Attendees: Sean Finn, Mary McFadzen, Alisa Wade, Bailie Eikill, Kelly Cooley, SOlliff, Aubin Douglas, Richard Klafki, Linh Hoang, Benjamin Misener, Sarah Lundstrum, Connie Simmons, Kathy Zeller, Anne Carlson, Richard Janssen, Natalie Poremba, Erin Sexton, Laura Caplins, Mike Durglo, Mary McClelland

Funding

- Funds coming in
    - USFWS
        - FY22: $71,877
    - The Wilderness Society
        - FY22:$35,000
    - Total funds = total funds since FY19 = $285,978; in kind=priceless
- Funding Breakdown
    -

Task/Role	Funds	Target
Project Coordinator	$30,000	Natalie Poremba
GIS cartographer	$20,020	Phil Matson
Spatial Modeling Contract	$22,000	Contractor
Climate Adaptation Specialist	$24,000	NC Climate Adaptation Science Center
Meetings & Travel	$ 5,172	Let's find a time to convene!
Indirect/Overhead	$ 5,685	

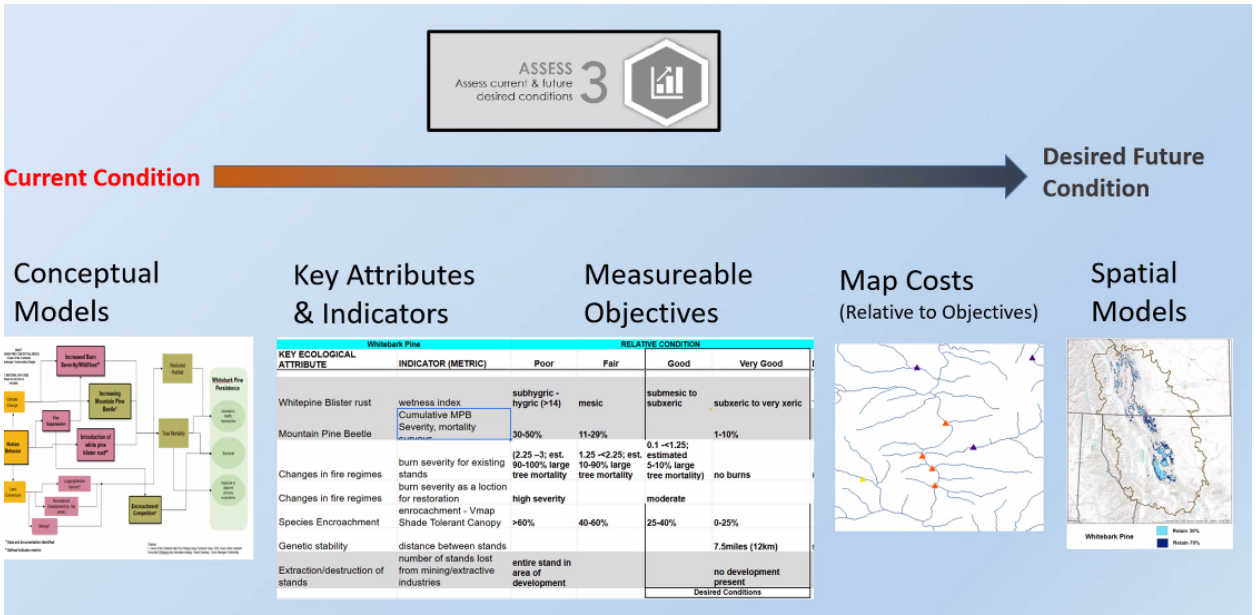
    - Spatial modeling contract - there is no one particular in mind, Kelly may know good people to recommend when the time comes

LCD Process

- Ultimate Goal: collaboratively build a blueprint and road map for a socio-ecologically resilient and sustainable Crown of the future
    - Where does conservation opportunity present itself and how do we get there?
- Steps:
    - 1. Initiate
        - Convened by Crown Managers Partnership, seed funding from USFWS, website
    - 2. Convene
        - 42 stakeholders on leadership team
        - Analysis team, Tech team, Social cultural, and economic team
        - Select 15 ecological features

Whitebark Pine	Forest
Bull Trout	Grassland
Westslope Cutthroat	Shrubland
Mule Deer	Wetland
Elk	Riparian
Grizzly Bear	Aquatic Systems
Wolverine	Connectivity
Canada Lynx	

        - Good representations of biodiversity across the Crown
    - 3. Assess
        - Reviewed 63 mgmt documents, phase 1 data exploration, conceptual models, building cost layers
        - This is where we are currently!
        - Situation analysis:
            - Where are these features?
            - What are status and trends?
            - What contributes to their conservation?
            - What hinders their conservation and why?
            - We are using the best available info: data sets, TEK, expert knowledge



        - Process:
            - Draft conceptual models ->receive expert feedback -> refine the conceptual models -> determine the “costs” ->assign thresholds/quantitative
                - We had 52 experts respond - people are invested!
            - Optimization = finding the best solution from among the set of all feasible solutions

        - “Cost” can be calculated as area, economic cost, estimate of socio-ecological issues where high-cost sites are ones we wish to avoid
        - Cost is where risk is higher and its more resource intensive - this doesn’t necessarily mean we won’t do work there
    - Given our difference in knowledge/uncertainty about certain species relative to others, is there a way to incorporate this uncertainty?
        - We are documenting where info comes from and we can go back where there is uncertainty or disagreement in future iterations

Social, Cultural, and Economic team

- Selected 2 features thus far
    - Water Access
    - Air Quality

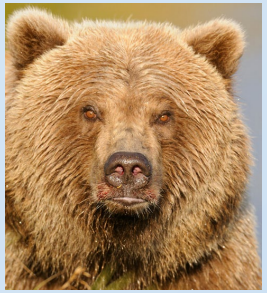
News from the Field

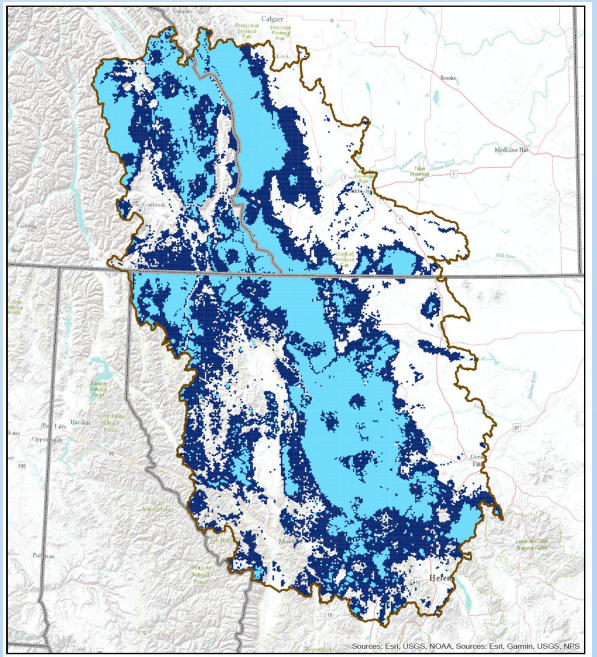
- Alternative Land Use Services - working with private landowners in Alberta - https://alus.ca/
    - Community developed, farmer delivered, targeted, market driven, voluntary
    - Pay producer for value of ecological good or service
    - Kelly will have a future presentation
- Emerging economies that Y2Y is doing
    - Completed phase 1, phase 2 is well underway
    - Y2Y will share results with the leadership team when completed
- America the Beautiful
    - Aiming for a billion for america the beautiful - coming out of Bipartisan Infrastructure - https://www.whitehouse.gov/ceq/news-updates/2022/04/11/biden-harris-administration-launches-1-billion-america-the-beautiful-challenge-to-support-and-accelerate-locally-led-conservation-and-restoration-projects/
    - Call for proposals will come out in may - National Fish and Wildlife Foundation (NFWF)
        - A lot of funding will be directed to states and tribes
        - Also plans that have lots of community support
        - Climate informed, cores and connectivity, environmental justice
    - https://www.nfwf.org/programs/america-beautiful-challenge

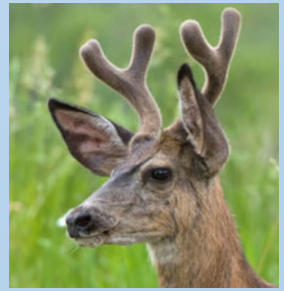
Next Meetings

- We will be meeting every other month as a leadership team

Crown of the Continent Landscape Conservation Design







Leadership Team call

26 April 2022

Today’s Agenda

1. Updates
    - Funding FY22
    - Phase 2: Ecological Feature progress

2. News from the Field

3. Any Additions?

Funding Update

US Fish and Wildlife Service:

- FY22 --- $71,877
- FY21 --- $25,000
- FY20 --- $97,271
- FY19 --- $41,831

The Wilderness Society

- FY22 --- $35,000
- FY21 --- $15,000
  - "to provide support for Indigenous governments (CSKT, the Blood/ Kainai, Piegan and Blackfeet) to lead the identification of cultural priorities for the collaborative Landscape Conservation Design in the Crown of the Continent"

Total funds: $285,978

Total In-kind: Priceless

(Leadership Team, Technical Team, Subcommittees, Experts)

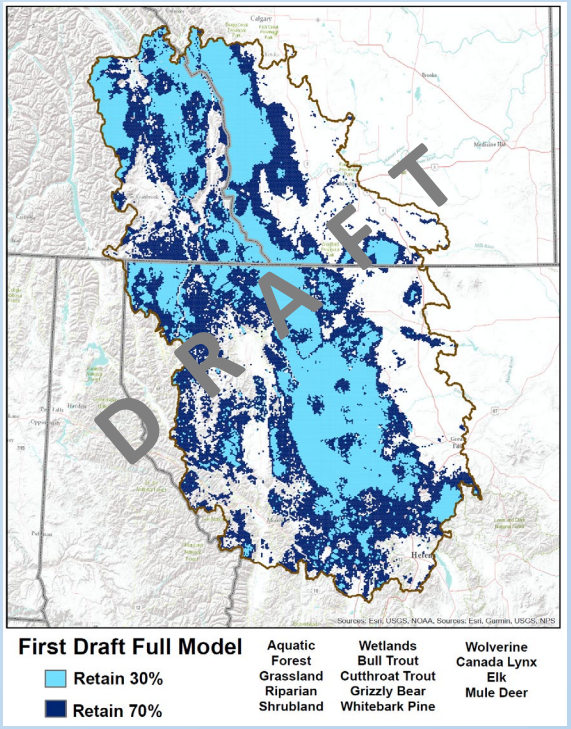
FY22 Funding Breakdown

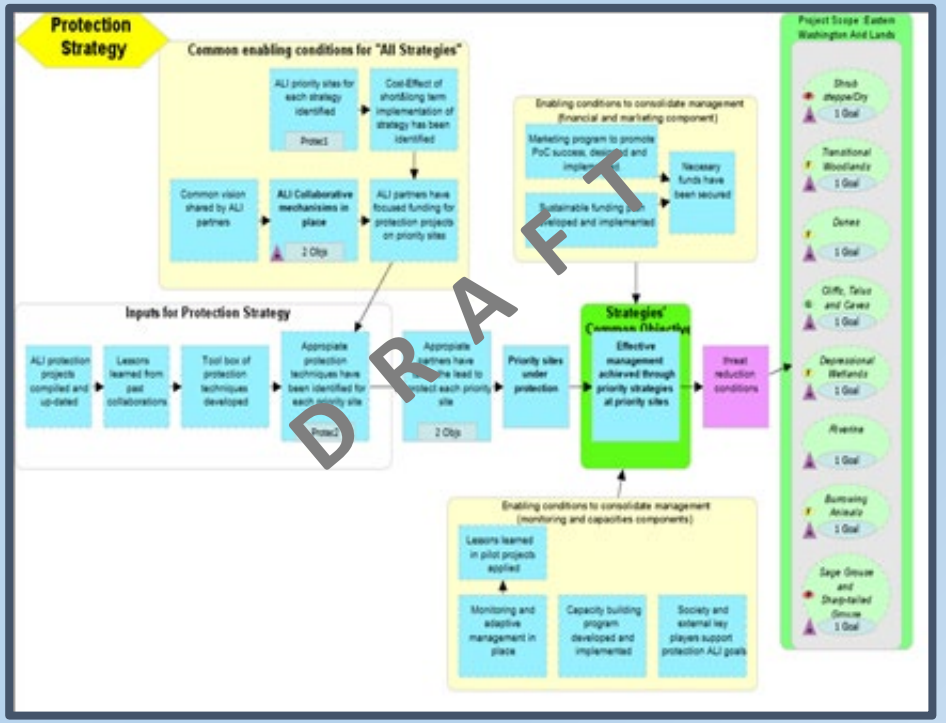
Task/Role	Funds	Target
Project Coordinator	$30,000	Natalie Poremba
GIS cartographer	$20,020	Phil Matson
Spatial Modeling Contract	$22,000	Contractor
Climate Adaptation Specialist	$24,000	NC Climate Adaptation Science Center
Meetings & Travel	$ 5,172	Let's find a time to convene!
Indirect/Overhead	$ 5,685	

LCD Process in the Crown of the Continent

Ultimate Goal:

Collaboratively build a **blueprint** and a **road map** for a socio-ecological resilient and sustainable Crown of the Continent Ecosystem of the Future





LCD Process in the Crown of the Continent

Convened by Crown Manager Partnership

codified in the CMP 2021 Strategic Framework

Seed funding from USFWS

Website:
https://www.crownmanagers.org/landscape-conservation-design

42 Stakeholders join Leadership Team

Analysis Team, Technical Team established

LCD Project Area identified, and 15 Focal Ecological Features selected

LCD Process in the Crown of the Continent

Reviewed 63 management documents

"Phase 1" data exploration and feasibility

Situation Analyses through Conceptual Modeling & Expert Elucidation

Building conservation "Cost" or resistance layers

Blueprints for focal features and CoCE

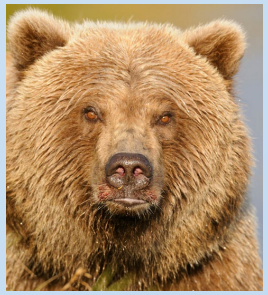
Road maps integrated with jurisdictional authorities and mandates

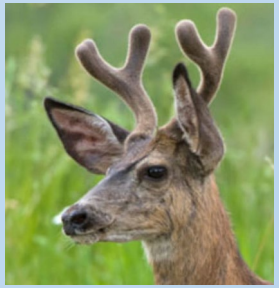
Feature Selection

15 Ecological Features

Whitebark Pine	Forest
Bull Trout	Grassland
Westslope Cutthroat	Shrubland
Mule Deer	Wetland
Elk	Riparian
Grizzly Bear	Aquatic Systems
Wolverine	Connectivity
Canada Lynx	

- See Selection Report on website
- Social, Culture, Economic Feature selection in progress (SCE Team)

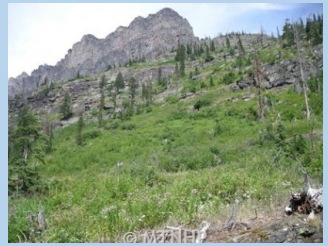


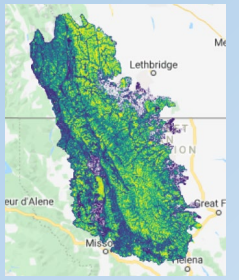






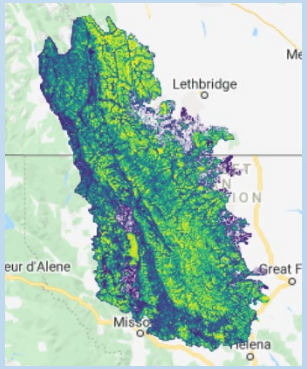


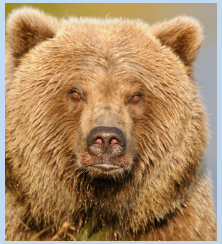



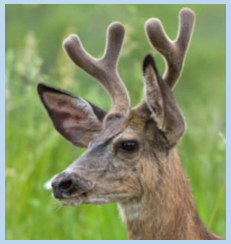



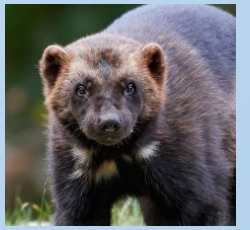
Situation Analyses:

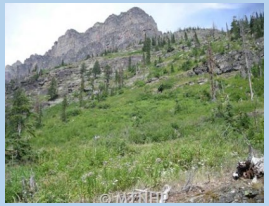
- Where are these features?
- What are status and trends?
- What contributes to their conservation?
- What hinders conservation and why?







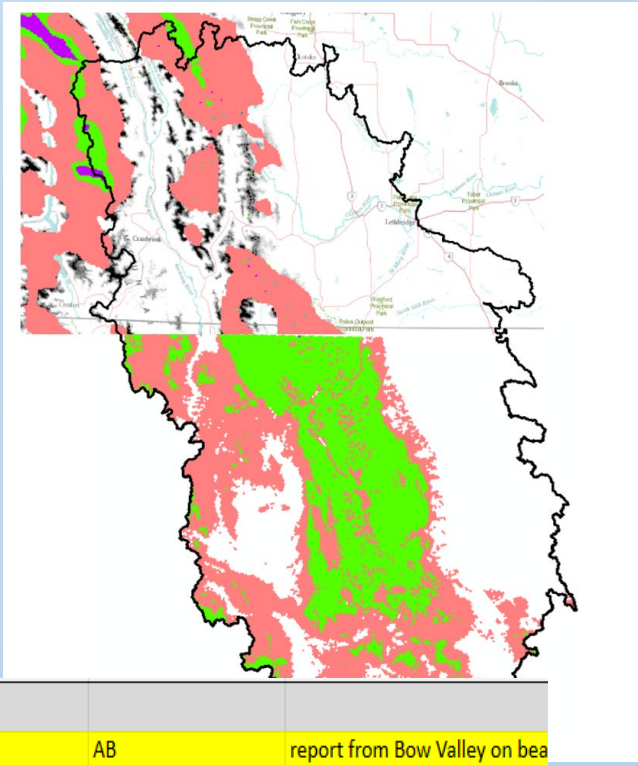




Situation Analyses:

- Where are these features?
- What are status and trends?
- What contributes to their conservation
- What hinders conservation and why?

Paradigm: Best available information



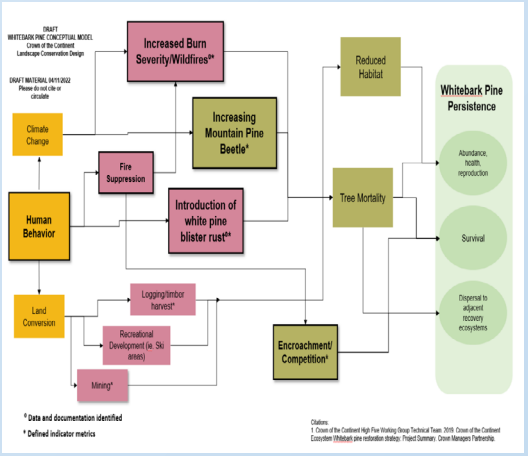
> 300 data layers cataloged and evaluated

DISTURBANCE				
Human-Wildlife Conflicts "AEP/SolGen"	AEP/SolGen	Human-Wildlife Conflicts	AB	report from Bow Valley on bea
Human-Wildlife Conflicts	WildSmart	Human-Wildlife Conflicts	BC	
Coal mines - Elk Valley	CMP	Active coal mine operations in the East Kootenay region of SE British Columbia.		
Western large Surface Mines	Digitized from selected MRDS points	Polygon shapefiles of large surface mines in the study area, 2014		
Wind turbine density	FAA wind turbine locations	Kernel Density calculated from point shapefile, 2015		Need to filter for those active,
Oil and gas well density				
O&G Roads	USGS Garman et al.	to be obtained		Only available for Wyoming
Future O&G	Copeland et al. 2009; Copeland et al. 2013	Probability of future oil and gas development, also calculated mean value at HUC12 level		
Current oil and gas wells (2016)	CMP	Shows surface wellsites related to energy resource in the Crown of the Continent with a 50km buffer.		
Oil and Gas Wells (c. 2009)	CMP	Current as of April 4, 2013:This geodatabase contains all freely available spatial information on surface wellsites related to energy resou		
Water use demands	State level, potential refine to county use/demands?			
Uranium mines				Be sure to capture holding and
Solar energy potential	NREL			
Wind energy potential	NREL, Canada Wind Atlas			
Mines	open.canada.ca	point locations for oil and gas, and producing mines	Crown_LCD_Boundary	
Minor road mapped	Counties			Very challenging to compile
Pipelines in the Crown	CMP	Contains all freely available spatial information on pipelines in the Crown of the Continent area.		
Pipelines in the Crown (c. 2020)	CMP	Contains all freely available spatial information on pipelines in the Crown of the Continent area circa 2020.		
Human Modification: 2017	**Theobald et al. 2020**	**Detailed temporal mapping of global human modification from 1990 to 2017**	**Global**	

Situation: Understanding Current Condition

Current Condition → **Desired Future Condition**

Conceptual Models

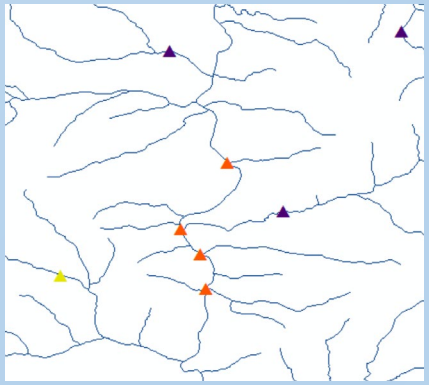


Key Attributes & Indicators

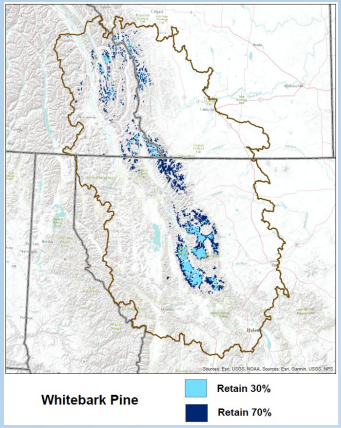
Measureable Objectives

Whitebark Pine		RELATIVE CONDITION			
KEY ECOLOGICAL ATTRIBUTE	INDICATOR (METRIC)	Poor	Fair	Good	Very Good
Whitepine Blister rust	wetness index	subhygric - hygric (>14)	mesic	submesic to subxeric	subxeric to very xeric
Mountain Pine Beetle	Cumulative MPB Severity, mortality surveys	30-50%	11-29%		1-10%
Changes in fire regimes	burn severity for existing stands	(2.25 –3; est. 90-100% large tree mortality	1.25 -<2.25; est. 10-90% large tree mortality	0.1 -<1.25; estimated 5-10% large tree mortality)	no burns
Changes in fire regimes	burn severity as a loction for restoration	high severity		moderate	
Species Encroachment	enrocachment - Vmap Shade Tolerant Canopy	>60%	40-60%	25-40%	0-25%
Genetic stability	distance between stands				7.5miles (12km)
Extraction/destruction of stands	number of stands lost from mining/extractive industries	entire stand in area of development			no development present
					Desired Conditions

Map Costs (Relative to Objectives)

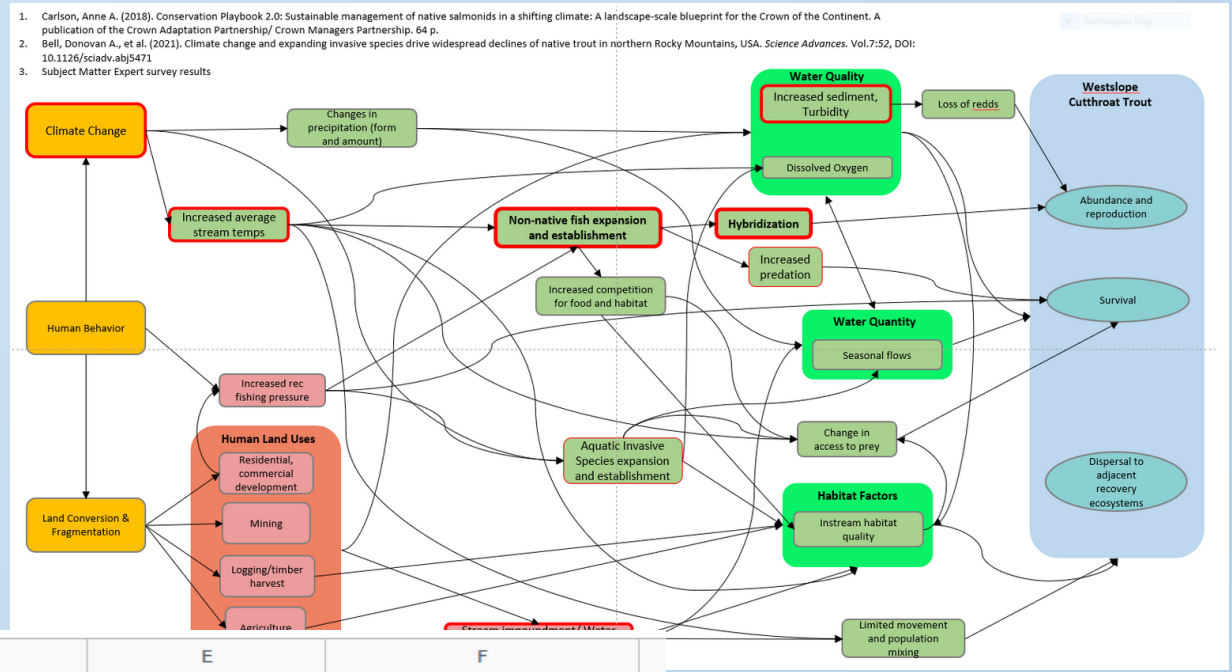


Spatial Models



Conceptual Models ➡ Expert Knowledge ➡ Objectives

Step 1: Draft Conceptual Model from Literature
Step 2: Vet Draft Models through Expert Review
Step 3: Refine Conceptual Models
Step 4: Estimate the relative cost of conservation delivery
Step 5: Build out spatial data models



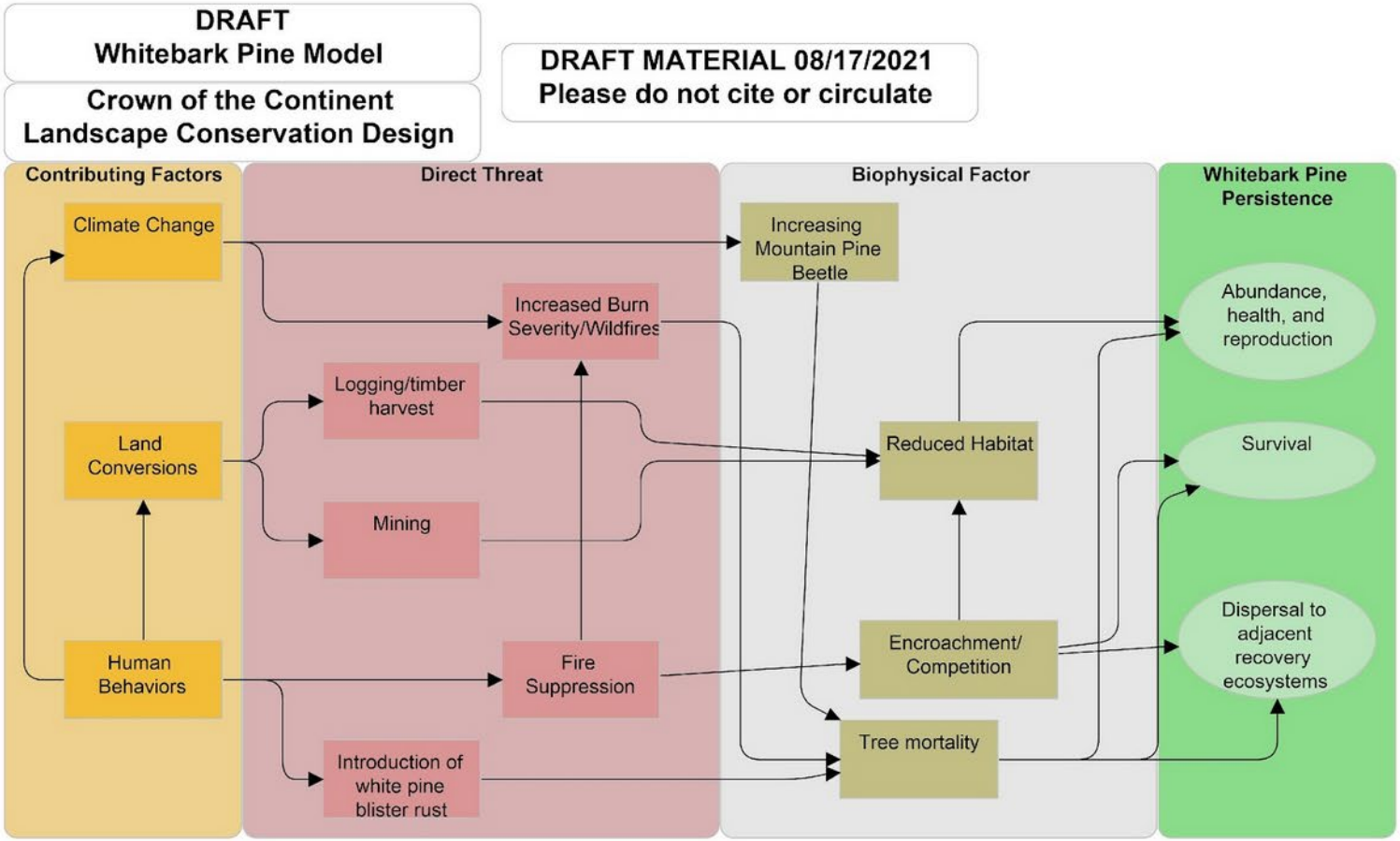
Feature	Name and Affiliation/ Organization	Approximately how many years have you worked with the species/system?	What is your primary geography of interest?	Please describe your general perception of this feature conservation status in the Project Area	In your opinion, what is the single most critical threat to long-term persistence and viability of this feature in the Crown ecosystem?
Riparian	Mary Manning, US Forest Service	36	MT, Rocky Mtns, Great Basin	Vulnerable	Climate change and loss of stream flows to sustain these ecosystems
Riparian	Michael Wagner, Forest Hydrologist / Government of Alberta	18	AB	Apparently Secure	cumulative impacts of land us and development
Riparian	Stewart Rood University of Lethbridge	30	Crown	Vulnerable	river damming, water withdrawal

Threat	KEY ECOLOGICAL ATTRIBUTE	INDICATOR (METRIC)	Desired Conditions RELATIVE CONDITION Poor	Fair	Good	Very Good	Information Source/Documentation
		Westslope Cutthroat Trout					
Climate Risk	Stream Temperature	Mean Aug. Stream Temp (degC)	20+	15-20	13-15	<13	Conservation playbook 2.0 (cites sources within); EcoSheds (Muhlfeld et al.)
		Max Aug. Stream Temp (degC)	23+	17-22	15-17	<15	EcoSheds (Muhlfeld et al.)
Demographic Risk	Demographic Connectivity	Number of other populations connected (#)	<10	11-43	44-69	>70	EcoSheds (Muhlfeld et al.)
Genetic Risk*	Hybridization Threat	Weighted (by fluvial distance) summation of admixture among all interconnected populations (Index)					EcoSheds (Muhlfeld et al.); brook trout and rainbow trout - CM: "leading threat for salmonids" Vin D'Angelo (pers comm) based on Shepherd (Clint - manager defined threshold)
	Rainbow Trout Admixture	Rainbow trout observed (0 to 100)		>10%		<1%	
Invasive & Introduced species*	Inter-specific Competition & Displacement	Brook, Brown, Rainbow and Lake Trout observed					Shepard, Bradley & Spoon, R. & Nelson, L.. (2002). A native westslope cutthroat trout population responds positively after brook trout removal and habitat restoration. Intermountain Journal of Sciences. 8. ; Seiler & Keeley, 2009, https://doi.org/10.1139/F08-194 ; Al-Chokhachy & Sepulveda, 2018, https://doi.org/10.1002/nafm.10244 ; Wairight et al., 2021 https://www.pnas.org/content/118/45/e2102179118.short?rss=1
	Predation	Brown, Lake Trout and Northern Pike observed					
	AIS	Presence of Quagga/zebra mussles, NZ Mudsnails, purple loosestrife, and/or Eurasian watermilfoil					https://www.nps.gov/rlc/crown/upload/Aquatic-Invasive-Species-Brief.pdf

Conceptual Models ➡ Expert Knowledge ➡ Objectives

Example: Whitebark Pine

Step 1: Draft Conceptual Model based on Literature Review



Citations:

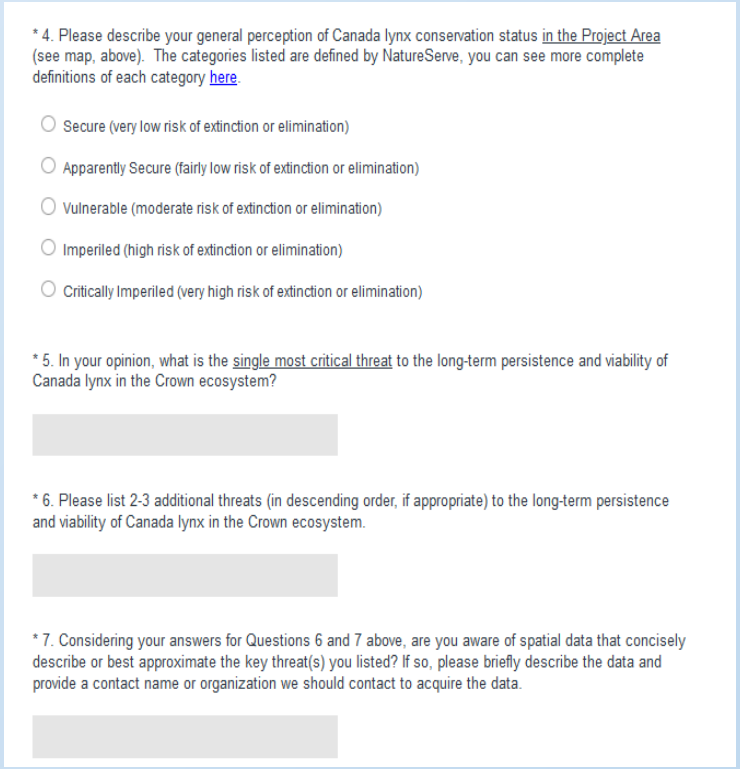
1. Crown of the Continent High Five Working Group Technical Team. 2019. Crown of the Continent Ecosystem Whitebark pine restoration strategy: Project Summary. Crown Managers Partnership.

Conceptual Models ➡ Expert Knowledge ➡ Objectives

Example: Whitebark Pine

Step 1: Draft Conceptual Model from Literature

Step 2: Vet Draft Models through Expert Review



* 4. Please describe your general perception of Canada lynx conservation status in the Project Area (see map, above). The categories listed are defined by NatureServe, you can see more complete definitions of each category here.

- Secure (very low risk of extinction or elimination)
- Apparently Secure (fairly low risk of extinction or elimination)
- Vulnerable (moderate risk of extinction or elimination)
- Imperiled (high risk of extinction or elimination)
- Critically Imperiled (very high risk of extinction or elimination)

* 5. In your opinion, what is the single most critical threat to the long-term persistence and viability of Canada lynx in the Crown ecosystem?

* 6. Please list 2-3 additional threats (in descending order, if appropriate) to the long-term persistence and viability of Canada lynx in the Crown ecosystem.

* 7. Considering your answers for Questions 6 and 7 above, are you aware of spatial data that concisely describe or best approximate the key threat(s) you listed? If so, please briefly describe the data and provide a contact name or organization we should contact to acquire the data.

Name / Affiliation	Years Experience	General Perception	Primary Threat	Secondary Threats
Michael Murray / BC Ministry of Forests	29	Vulnerable	White Pine Blister Rust	Mountain Pine Beetle, Altered Fire Regimes
Dawn LaFleur Glacier National Park	20	Critically Imperiled	White Pine Blister Rust	Drought, wildland fire, mountain pine beetle
Sabine Mellmann-Brown, USFS Region 1	30	Imperiled	White pine blister rust	Changes in natural fire regimes confounded by climate change
Bob Keane, USFS Emeratus	40	Imperiled	White pine blister rust	climate change; increasing wildfires; increasing mountain pine beetles
Rick Yates, US Forest Service - Retired	25	Vulnerable	Climate-change	Pine beetle, wild fire, prescribed fire
Nick Lai, Parks Canada	0.5	Apparently Secure	Blister Rust	Fire suppression, climate change, resource extraction (forestry, etc.)
Michael Murray / FLNRORD	29	Imperiled	Blister Rust Disease	Mountain Pine Beetle and Changing Fire Regimes
ShiNaasha Pete, CSKT Forestry	8	Imperiled	Fire Supression	Blister rust, Pine beetle, species encroachment

Expert Surveys

n = 84 experts identified

52 responses received

Conceptual Models ➡ Expert Knowledge ➡ Objectives

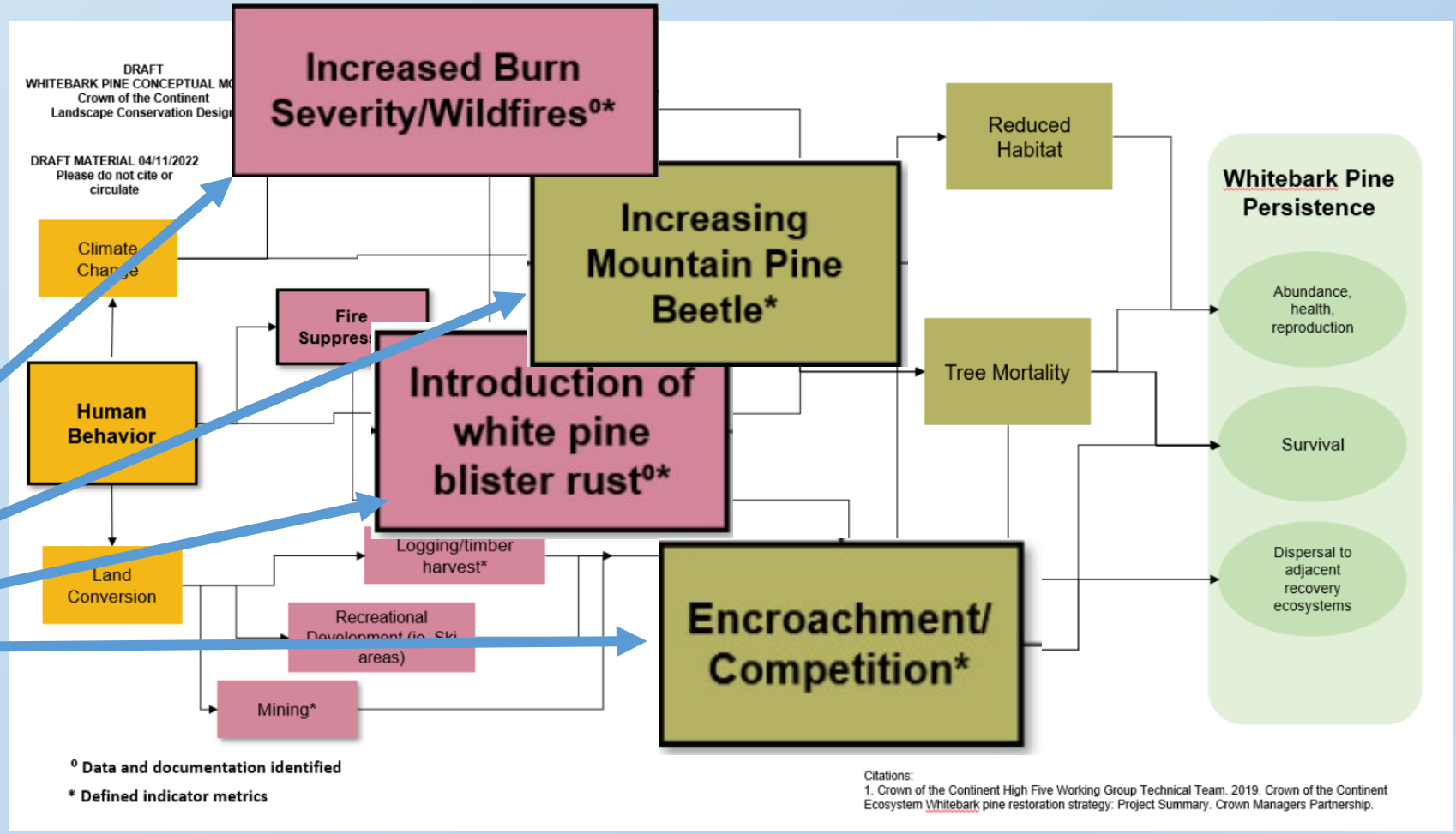
Example: Whitebark Pine

Step 1: Draft Conceptual Model from Literature

Step 2: Vet Draft Models through Expert Review

Step 3: Refine Conceptual Models

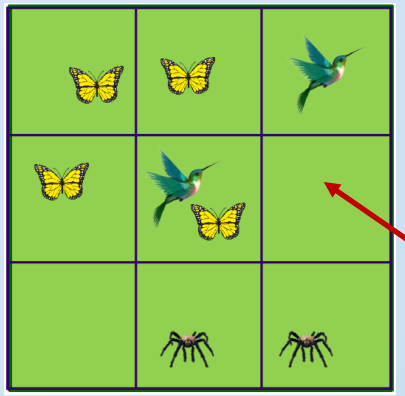
The "COST" of delivering conservation to Whitebark Pine



Understanding Cost in the LCD Framework

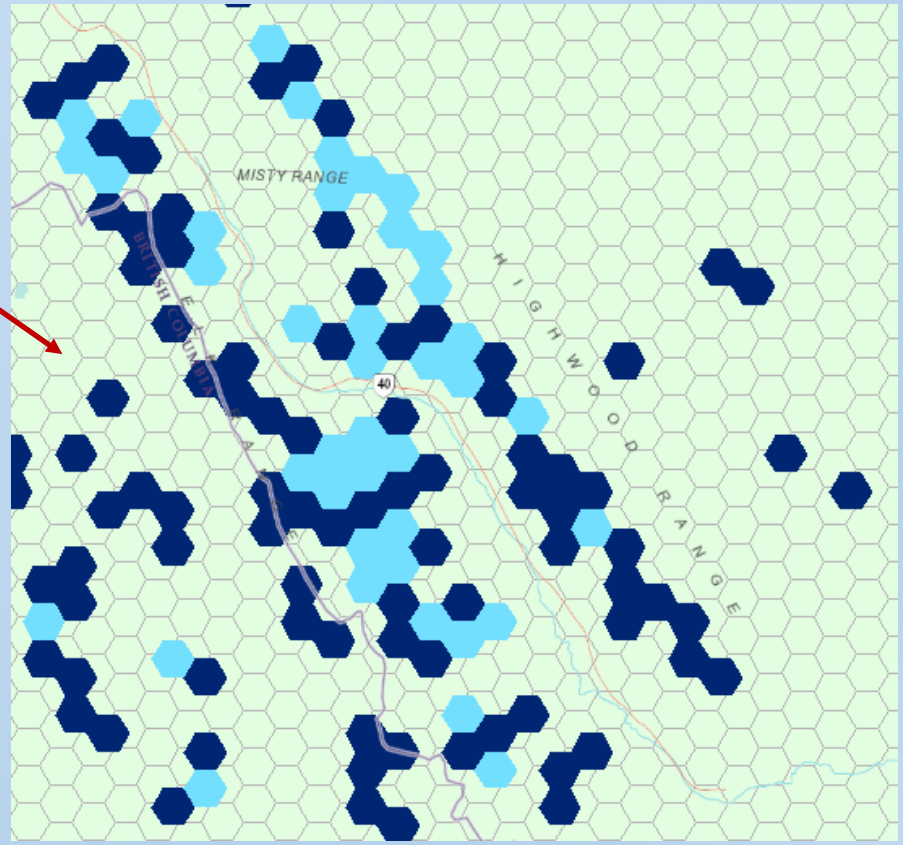
Optimization Modeling*

optimization problem: the problem of finding the *best* solution from among the set of all *feasible* solutions.



Planning Unit (n = 9)

Crown LCD Planning Unit (n = 66,866)



* used in a range of sectors including business investment, biotechnology, metallurgy, agriculture, medicine, sociology and a variety of natural resource decisions

Understanding Cost in the LCD Framework

Optimization Modeling

optimization problem: the problem of finding the *best* solution from among the set of all *feasible* solutions.

Each Planning Unit is assigned scores based on its relative value for the Conservation Feature **and the "Cost" of delivering conservation there**

"Cost can be calculated as:

- A simple reflection of area,
- An economic cost, or
- **An estimate of socio-ecological issues where high-cost sites are ones we wish to avoid, all else being equal."**

Understanding Cost in the LCD Framework

Cost as an estimate of socio-ecological issues where higher cost planning units are ones we wish to avoid, all else being equal.

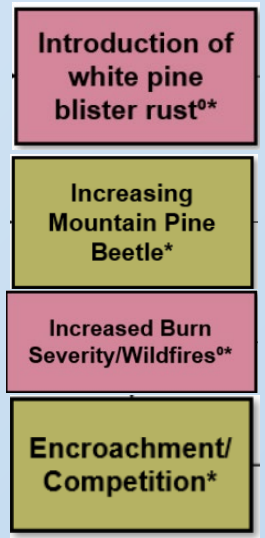
Analogous to a 'Resistance Surface' used in many spatial models, for example ecological connectivity analyses:

Variable	Ecological influence	Resistance weight	Ecological weight	Source
Development				
Hard development	Impervious surfaces interrupt ecological flows	10	1000	Centre for Remote Sensing et al. 2020; Microsoft 2017; Crown Managers Partnership 2016
Traffic rate	Higher traffic roads pose greater mortality risks for species movement	40	0	Crown Managers Partnership 2016
Agriculture	Affects natural ecological processes	3	3	Centre for Remote Sensing et al. 2020
Moisture and hydrology				
Wetness	Amount of moisture at any location. Affects species habitat, soils, and nutrient cycling	4 (now 1)	8 (now 4)	Derived from NASA 30m SRTM; Farr et al. 2007
Flow accumulation (ln)	Amount of water in rivers, streams, and wetlands. Affects species habitat and sediment transport	4	4	Derived from NASA 30m SRTM; Farr et al. 2007 and stream lines from Jones et al. 2017
Flow gradient	Stream slope (percent). Affects sediment and nutrient transport and species habitat	1	2	Derived from NASA 30m SRTM; Farr et al. 2007 and stream lines from Jones et al. 2017

Borrowed from Zeller et al. *in prep.* Ecological connectivity in the crown of the continent

Understanding Cost in the LCD Framework

We define Cost as an estimate of socio-ecological issues where higher cost planning units are ones we wish to avoid, all else being equal.



Biophysical Limits (e.g., elevation)
Blister Rust
Mountain Pine Beetle
Wildfire Severity
Competition

Whitebark Pine
Presence
Abundance
Productivity

Conceptual Models ➡ Expert Knowledge ➡ Objectives

Example: Whitebark Pine

Step 1: Draft Conceptual Model from Literature

Step 2: Vet Draft Models through Expert Review

Step 3: Refine Conceptual Models

Step 4: Estimate the relative cost of Whitebark Pine conservation

Introduction of white pine blister rust⁰*

Increasing Mountain Pine Beetle*

Increased Burn Severity/Wildfires⁰*

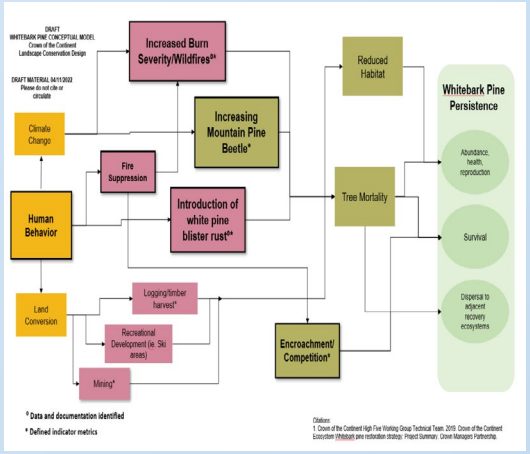
Encroachment/ Competition*

Whitebark Pine		RELATIVE CONDITION				
KEY ECOLOGICAL	INDICATOR (METRIC)	Poor	Fair	Good	Very Good	Information Source/Documentation
	wetness index	subhygric - hygric (>14)	mesic	submesic to subxeric	subxeric to very xeric	Tarboton, D. 2005. Terrain Analysis Using Digital Elevat
	Cumulative MPB Severity, mortality surveys	30-50%	11-29%		1-10%	
	burn severity for existing stands	(2.25 –3; est. 90-100% large tree mortality	1.25 -<2.25; est. 10-90% large tree mortality	0.1 -<1.25; estimated 5-10% large tree mortality)	no burns	Key, C. H.; Benson, N. C. (1999) Measuring and remote
	burn severity as a loction for restoration	high severity		moderate		
	enrocachment - Vmap Shade Tolerant Canopy Cover	>60%	40-60%	25-40%	0-25%	
Genetic stability	distance between stands				7.5miles (12km)	The distance that Clark's nutcrackers will reasonably fly
Extraction/destruction of stands	number of stands lost from mining/extractive industries	entire stand in area of development			no development present	
				Desired Conditions		

Situation: Understanding Current Condition

Current Condition → **Desired Future Condition**

Conceptual Models

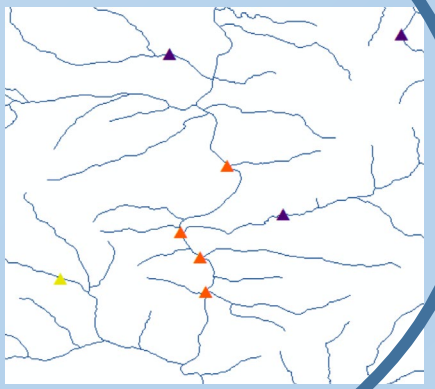


Key Attributes & Indicators

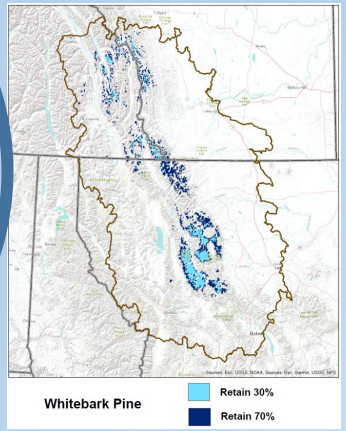
Measureable Objectives

Whitebark Pine		RELATIVE CONDITION			
KEY ECOLOGICAL ATTRIBUTE	INDICATOR (METRIC)	Poor	Fair	Good	Very Good
Whitepine Blister rust	wetness index	subhygric - hygric (>14)	mesic	submesic to subxeric	subxeric to very xeric
Mountain Pine Beetle	Cumulative MPB Severity, mortality surveys	30-50%	11-29%		1-10%
Changes in fire regimes	burn severity for existing stands	(2.25 –3; est. 90-100% large tree mortality	1.25 -<2.25; est. 10-90% large tree mortality	0.1 -<1.25; estimated 5-10% large tree mortality)	no burns
Changes in fire regimes	burn severity as a loctio for restoration	high severity		moderate	
Species Encroachment	enrocachment - Vmap Shade Tolerant Canopy	>60	40-60%	25-40%	0-25%
Genetic stability	distance between stands				7.5miles (12km)
Extraction/destruction of stands	number of stands lost from mining/extractive industries	entire stand in area of development			no development present
				Desired Conditions	

Map Costs (Relative to Objectives)

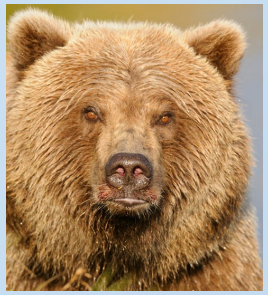


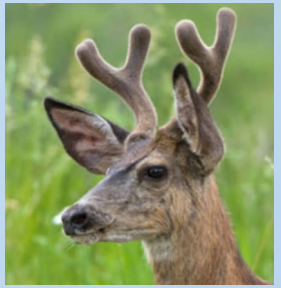
Spatial Models



Th Analysis Team is carefully defining Cost for each ecological feature using published literature, management plans and consulting with experts

Whitebark Pine	Forest
Bull Trout	Grassland
Westslope Cutthroat	Shrubland
Mule Deer	Wetland
Elk	Riparian
Grizzly Bear	Aquatic Systems
Wolverine	Connectivity
Canada Lynx	

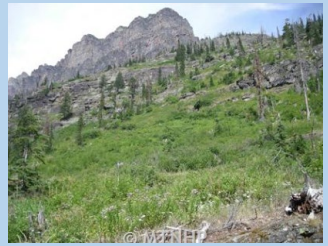


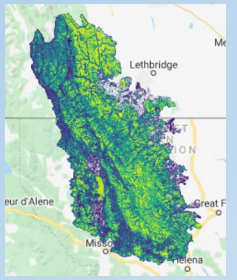




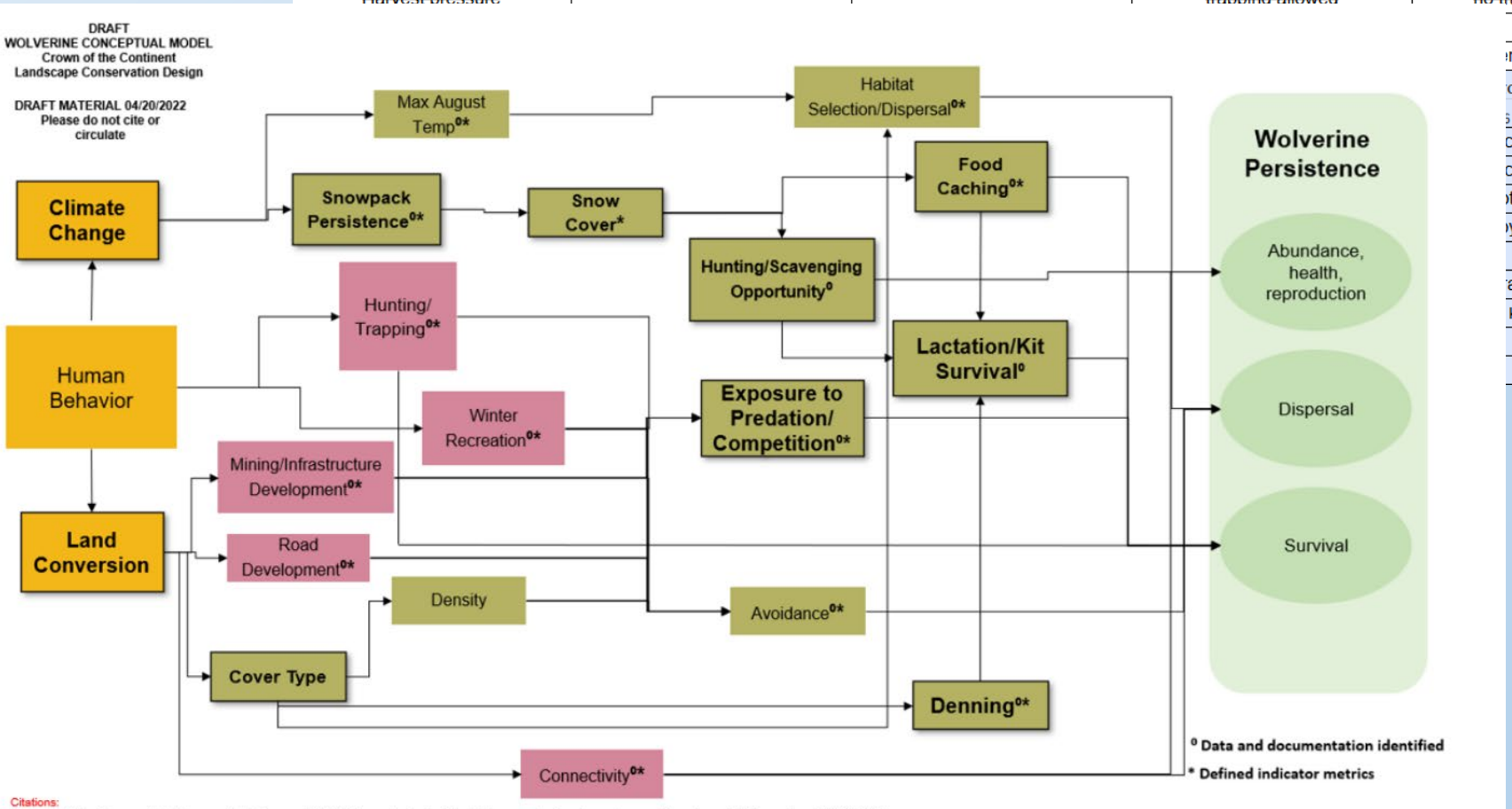




Feature			RELATIVE CONDITION			
Key Ecological Attribute	**Indicator (Metric)**		**Poor**	**Fair**	**Good**	**Very Good**
Ave Seasonal Temperature	~~Mean seasonal Temp (degC)~~					
	Max seasonal Temp (degC)	Max Aug Temps	> 22 degrees Celsius	>22 degrees Celsius	<22 degrees Celsius	<22 degrees Celsius
Snow Pack	Snow Cover (depth, duration)	hunting success	shallow, short	shallow, short	Deep, persistant	Deep, persistant
	Persistant Spring Snow Cover	denning/kit survivability	No snow from April 24 to May 15	No snow from April 24 to May 15	Snow present from April 24 to May	Snow present from April 24 to May
	food caching	lactation, litter loss	absence of food caches/winter kill	absence of food caches/winter kill	presence of food caches/winter kil	presence of food caches/winter kil
	prey density	lactation, litter loss	no summer supply carrion/marmot	little summer supply carrion/marm	summer supply carrion/marmot/ne	summer supply carrion/marmot/ne
Hunting/Trapping	direct mortality		>8.4% of population	8.4% of population	<8.4% of population	4.2% of population
Hunting/Trapping	direct mortality		trapping allowed	no trapping allowed	no trapping allowed	no trapping allowed
~~Harvest pressure~~			~~trapping allowed~~	~~no trapping allowed~~	~~no trapping allowed~~	~~no trapping allowed~~
					~~consistant, lots~~	
			ence of winter rec	absence of winter rec	absence of winter rec	absence of winter rec
			oad densities (from 0.4	low densities (<0.44 km/km2)		very low densities (<0.06 km/km2
			6 km/km2	0.44 to 1.06 km/km2		<0.44 km/km2
			ce of disturbances	Absence of disturbances		Absence of disturbances
			ce of disturbances	Absence of disturbances		Absence of disturbances
			te/fox presence	coyote/fox absence		coyote/fox absence
			yote/fox presence	wolf/coyote/fox absence		wolf/coyote/fox absence
			ating/mixed forests	Dense Conifer/Shrub/SnowCover		Dense Conifer/Shrub/SnowCover
			km2), females >100 km2	males > 100km2		males 1582km2, females 384km2



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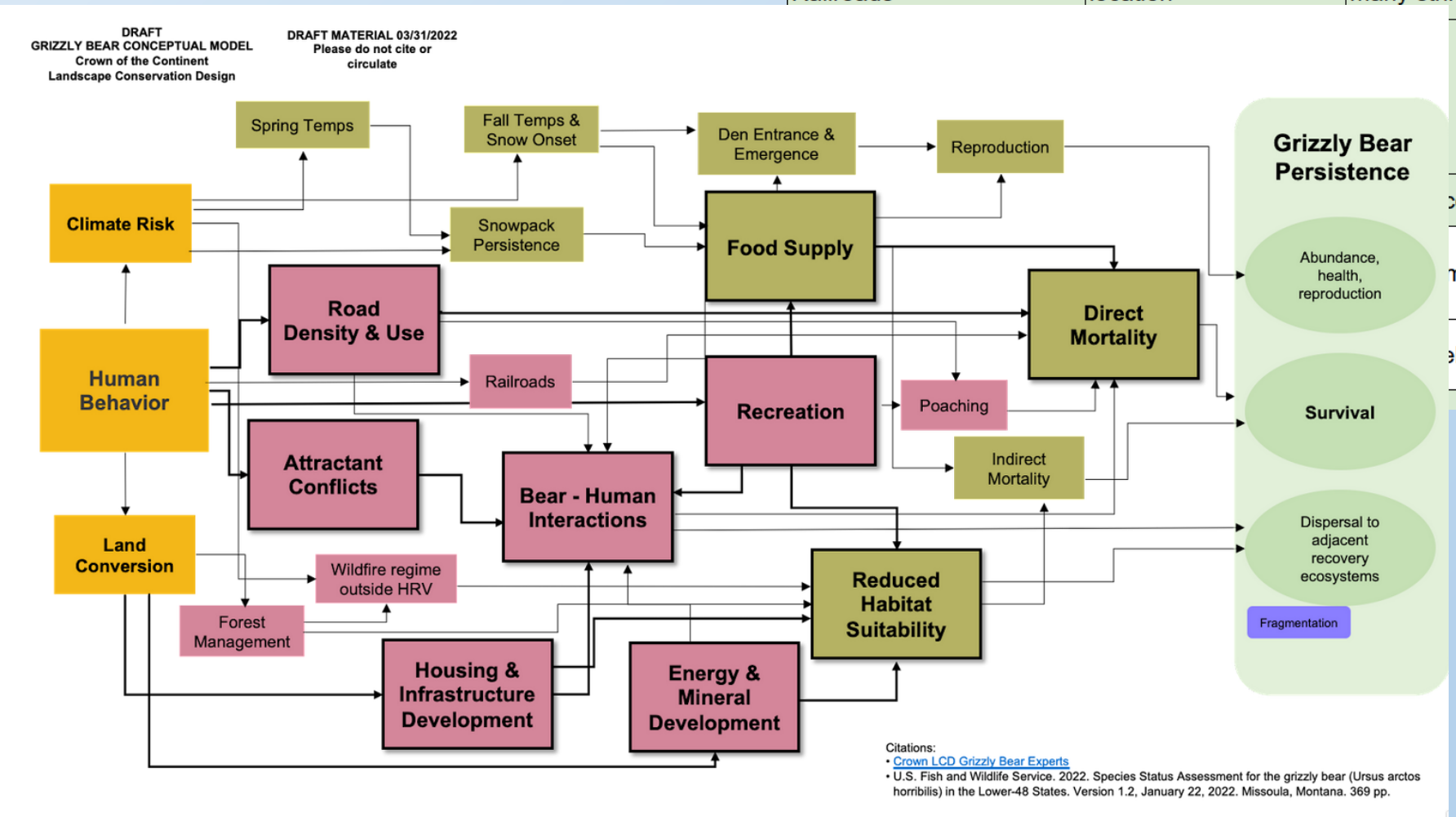
Feature = Wolverine

Grizzly Bear		RELATIVE CONDITION			
KEY ECOLOGICAL ATTRIBUTE	INDICATOR (METRIC)	Poor	Fair	Good	Very Good
Management removal: livestock depredation	active grazing allotments (public allotments and private lands)	high depredation			no depredation
Management removal: site conflicts/human safety	housing locations	many interactions			no interactions
Railroads	location	many strikes			no strikes
			SSA: <500m from access route and 10.1 km2 in size	SSA: >500m from access route and 10.1 km2 in size	
		counters			no encounters
		mentation			no fragmentation
		elopment			no development



Feature = Grizzly Bear

Questions, Comments, Discussion

Social, Cultural & Economic Features

Social, Cultural & Economic Team

Nominates:

Feature: Water Access		
Justification/Description/Considerations:		
Key Attributes	Measurable Indicators	Data & Sources
Water Quantity	Reservoir distribution; municipal-managed watersheds; input-output	aquifer records; distribution systems; precipitation trends; climate projections; USGS discharge measurements; CMP's High5 Needle Pine group has a community watersheds shapefile.
Water Quality	Reserve water quality; end pipe quality;	Agency (BOR, EPA) records; municipality records; well testing records
Access	Urban; ex-urban; unincorporated; distances & economics * Tribal rights & Pacts	Spatial data on population distribution; water delivery infrastructure
Public Attitudes		
Headwater Health		AB - in development WPAC Oldman watershed council - linear disturbance risk assessment -

Feature: Air Quality		
Justification/Description/Considerations:		
Key Attributes	Measurable Indicators	Data & Sources
Smoke Production	Fire frequency and size; fire distribution in relation to vulnerable population distribution; lifespan/mortality rates	NIFC, BAER, etc.
Prescribed Fire	Agency planning (vs. implementation?); Rx frequency, size, seasonality; Ag field burning (upstream … beyond CCE)	Agency records
Particulates	Drought trend/frequency/severity; aeolian erosion rates	Drought indices; bare ground; seasonal agricultural practices; post-fire rehab & effectiveness

Social, Cultural & Economic Features

Social, Cultural & Economic Team

Still working on:

- Land Access
- Recreation
- Tourism
- Bison(?)

News from the Field