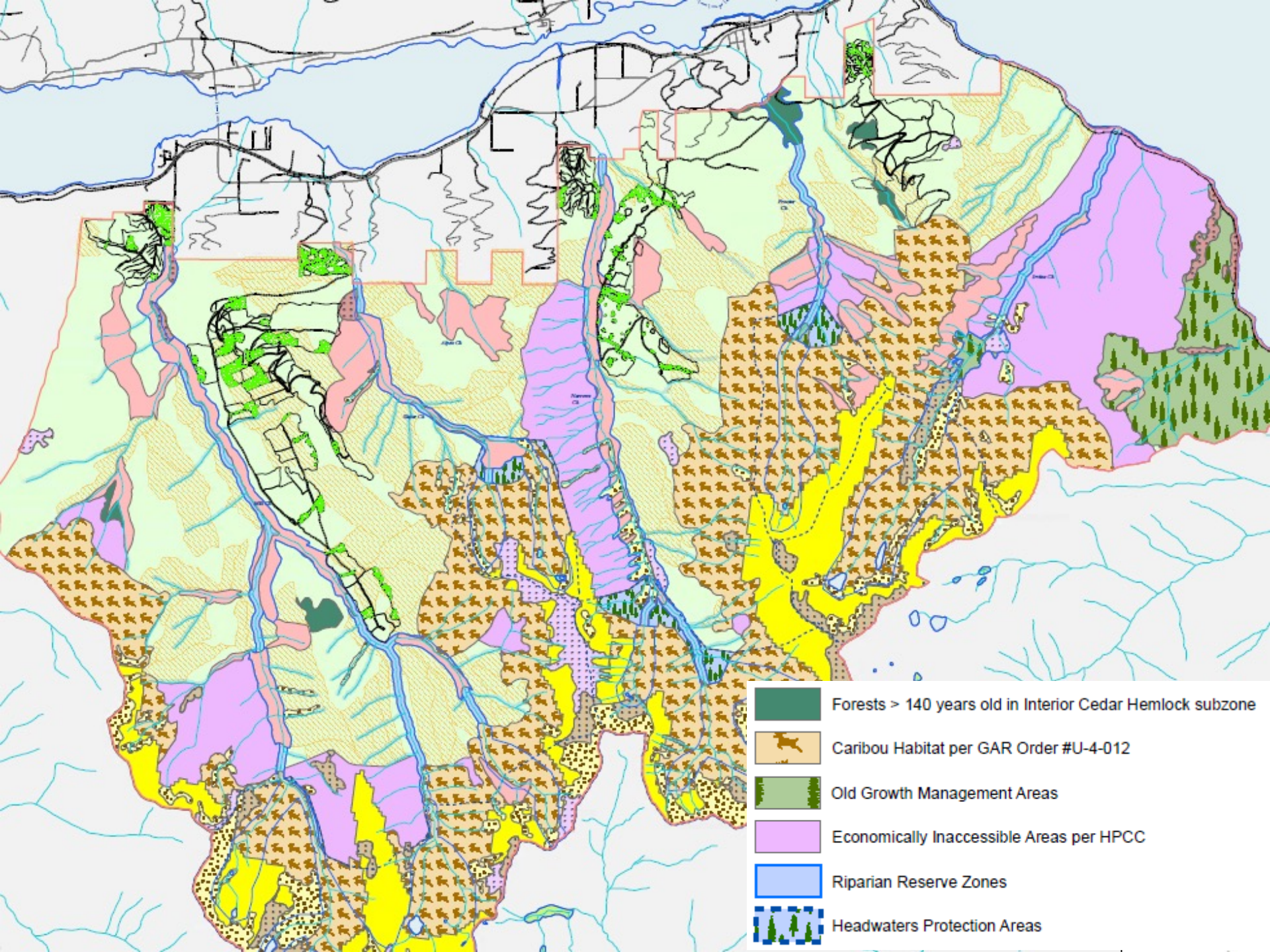
- Resilience strategy
 - Subregional and watershed scales
- Diversify forest composition and structure
- Variable patch sizes and retention levels
- Develop through landscape planning









Strategy: Reserve (and protect)

- Resistance strategy
- Desired future conditions similar to current conditions
- High value (high consequence) areas
 - Rare ecosystems/ old growth
 - Headwaters of community watersheds
- Risk: may be rowing upstream against climate changes





-  Forests > 140 years old in Interior Cedar Hemlock subzone
-  Caribou Habitat per GAR Order #U-4-012
-  Old Growth Management Areas
-  Economically Inaccessible Areas per HPCC
-  Riparian Reserve Zones
-  Headwaters Protection Areas

Strategy: Landscape fuel breaks

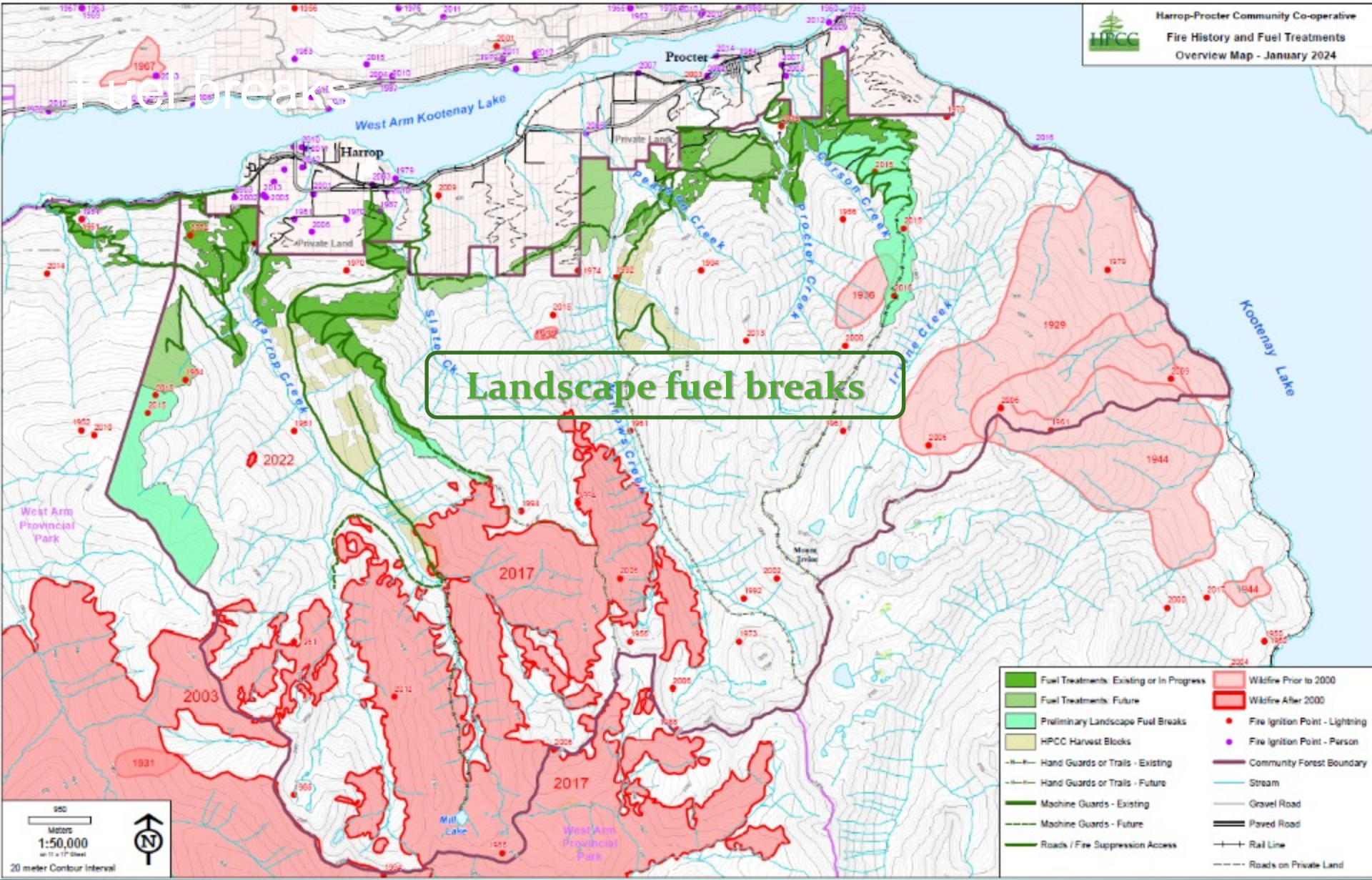
- Resistance strategy (watershed level)
- Connected across WUI
- Between watersheds (firesheds)

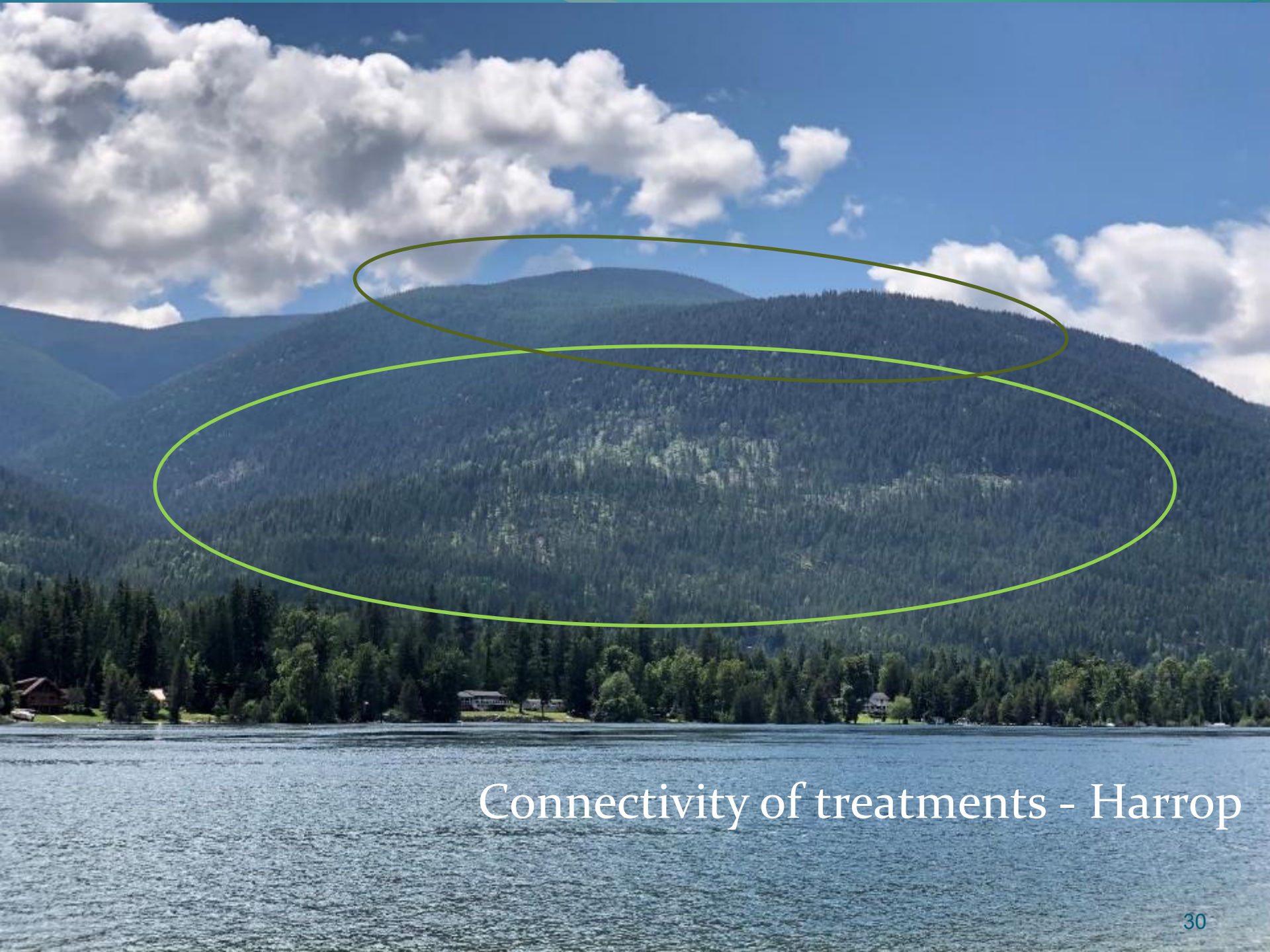




Fire breaks

Landscape fuel breaks





Connectivity of treatments - Harrop



Strategy: reduce density on dry sites

- Resilience strategy
- Prioritize based on drought likelihood (actual soil moisture regimes)
- Partial cutting to promote drought tolerant species
 - Commercial thinning, spacing
- Promote through WUI fuel treatments









Partial cut 2019, understory burn 2020



2 years after prescribed burn

Strategy: Convert maladapted stands

- Transition strategy
 - Current conditions not compatible with desired future conditions
- For high timber risk stands (proactive salvage)
- Reset – new trajectory







A photograph of a forest scene. In the foreground, a large, dark brown tree trunk with rough, textured bark is the central focus. A small, rectangular marker with red and yellow sections is attached to the bark. The background is filled with many thinner, vertical tree trunks, some of which are bare and light-colored, suggesting a transition or restoration phase. The ground is covered with dry leaves and twigs. The text "Transition/ Restoration" is overlaid in white on the lower part of the tree trunk.

**Transition/
Restoration**

Carbon carrying capacity

Peak carbon: June 2003

Where can we hold carbon?

- *short-term vs long-term*
- *manage transition*

Hold carbon (resist) on moist sites

Proactively reduce carbon (transition) on drier sites



Harvest rates –AAC reconsidered

How fast do we transition?

Revise timber supply assumptions

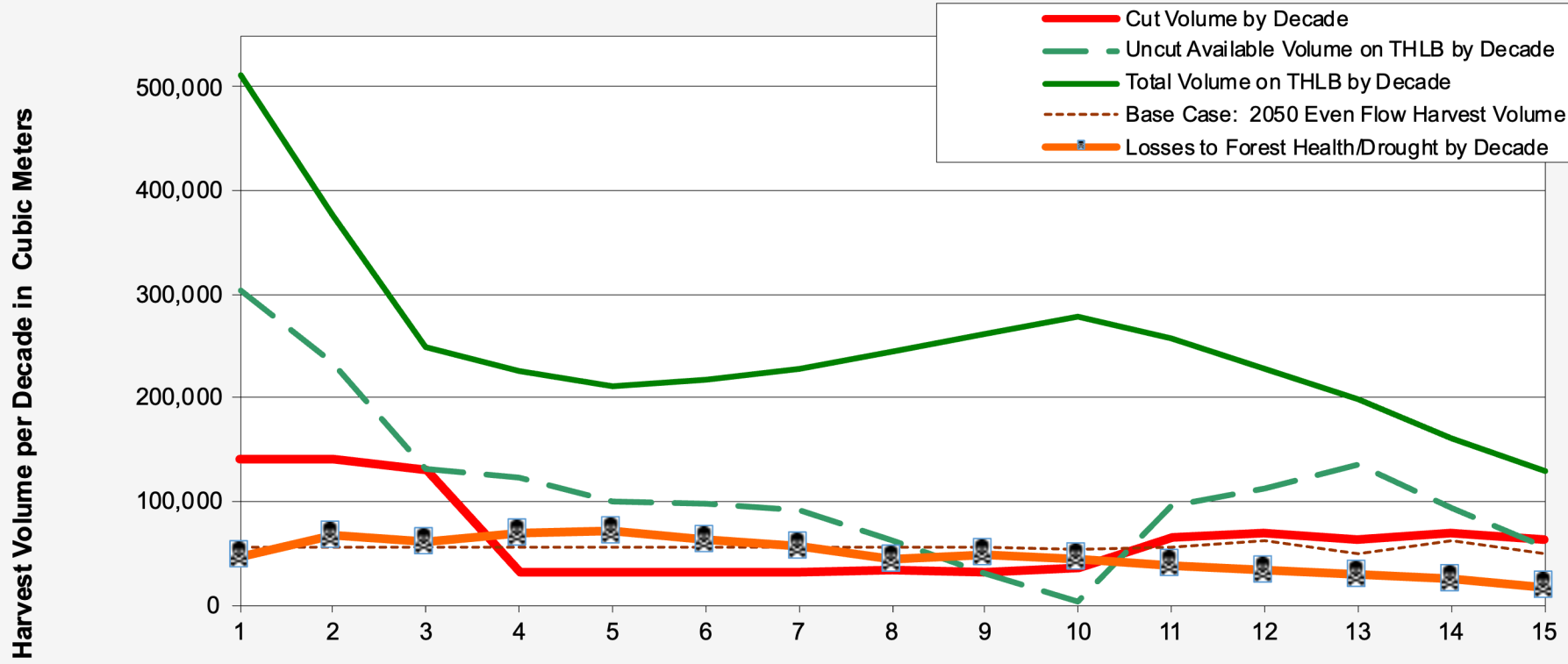
- Unsalvaged losses
- Growth rates

Reconsider ‘sustained yield’ and
‘even flow’

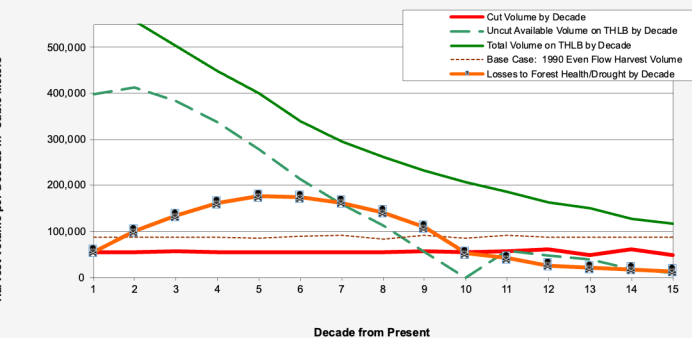
Social choices—based on risks



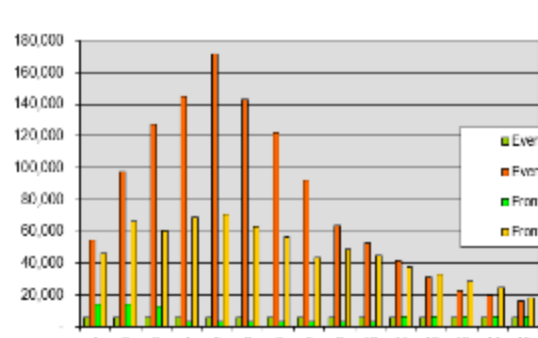
Elevated Initial Harvest Rate- Community Forest K1B THLB 2050 Conditions- Unsalvaged Losses to Forest Health Agents of 3%/10%/20% per Year Depending on Stand Drought Probability 14,000 m³/year, then 3,200 m³/yr, then 6,600 m³/yr Harvest Rate



**Even Flow Harvest Pattern from Community Forest K1B THLB
2050 Conditions- Unsalvaged Losses to Forest Health Agents
of 3%/10%/20% per Year Depending on Stand Drought Probability
5,500 m³/year Harvest Rate**



**Comparison of FIXNET Losses
Even Flow Harvest Rate VS
High Initial Harvest Rate V2**





CLIMATE CHANGE AND NEW APPROACHES TO WILDFIRE RISK REDUCTION

HP Community Forest - YouTube



Thank you!

www.hpcommunityforest.org

