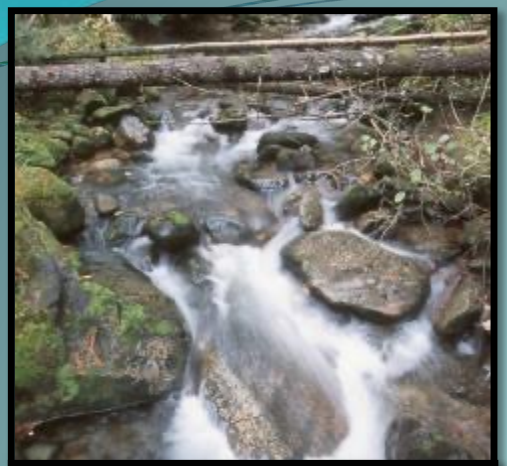


Adaptation in Action in the Harrop – Procter Community Forest

BCCFA conference

June 12, 2024

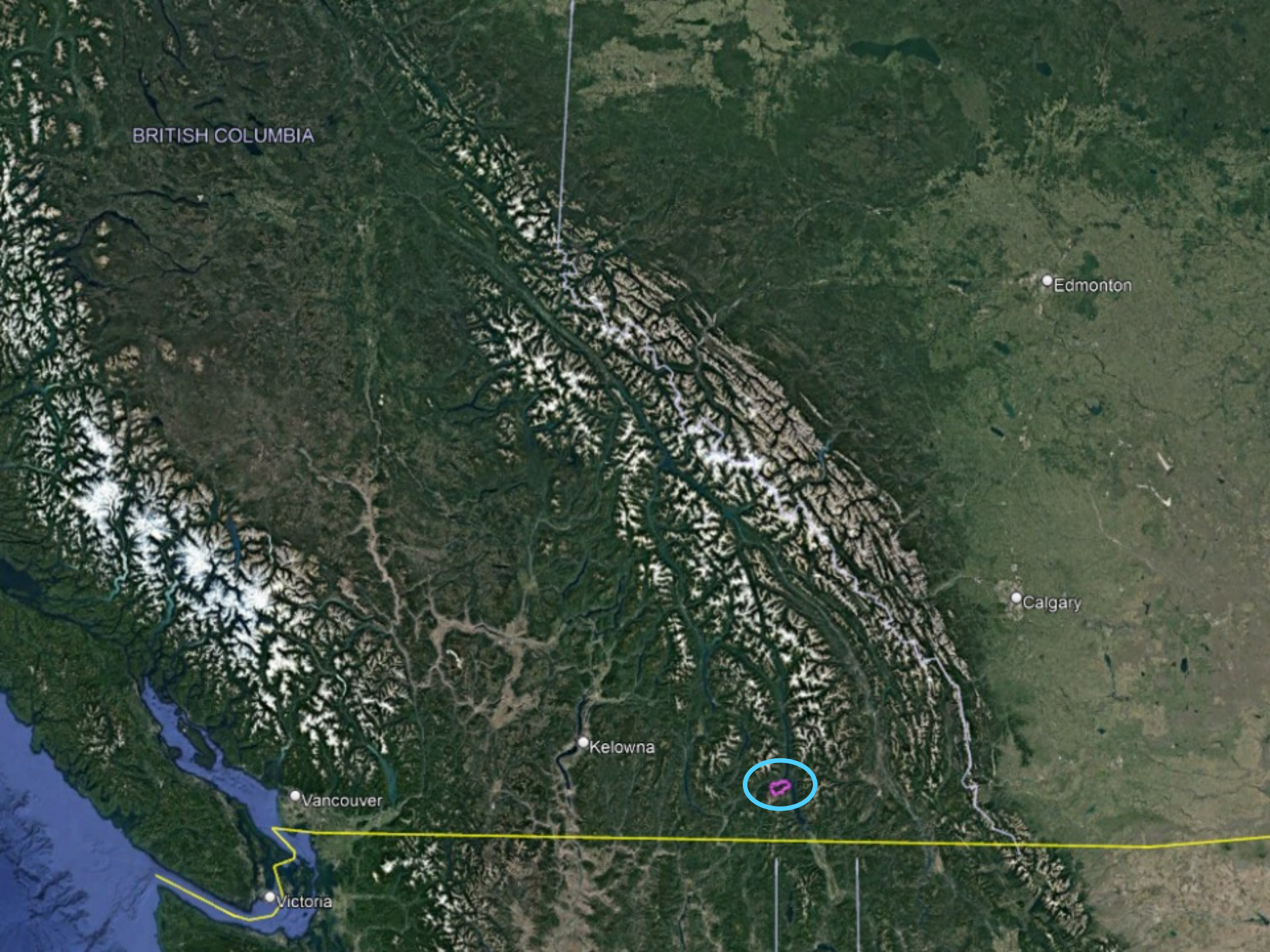
Erik Leslie, RPF

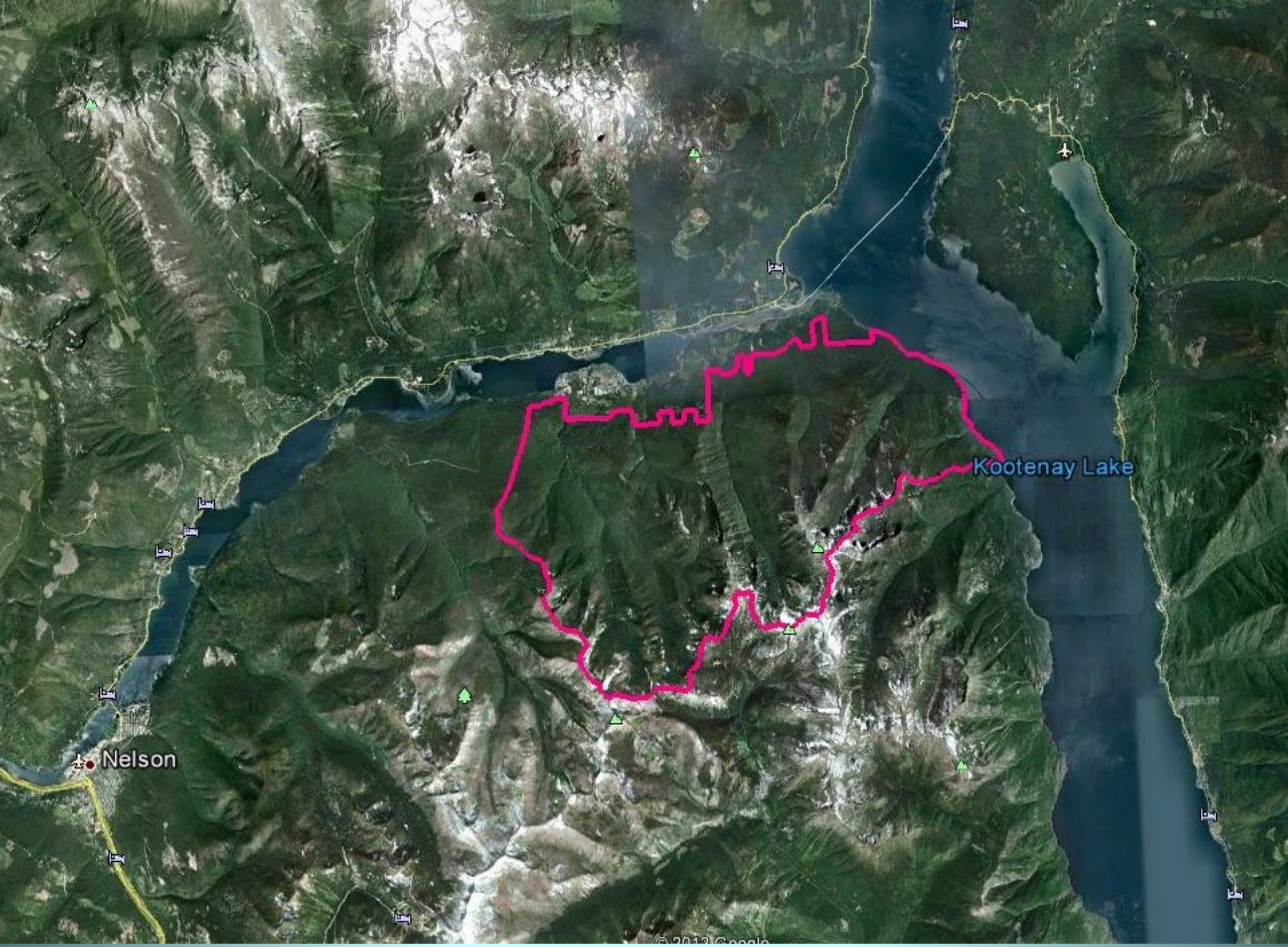
Forest Manager, Harrop-Procter Community Co-op

HPCC

Harrop Procter Community Co-Op

Columbia Basin trust


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’

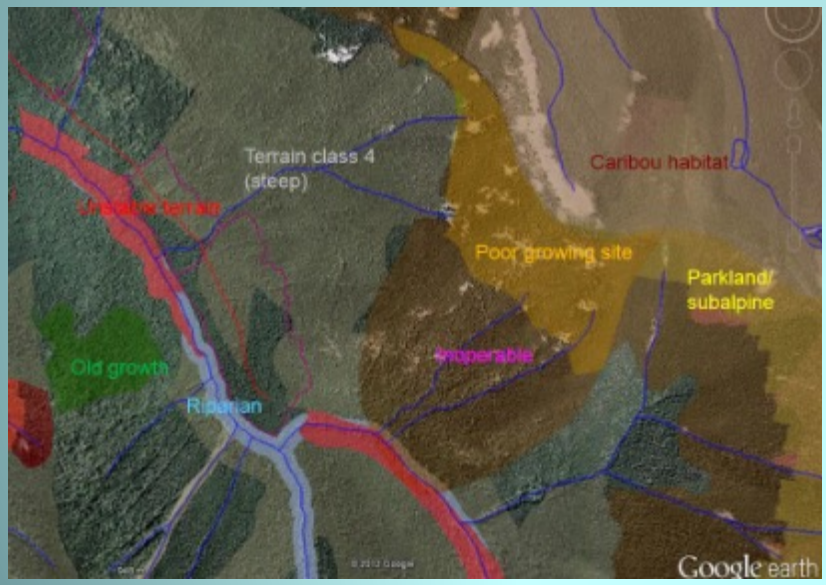
- What? How?
- Species and age targets?
- Priorities? How?

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:

- Fire
- Drought

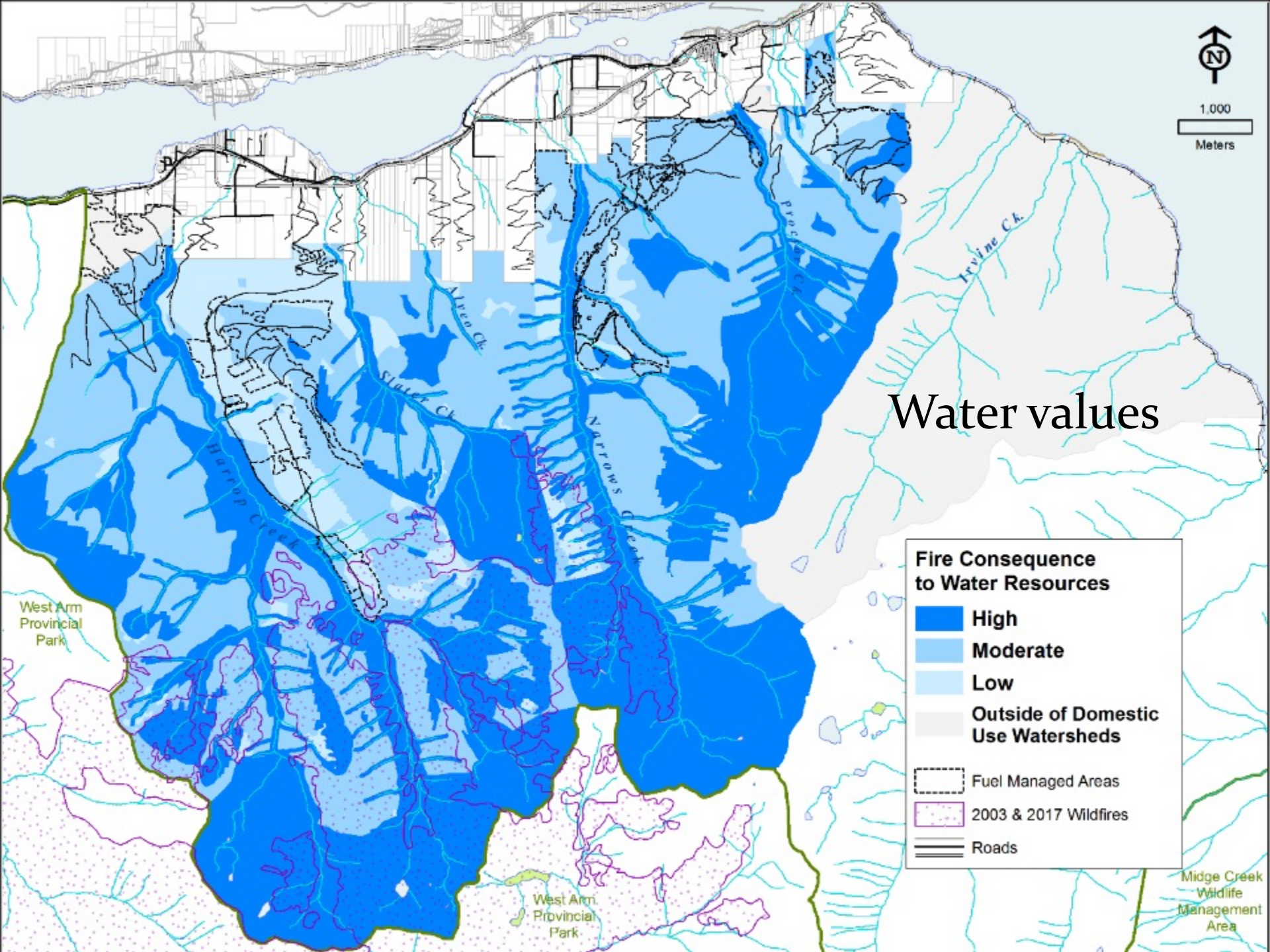
Consequence to:

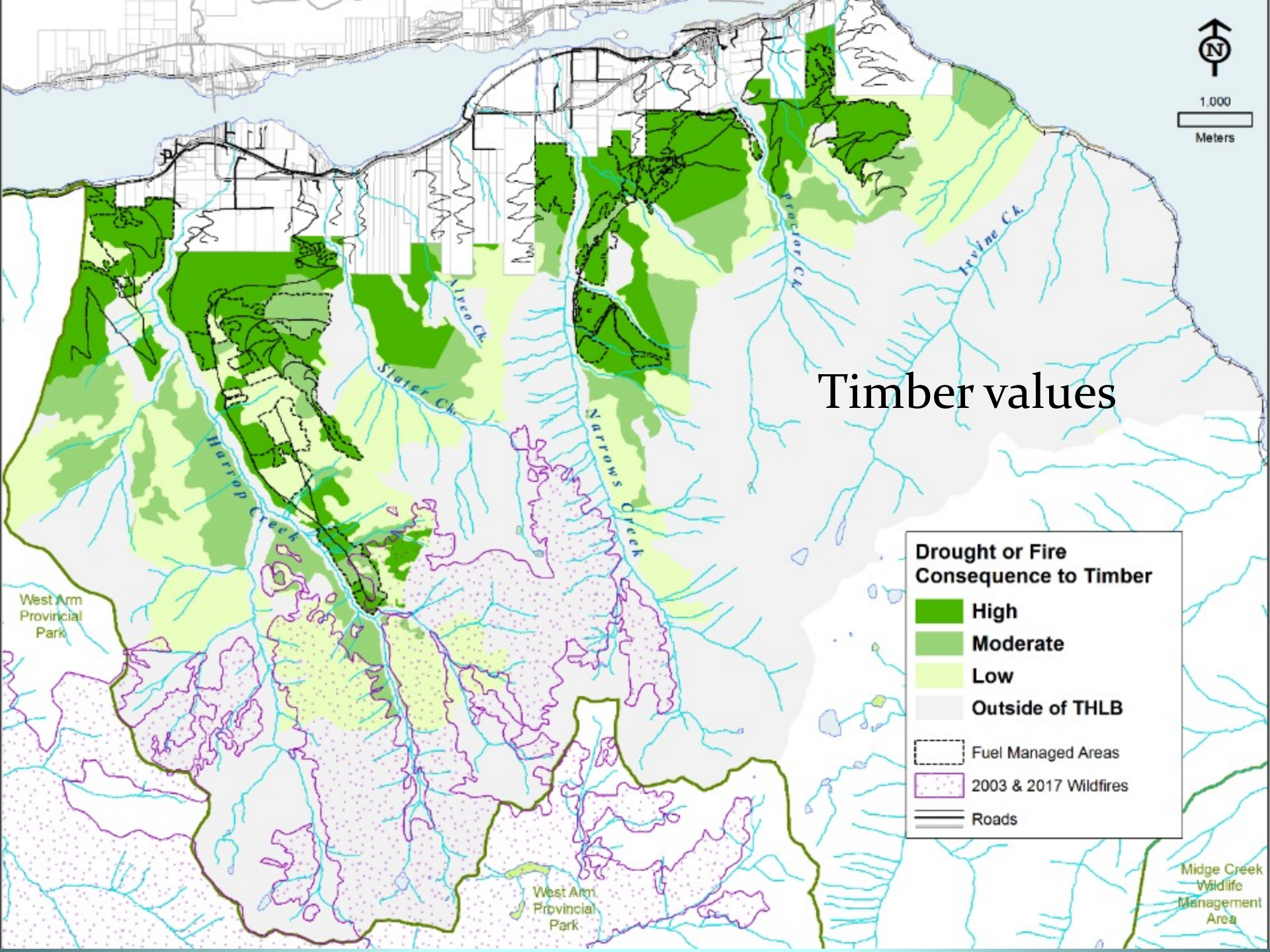
- Homes
- Water
- Biodiversity
- Timber

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

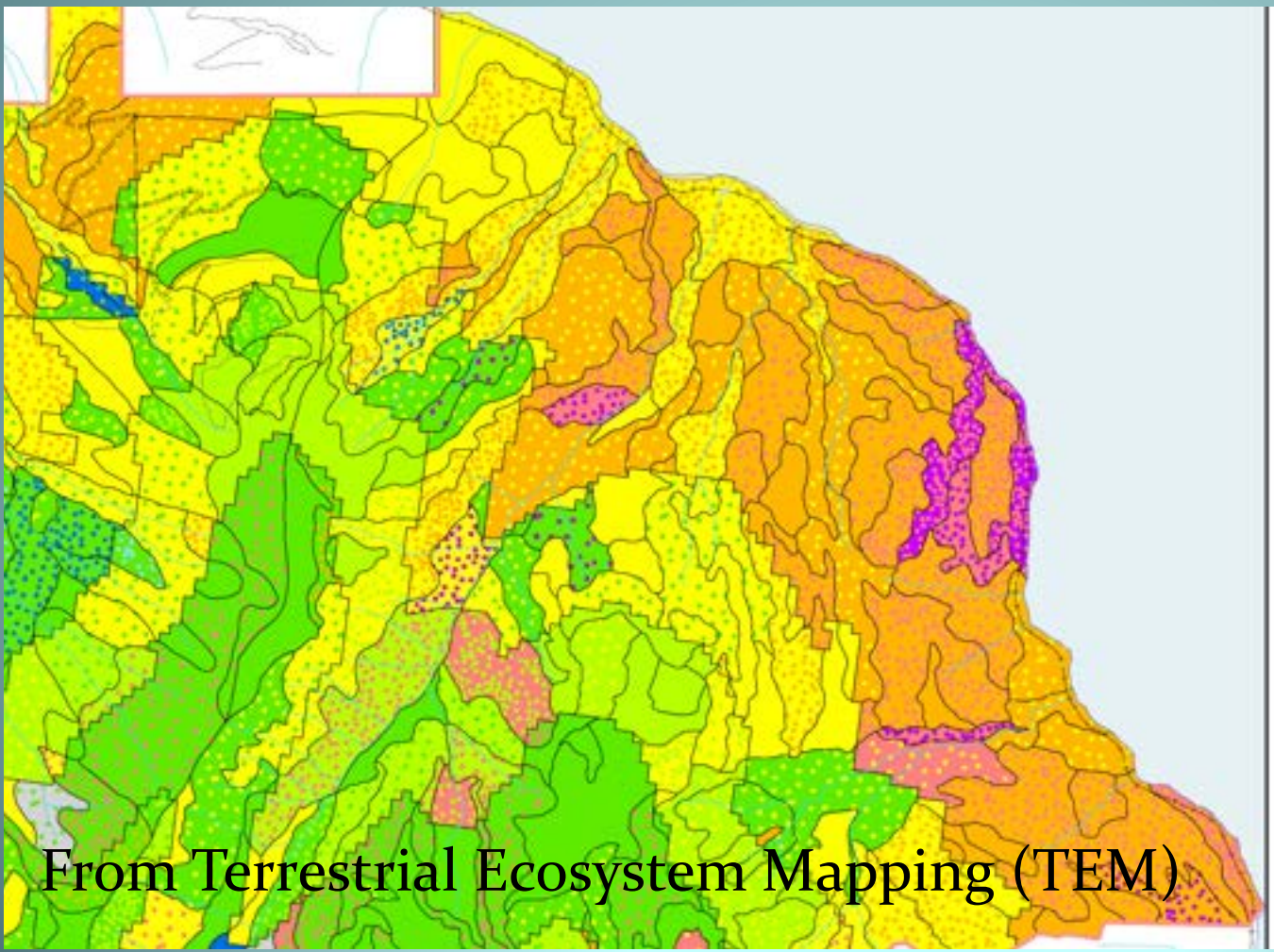
- Homes
- Water
- Biodiversity
- Timber


Water values
1,000
Meters
Fire Consequence to Water Resources
High
Moderate
Low
Outside of Domestic Use Watersheds
Fuel Managed Areas
2003 & 2017 Wildfires
Roads
West Arm Provincial Park
West Arm Provincial Park
Midge Creek Wildlife Management Area
Irvine Ck.
Harrop Creek
Narrows Creek



Timber values

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



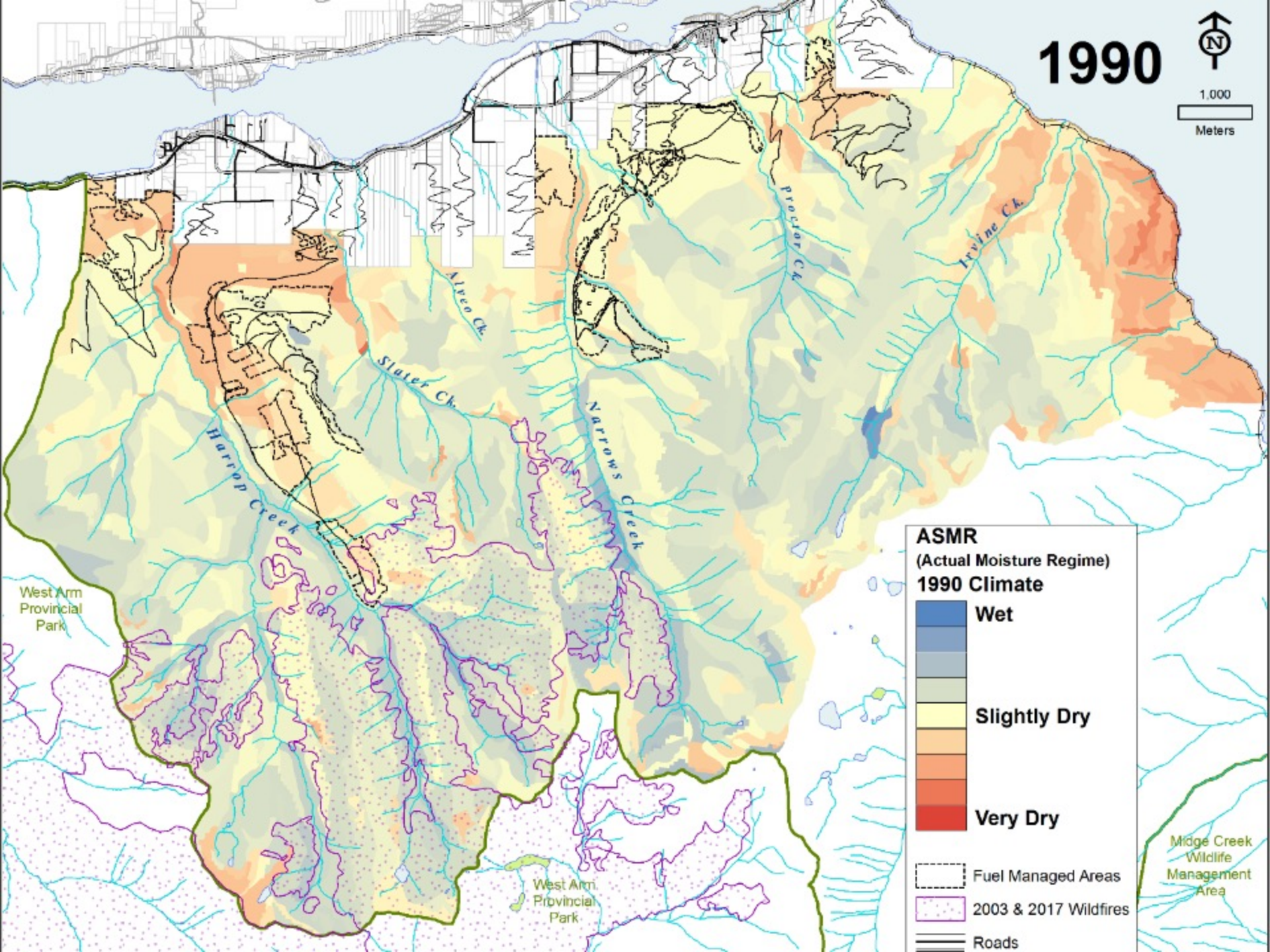
From Terrestrial Ecosystem Mapping (TEM)

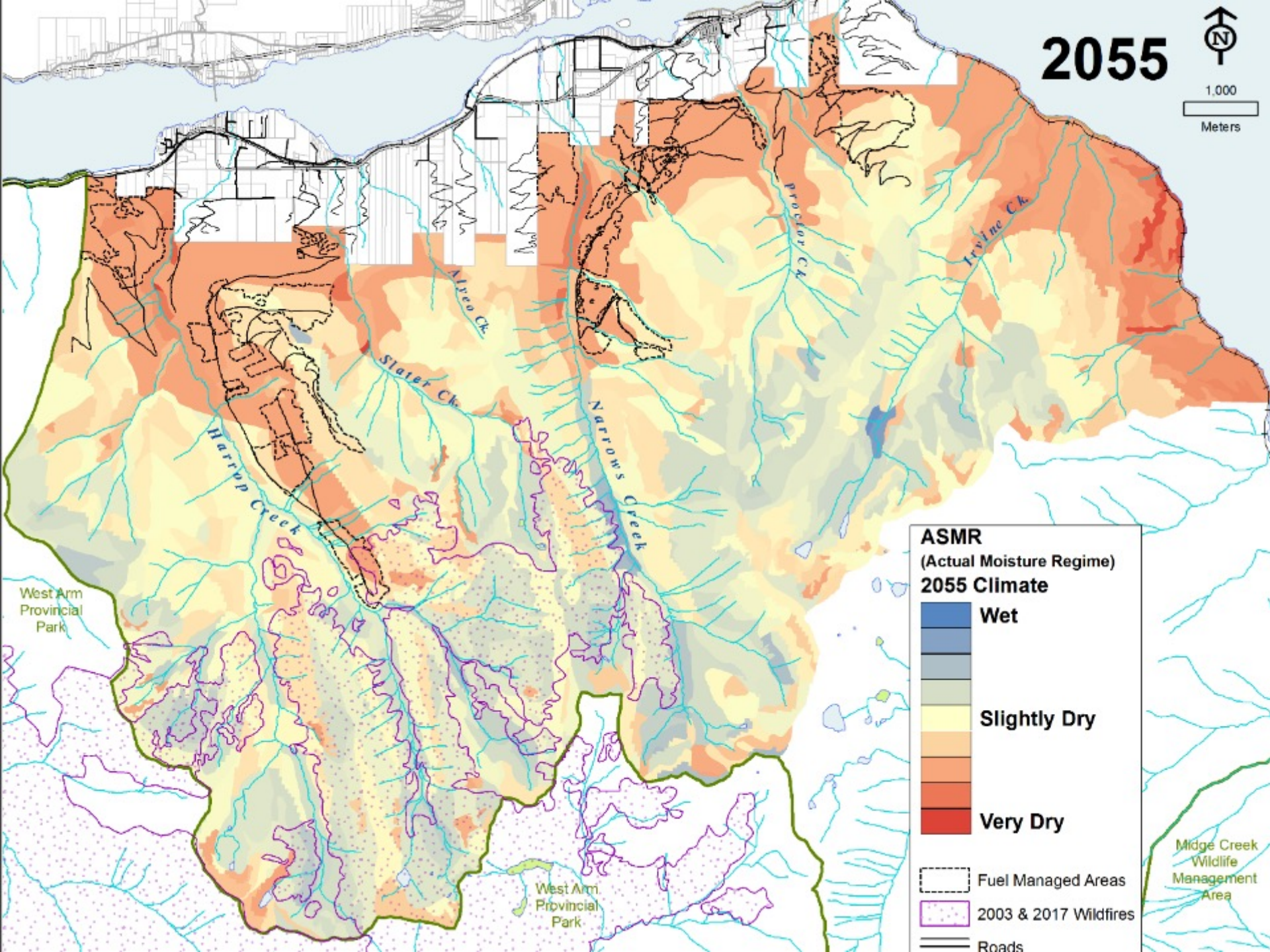
Absolute Moisture Regime

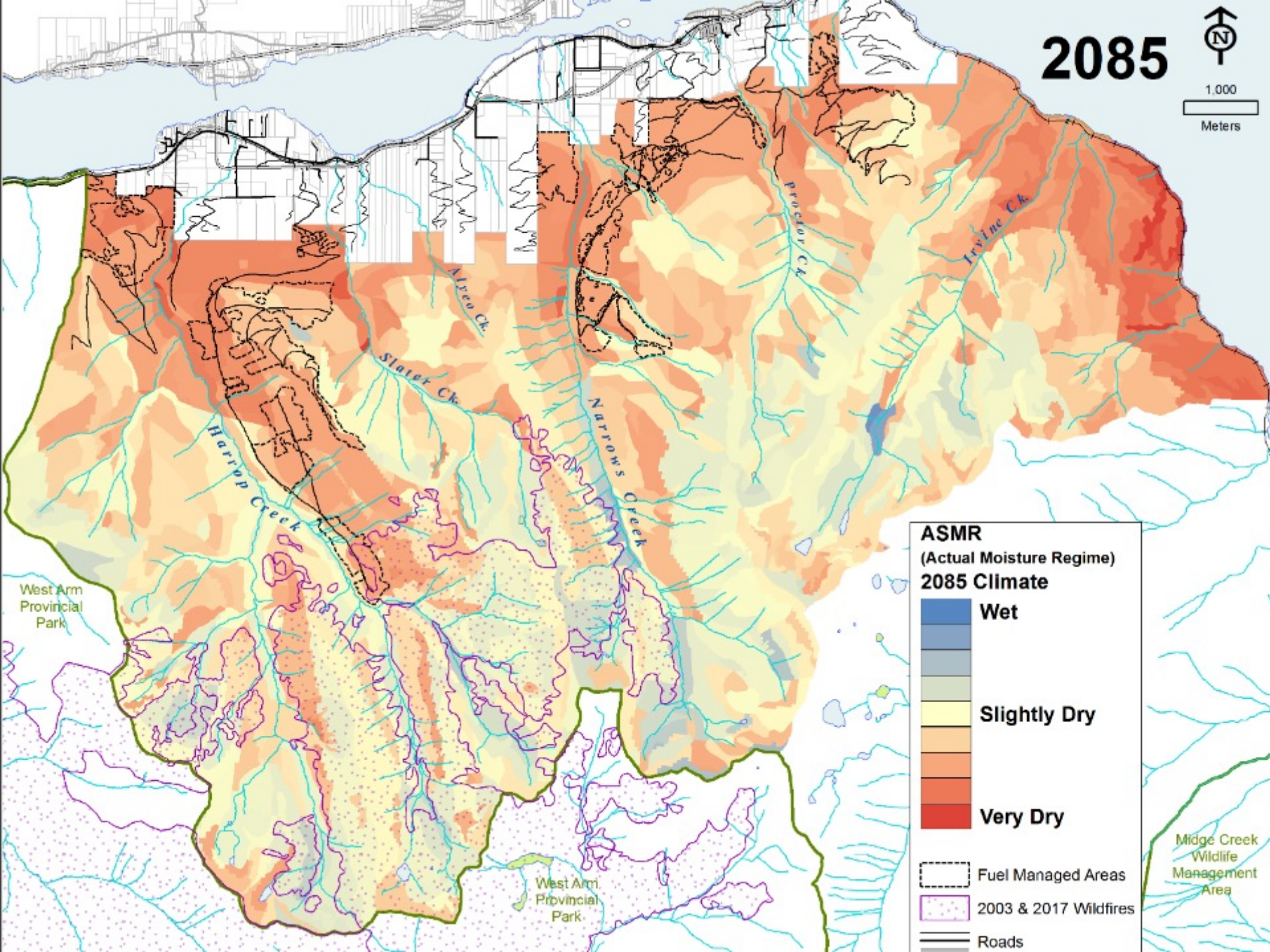
- Unclassified
- Extremely Dry
- Very Dry
- Mod Dry - a
- Mod Dry - b
- Slightly Dry
- Slightly Dry to Fresh
- Fresh
- Moist
- Very Moist

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

- 10% Coverage of Second Regime
- 20% Coverage of Second Regime
- 30% Coverage of Second Regime
- 40% Coverage of Second Regime
- 50% Coverage of Second Regime


1990
1,000
Meters
Alves Ck.
Slater Ck.
Harrop Creek
Narrows Creek
Proctor Ck.
Irvine Ck.
West Arm Provincial Park
West Arm Provincial Park
Midge Creek Wildlife Management Area
ASMR
(Actual Moisture Regime)
1990 Climate
Wet
Slightly Dry
Very Dry
Fuel Managed Areas
2003 & 2017 Wildfires
Roads


2055
1,000
Meters
Alyeo Ck.
Slater Ck.
Harrpp Creek
Narrows Creek
Proctor Ck.
Irvine Ck.
West Arm Provincial Park
West Arm Provincial Park
Midge Creek Wildlife Management Area
ASMR
(Actual Moisture Regime)
2055 Climate
Wet
Slightly Dry
Very Dry
Fuel Managed Areas
2003 & 2017 Wildfires
Roads

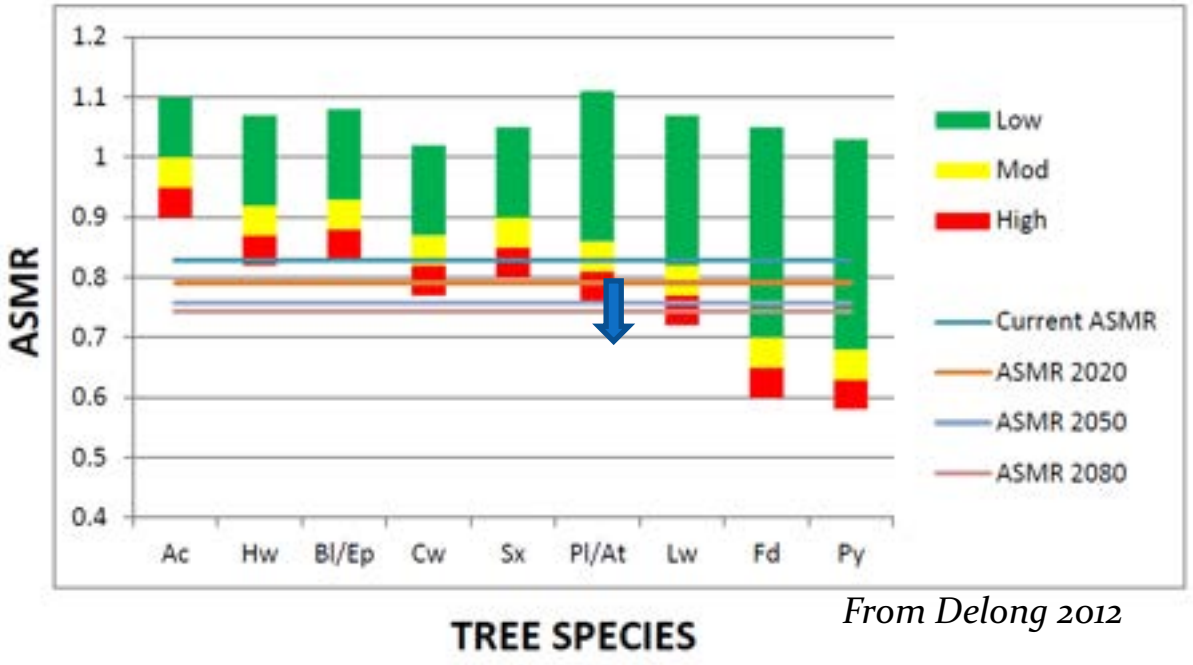

2085
1,000
Meters
Alpeo Ck.
Slater Ck.
Harrop Creek
Narrows Creek
Proctor Ck.
Irvine Ck.
West Arm Provincial Park
West Arm Provincial Park
Midge Creek Wildlife Management Area
ASMR
(Actual Moisture Regime)
2085 Climate
Wet
Slightly Dry
Very Dry
Fuel Managed Areas
2003 & 2017 Wildfires
Roads

Drought probability: ASMR limits

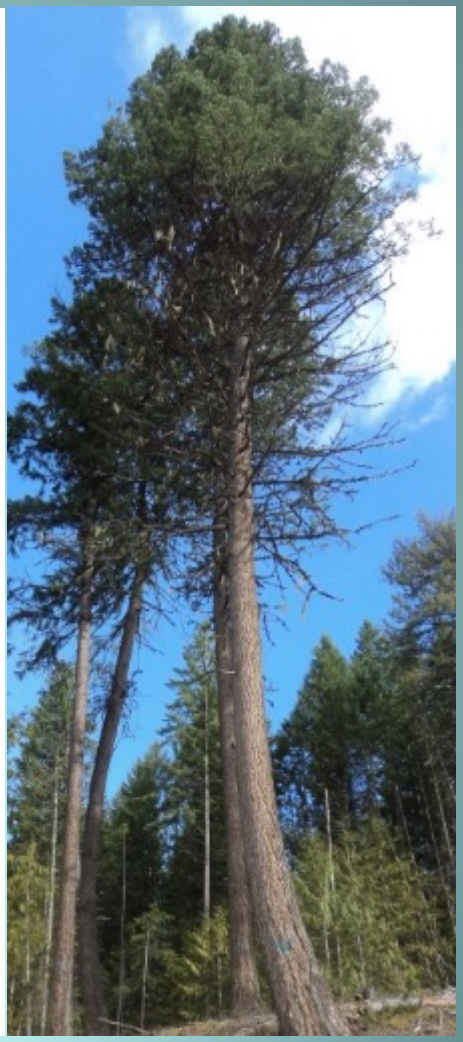
BEC	ICH dw 1	Bigeoclimatic Unit
RSMR	4	Relative Soil Moisture Regime
		Actual Soil Moisture Regime

Values

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



From Delong 2012



See current work of Future Forest Ecosystem Centre

Fire probability

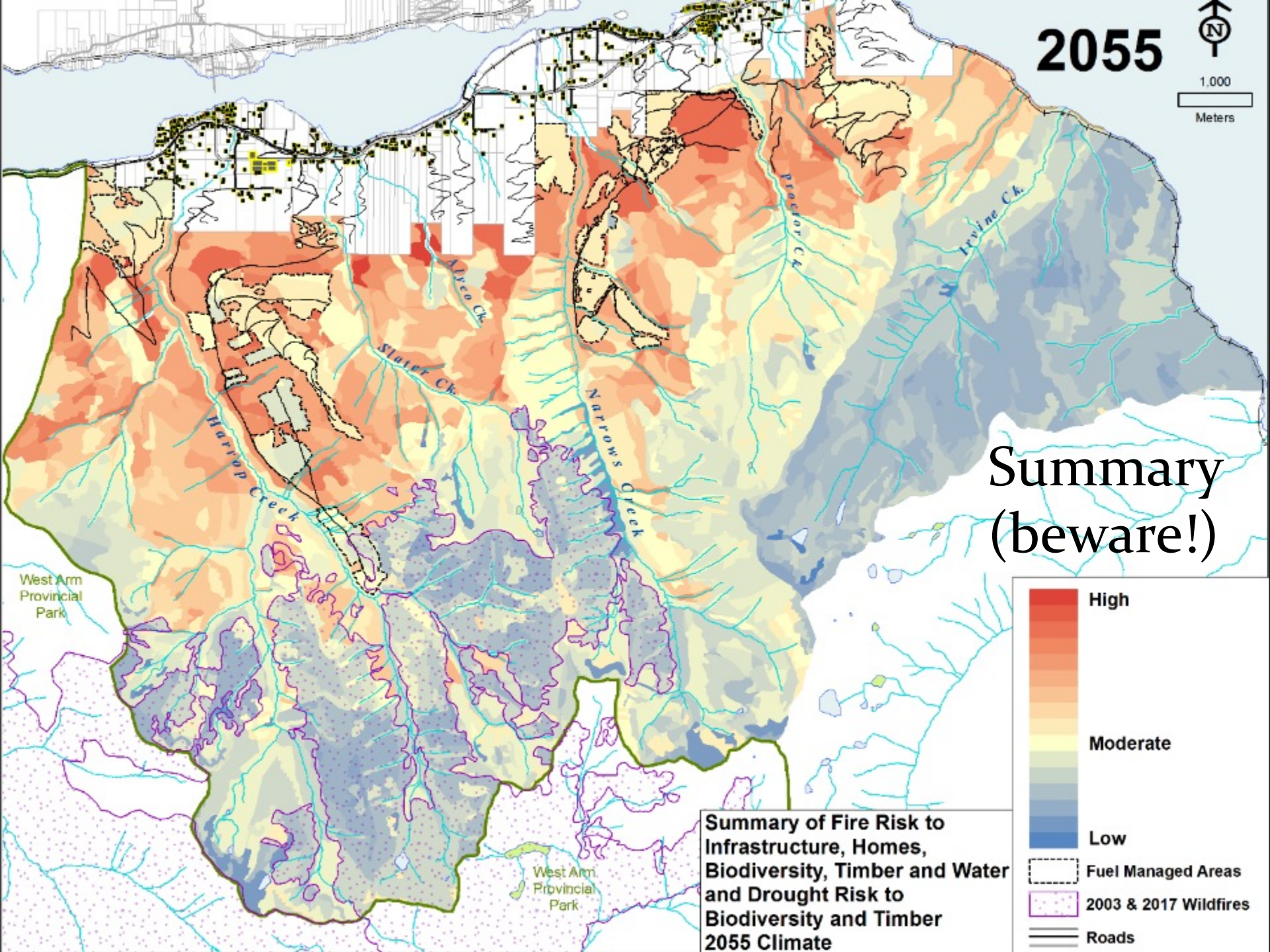
Fire probability: likelihood of high severity fire

Did <u>not</u> 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
N
1,000
Meters
Alyce Ck.
Slater Ck.
Harrop Creek
Narrows Creek
Proctor Ck.
Irvine Ck.
West Arm Provincial Park
West Arm Provincial Park
Summary (beware!)
High
Moderate
Low
Fuel Managed Areas
2003 & 2017 Wildfires
Roads
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

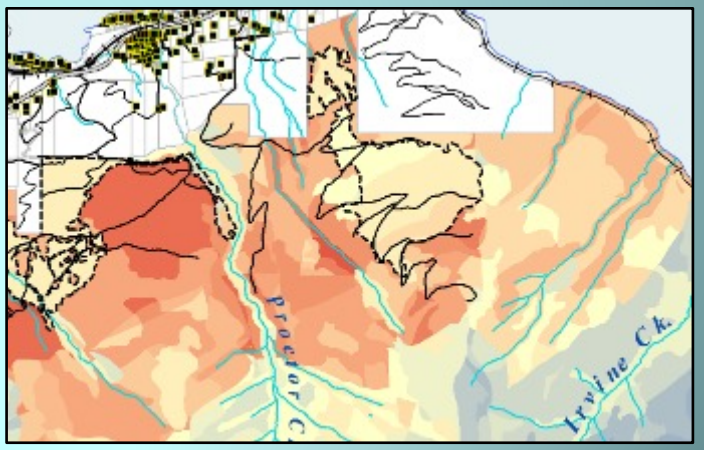
Homes: Untreated WUI (except moist sites)

Water: Headwaters areas with high fire likelihood

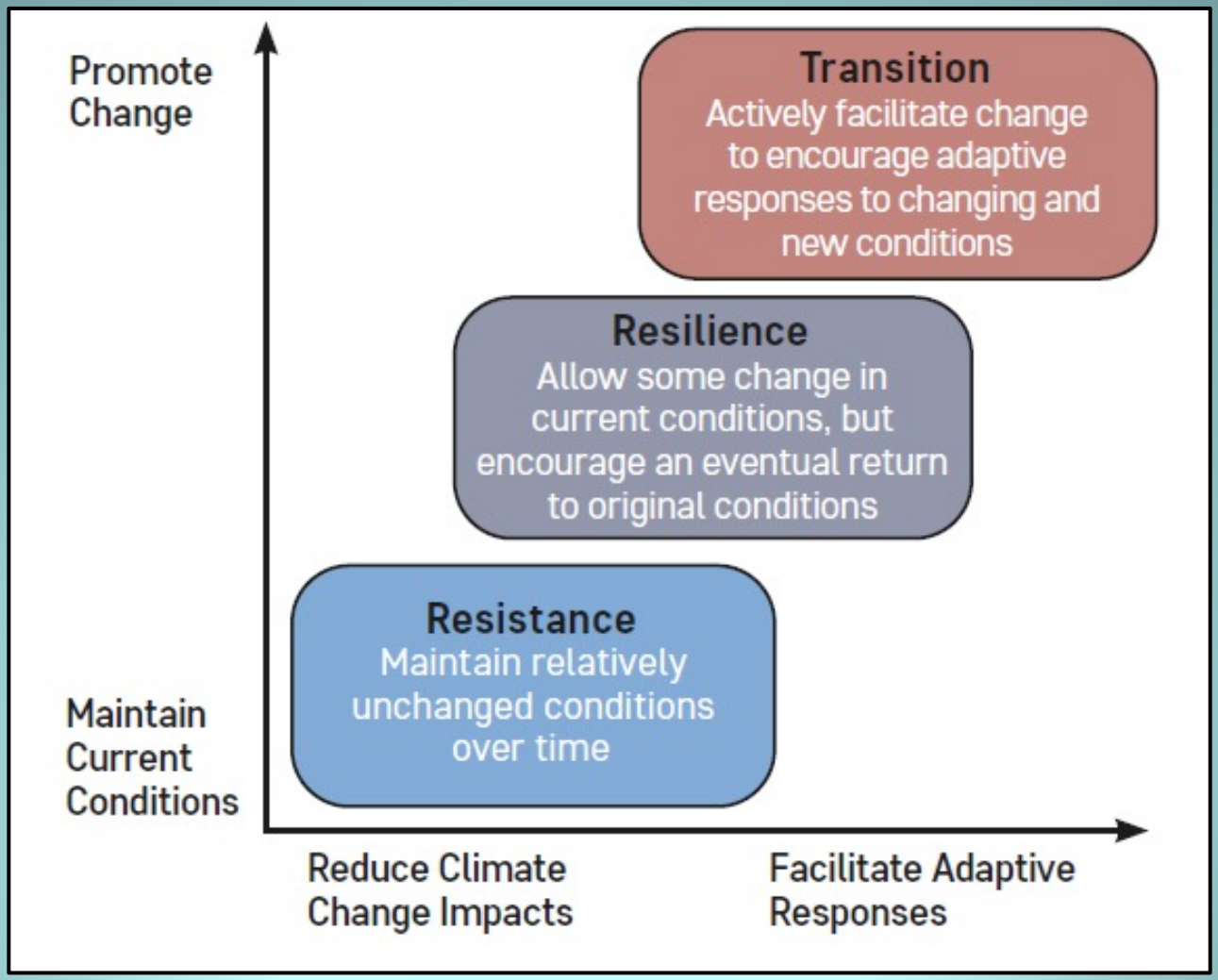
Biodiversity: Old forests on drier sites

Timber: Cedar / hemlock on drier sites

Triage—need to prioritize



Adaptation options - concept



Nagel et al. 2017

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

Desired Future Condition Assessment Inputs

CLIMATE: What future forest conditions are feasible?
(Based on ecosystem and soil moisture regimes.)

What are the priority values and objectives?

What is the landscape context?

What are Desired Future Conditions?
In 2050's and 2080's
Must Be Feasible

Are Desired Future Conditions compatible with Current Forest Conditions?

What are Current Forest Conditions?
(Species, age, structure, fuels, health, etc.)

YES
Defend against change.
RESISTANCE

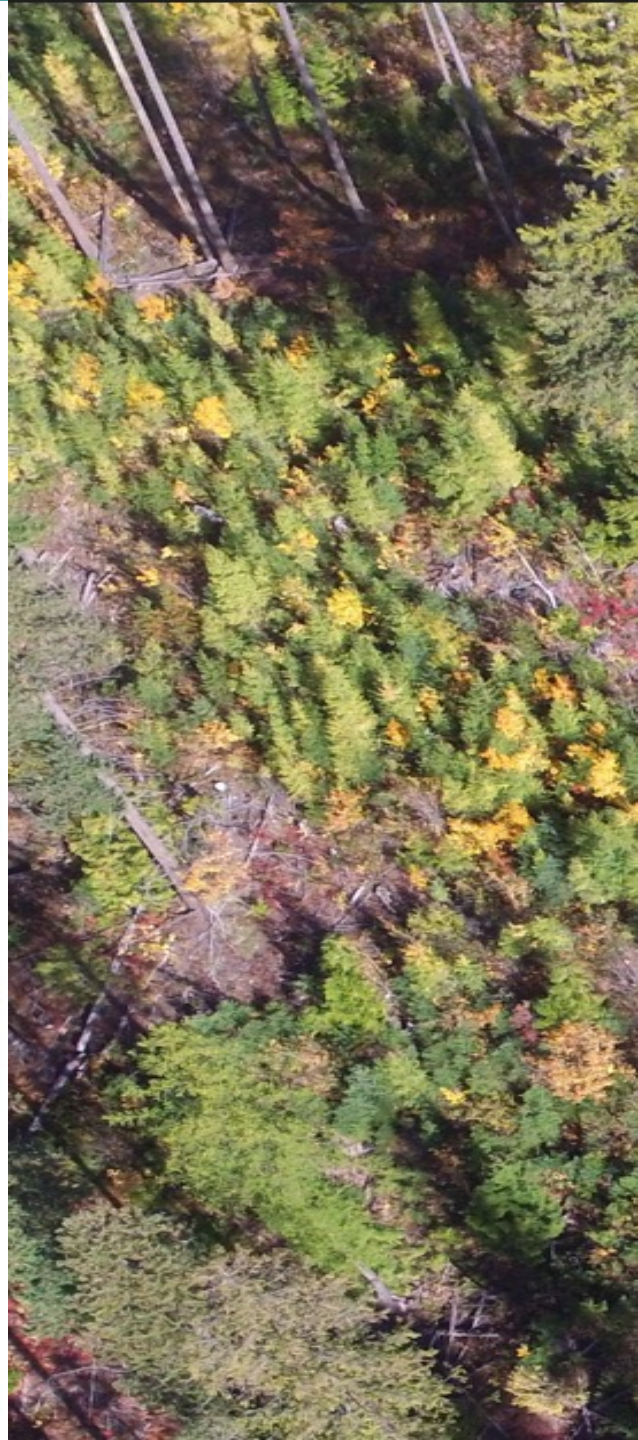
- Reserve and protect high value ecosystems and habitats
- Suppress wildfire
- Reduce surface and ladder fuels
- FireSmart homes and infrastructure
- Control beetle populations
- Remove invasive species

YES
Accommodate some change.
RESILIENCE

- Diversify forest composition and structure
- Partial cut to reduce density, select for drought resistance, reduce fuel loads
- Low intensity prescribed fire
- Commercial thinning
- Manage densities, species composition, and fuel loads in young stands

NO
Actively promote change
TRANSITION

- Convert maladapted stands
- Proactive salvage
- Novel stocking standards
- Assisted migration (range expansion or long-distance migration)
- (Re)introduce regenerative fire
- Realign after severe disturbance

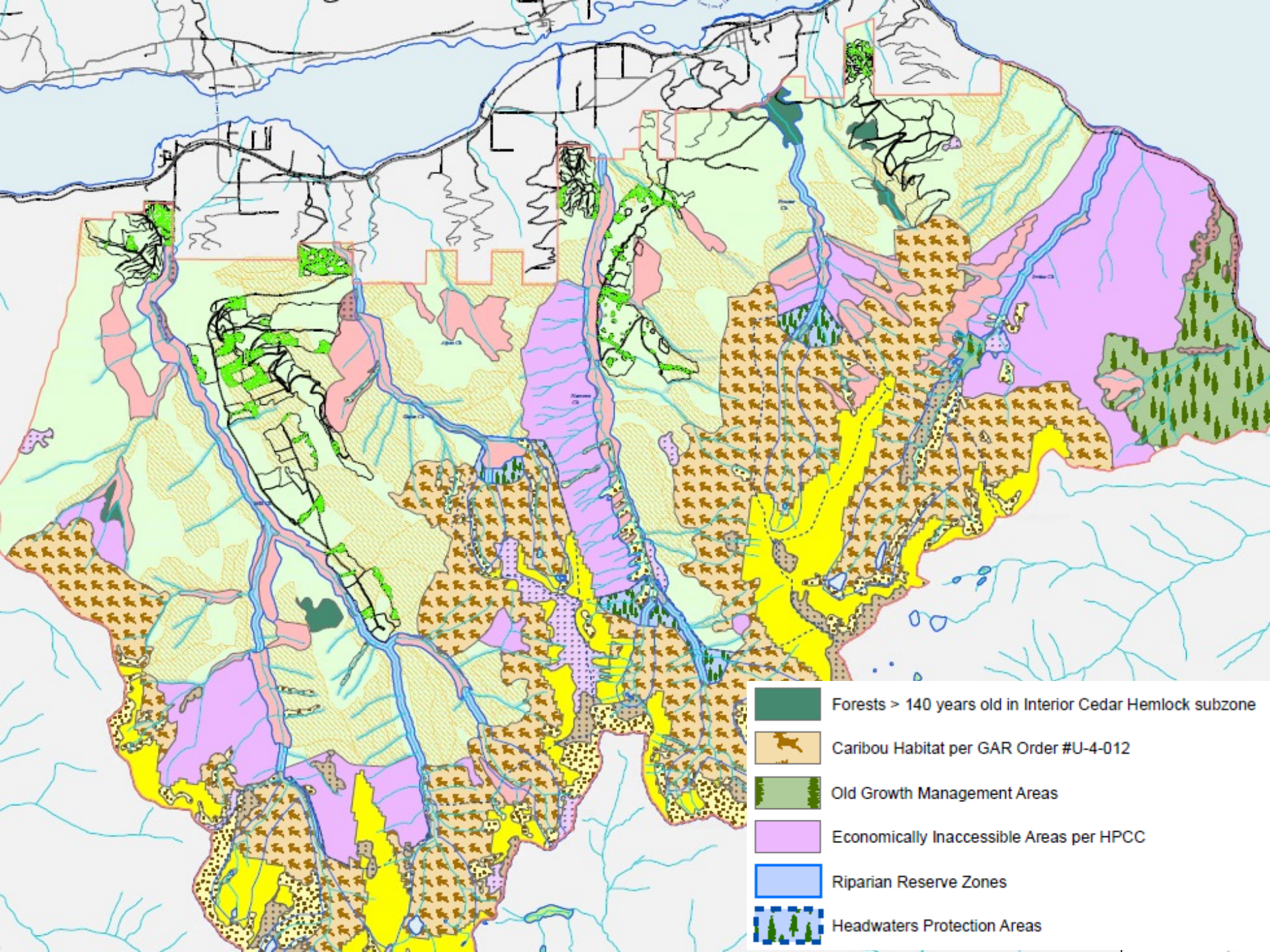


Strategy: Promote landscape diversity

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

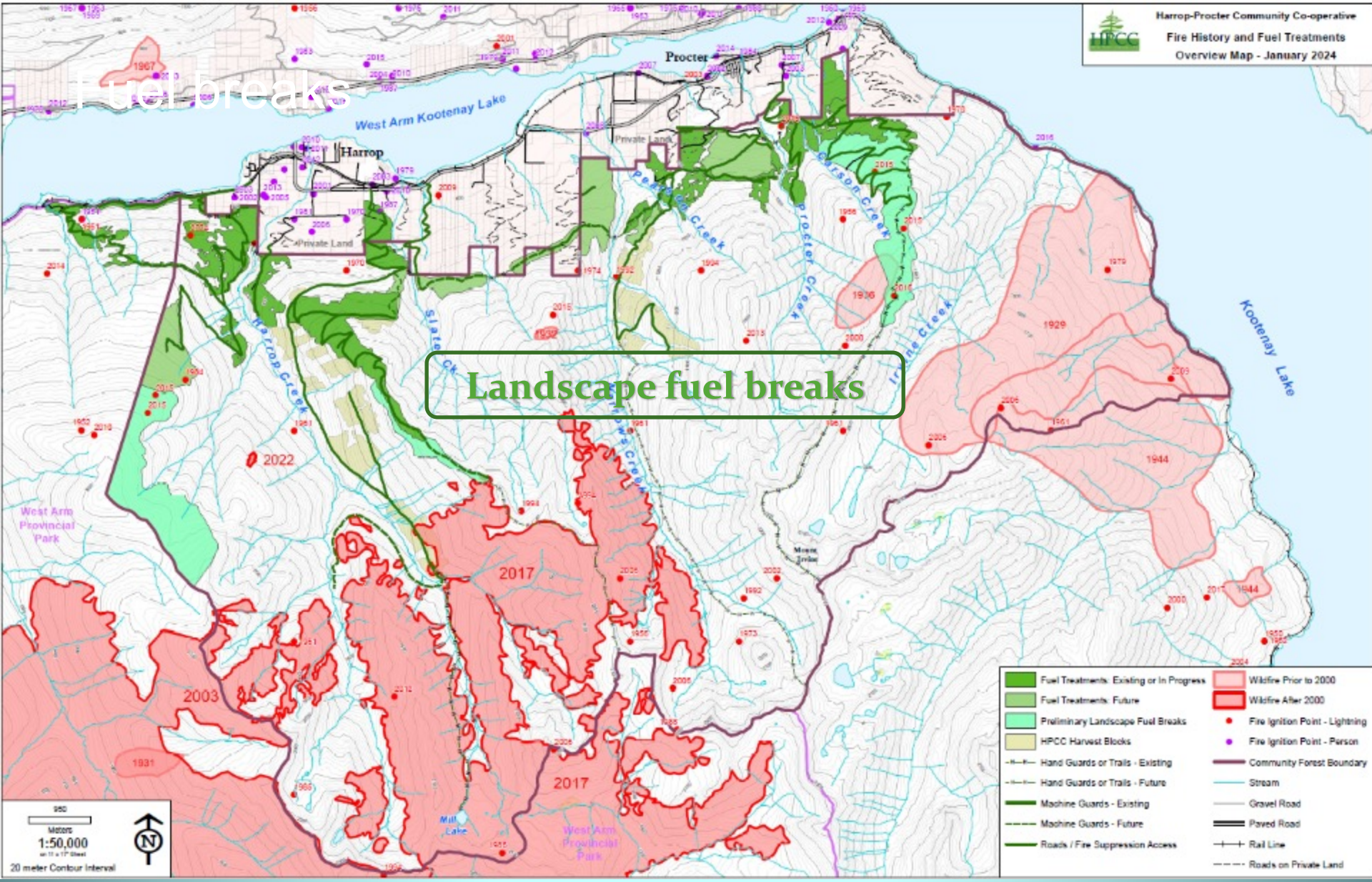
Strategy: Reserve (and protect)

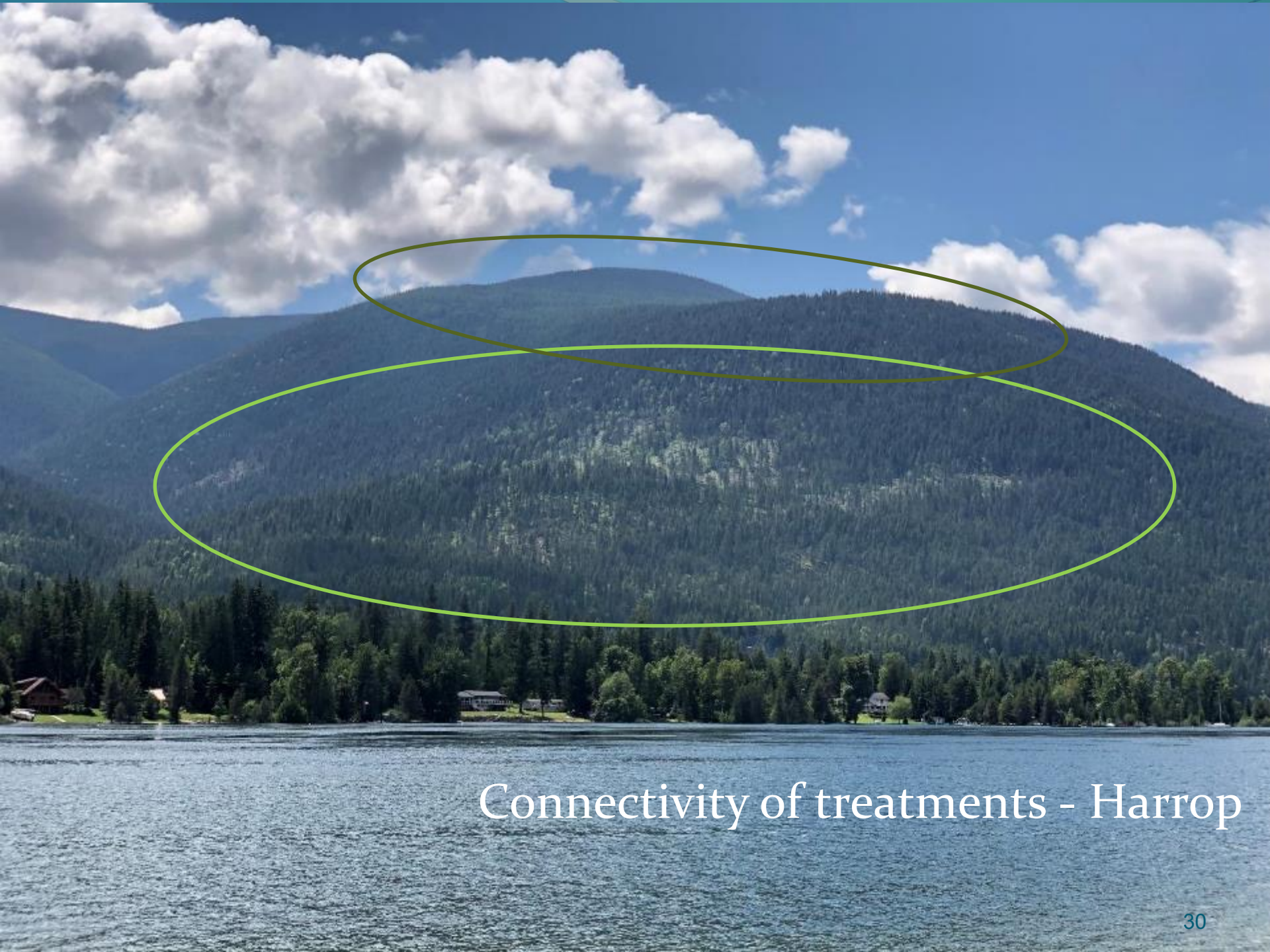
- Resistance strategy
- Desired future conditions similar to current conditions
- High value (high consequence) areas
  - Rare ecosystems/ old growth
  - Headwaters of community watersheds
- Risk: may be rowing upstream against climate changes


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)


Fuel breaks
Harrop-Procter Community Co-operative
Fire History and Fuel Treatments
Overview Map - January 2024
Landscape fuel breaks
West Arm Kootenay Lake
Harrop
Procter
Private Land
Harrop Creek
Pedley Creek
Procter Creek
Carson Creek
Irvine Creek
Kootenay Lake
West Arm Provincial Park
Mill Lake
2022
2017
2003
1944
1929
1931
1:50,000
20 meter Contour Interval
Fuel Treatments: Existing or In Progress
Fuel Treatments: Future
Preliminary Landscape Fuel Breaks
HPCC Harvest Blocks
Hand Guards or Trails - Existing
Hand Guards or Trails - Future
Machine Guards - Existing
Machine Guards - Future
Roads / Fire Suppression Access
Wildfire Prior to 2000
Wildfire After 2000
Fire Ignition Point - Lightning
Fire Ignition Point - Person
Community Forest Boundary
Stream
Gravel Road
Paved Road
Rail Line
Roads on Private Land



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


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

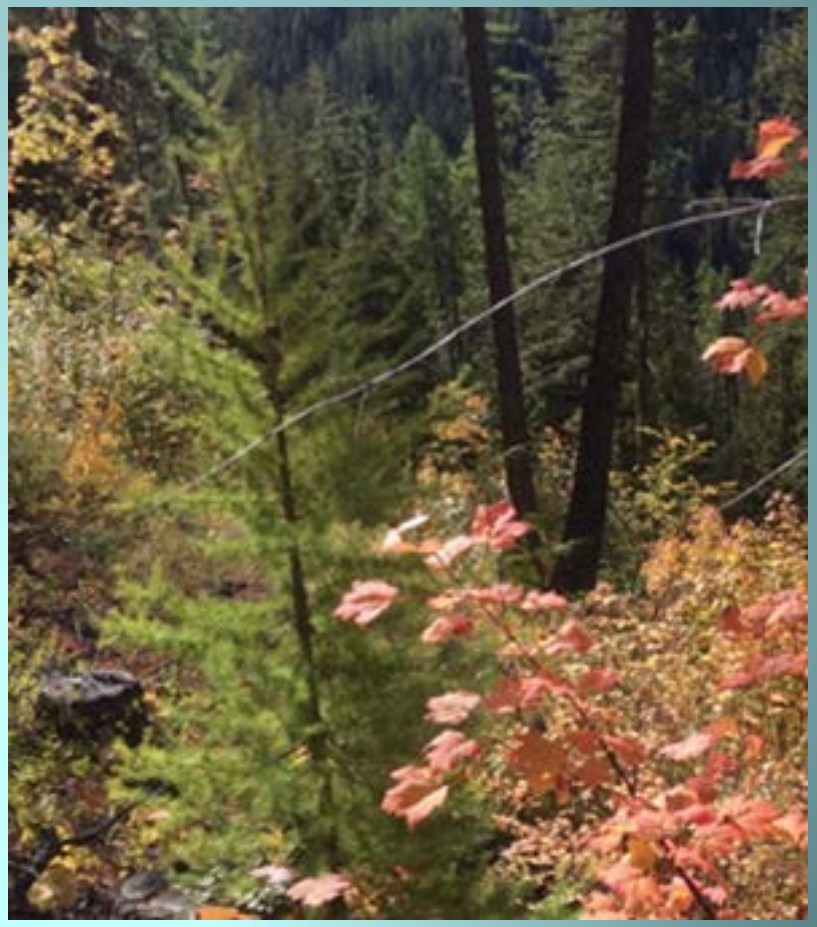
How fast do we transition?

Revise timber supply assumptions

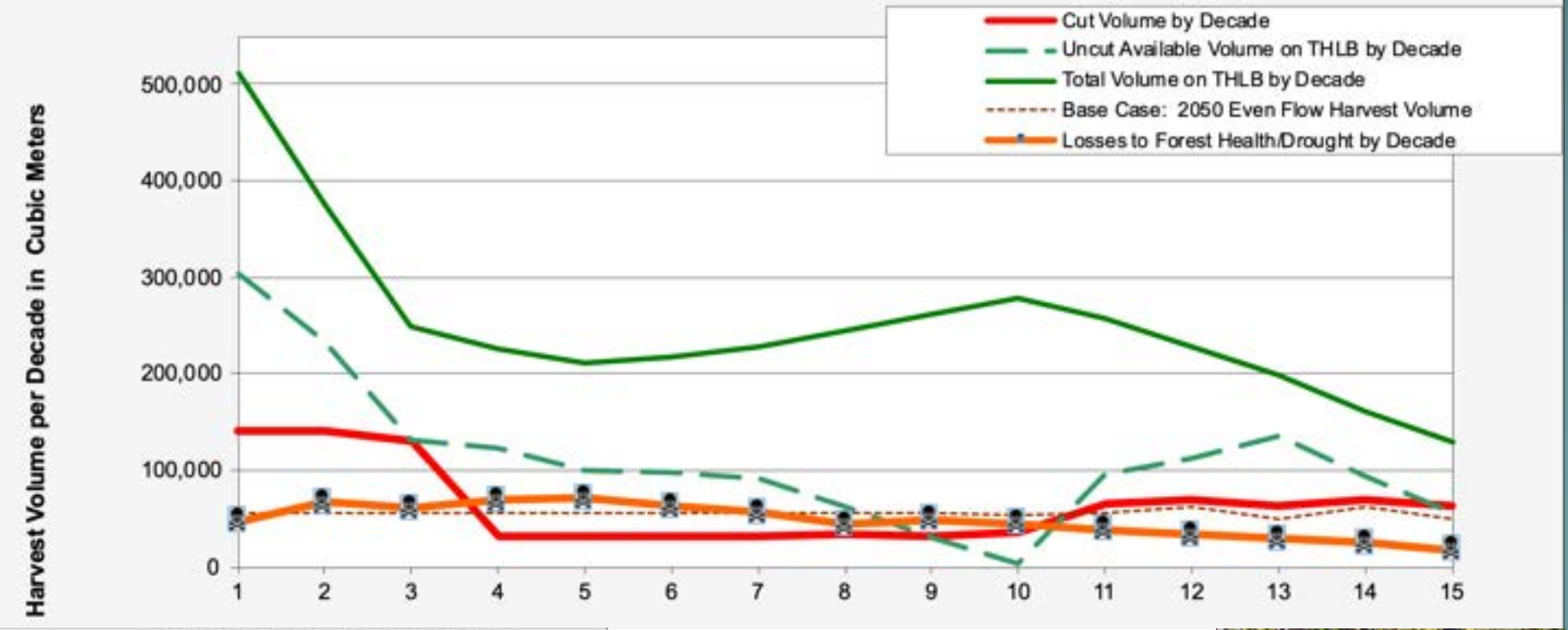
- Unsalvaged losses
- Growth rates

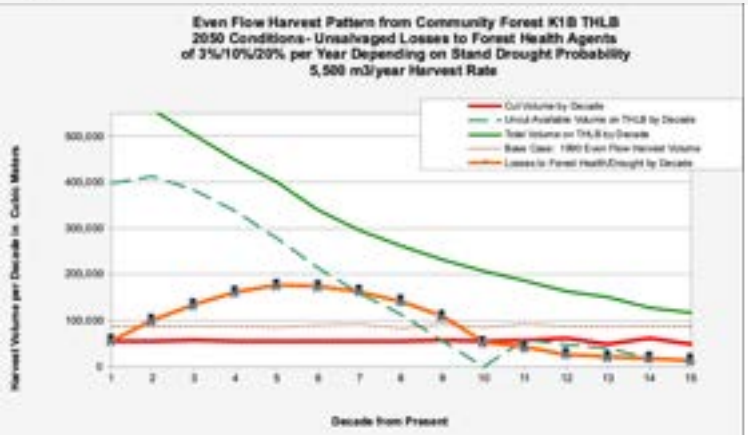
Reconsider ‘sustained yield’ and ‘even flow’

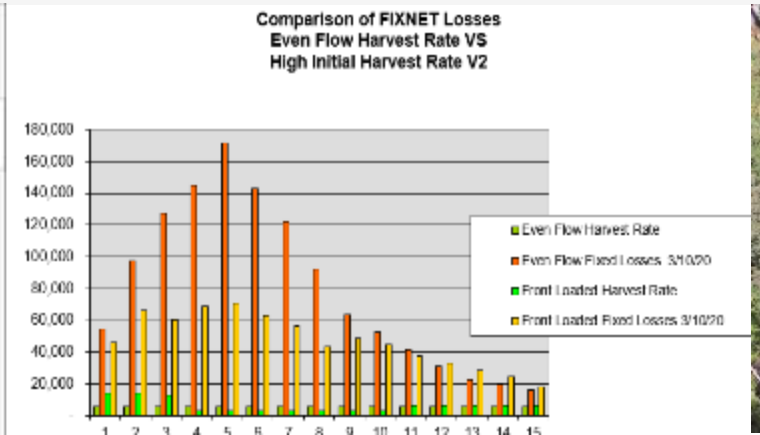
Social choices—based on risks



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







CLIMATE CHANGE
AND NEW APPROACHES TO WILDFIRE RISK REDUCTION

HP Community Forest - YouTube

Thank you!

www.hpcommunityforest.org

HPCC