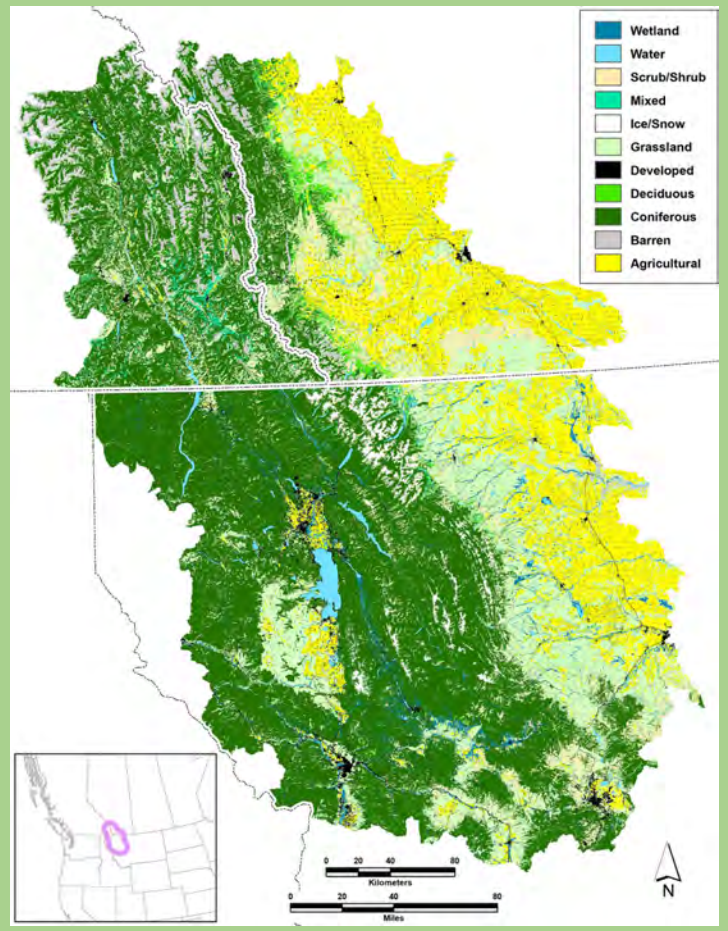
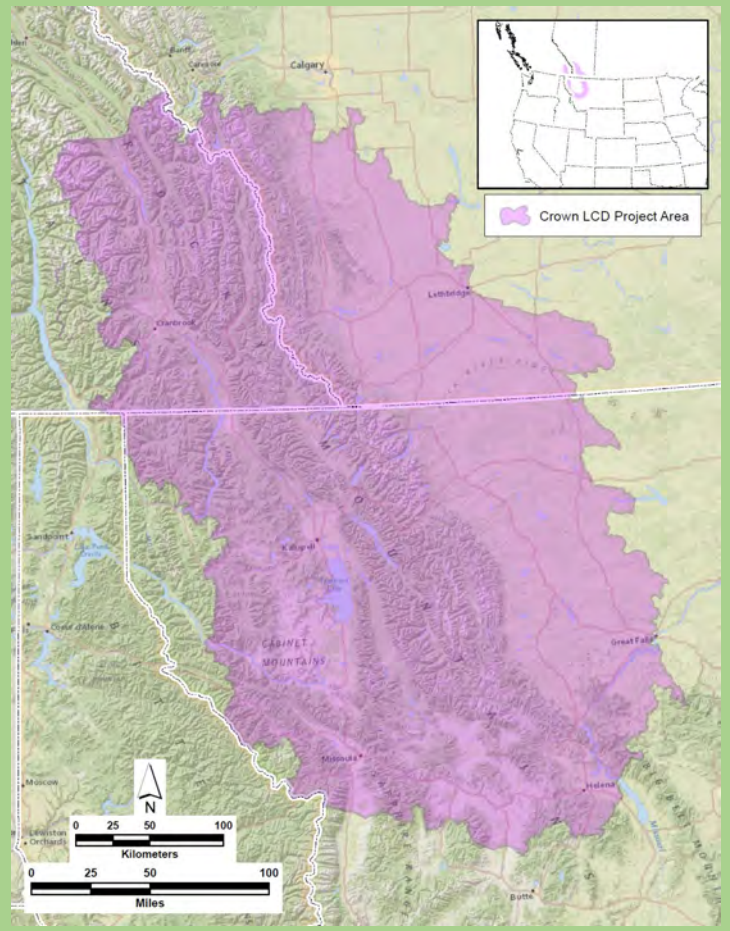
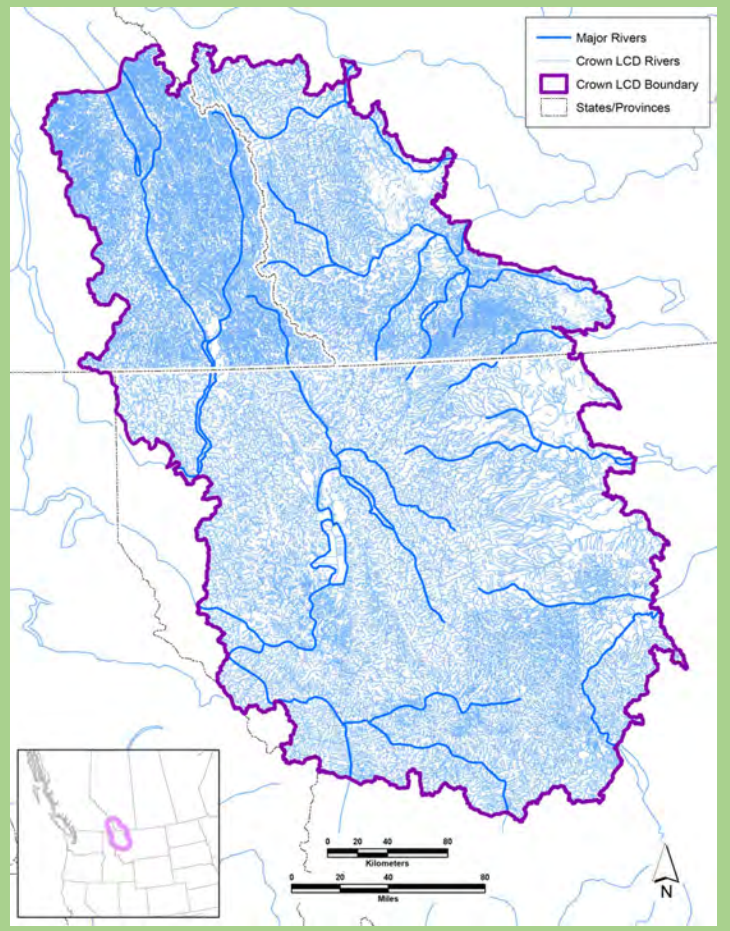
Crown of the Continent Landscape Conservation Design

Leadership Team call -- 23 June 2020







Agenda

1. Quick review of agenda, any additions?
2. Review prior action items (Sean)
3. Website (Mary M.)
    a. Identifying and Referencing Participants
    b. Photos please
4. Vision Statement update (Kris T.)
5. Brief Review of LCD expectations & products (Sean)
6. Feature Selection (Sean)
    a. Review to date
    b. Process for selecting
    c. Getting the analysis team started
7. Cold Water Salmonids (Sean)
8. Other topics

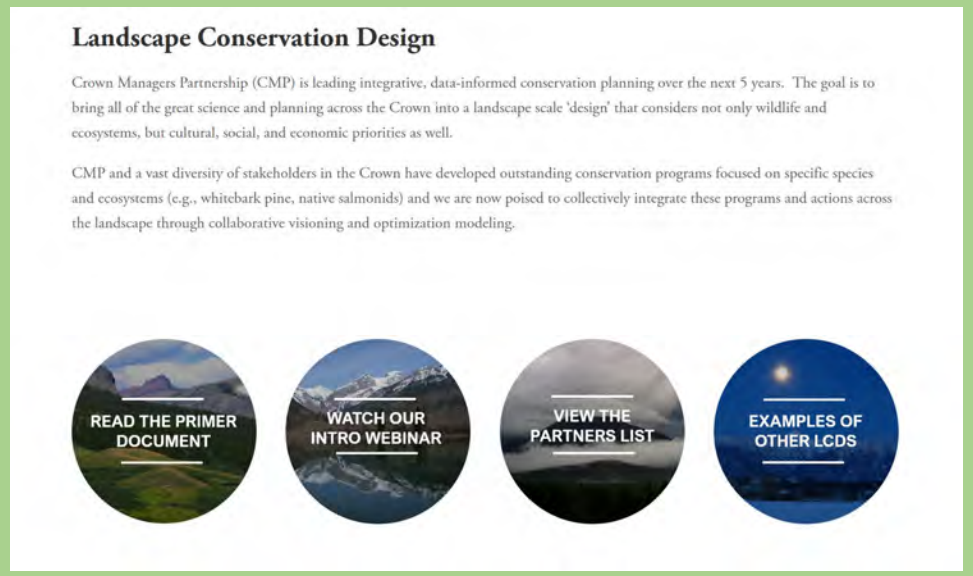
Outstanding Action Items

What?	Who?	When?
Make progress on Feature Selection process ✓	Sean and Analysis Team	Report out at June 23 LT call
Revisit objectives of the spatial design and how it informs, not determines, strategy design (see Chat box comments on feature selection) ✓	Sean	Report out at June 23 LT call
Initiate analytical work on cold water salmonids (and climate refugia) as a likely focal landscape feature ✓	Analysis Team	Get started; full report to LT in July
Nominate staff, colleagues or contacts for cold water salmonid Subject Matter Expert Team	Leadership Team	By or on June 23 LT call
Think about how we can recruit social, cultural and economic experts	Leadership Team	Ongoing; we will revisit in July
Follow up on leads provided by LT on June call	Sean	As soon as possible
Send Natalie photographs for the website	Everyone	As available
Follow up with Mike D, CSKT and other Tribes & First Nations	Sean	ASAP

Website

www.crownmanagers.org/landscape-conservation-design

- Reminder the website is up: We post all meeting notes there!



- We are populating the “Partner” page. We expect to list your:
  - Organization Logo, Organization Name, Your Name

- Please share photos with Natalie

LCD Vision Team

ANNE CARLSON – THE WILDERNESS SOCIETY

MARY MCCLELLAND – WEST GLACIER GATEWAY PROJECT

MARY MCFADZEN – MSU

NATALIE POREMBA – CROWN MANAGER PARTNERSHIP

ERIN SEXTON – FLATHEAD LAKE BIO STATION

KRIS TEMPEL – MT FWP

CHAD WILLMS – AB ENVIRONMENT AND PARKS

What should we call ourselves?
Are we the Crown of the Continent?

Do you like our tagline?

LCD NAME: Conservation without borders

Ensuring a resilient and connected landscape with clean water, healthy forests and grasslands, and thriving wildlife and human communities.

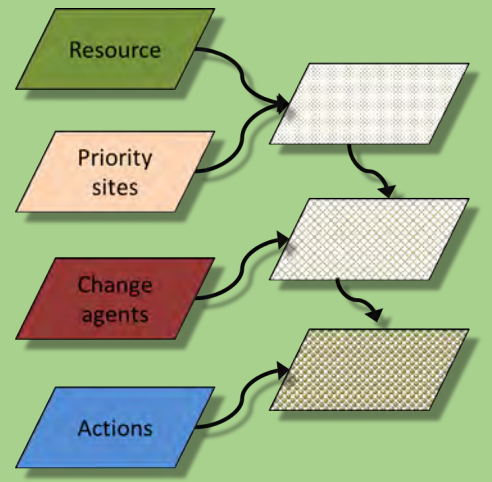
ARE WE ON THE RIGHT TRACK??

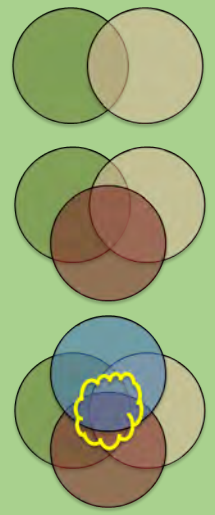
Ideally, we'd like to capture the "people" aspect in a less biological sounding way. Suggestions on how to add this sociocultural element?

Brief Review of LCD Objectives

I'm uncomfortable in trying to overlap all the features to optimize as - the most important places for one feature often is not the same as most important place for other - and the overlaps will dilute these important areas that are specific to the species

- LCD not intended to supersede existing mandates, policies or plans
  - For example the Bull Trout Recovery Plan
- Rather, LCD complements and provide landscape context to existing work
- Products:
  - Spatial Design … identifies where we – collectively – can find opportunity to deliver conservation efficiently
  - Strategy Designs … identify how we can achieve multiple conservation objectives by bringing our collective resources togethers effectively





Brief Review of LCD Objectives: Spatial Design

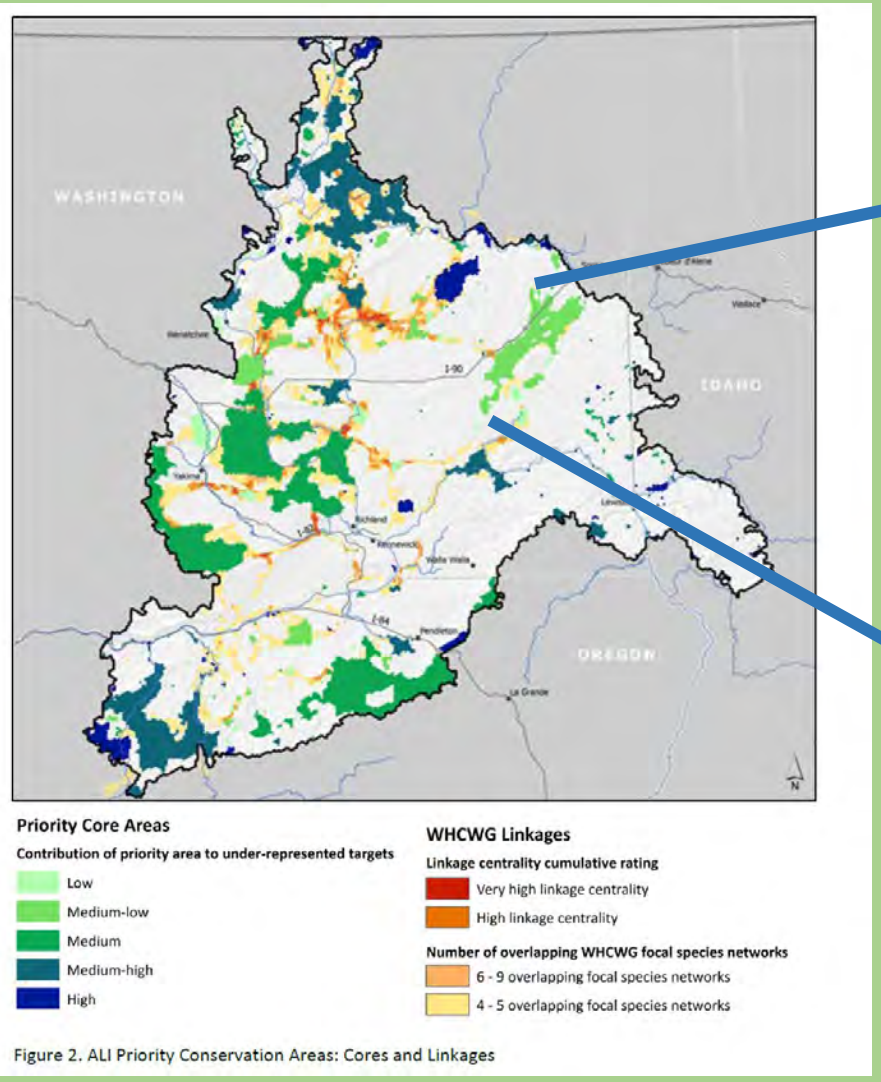
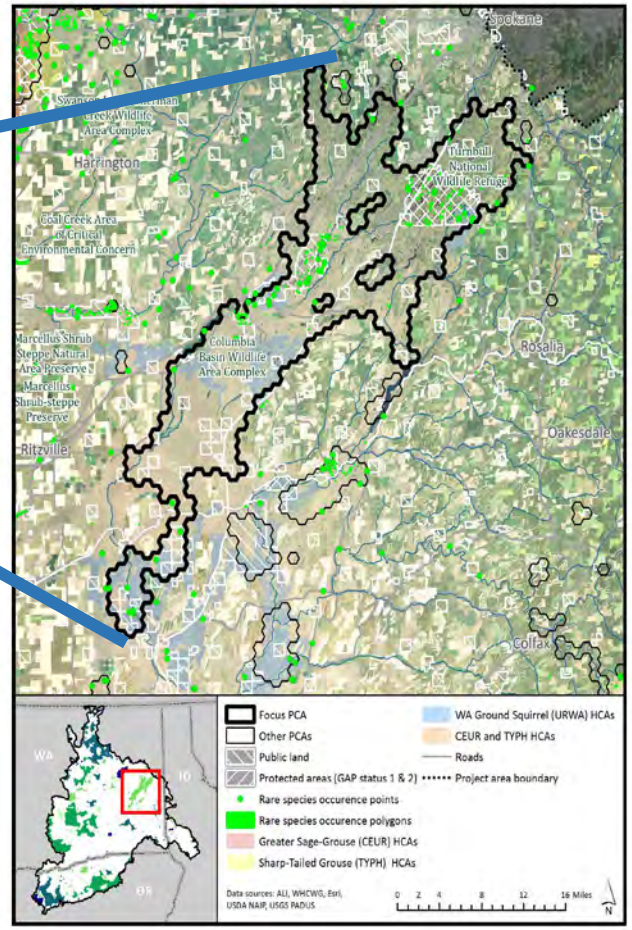


Figure 2. ALI Priority Conservation Areas: Cores and Linkages



Turnbull NWR PCA (#231), Channeled Scablands Ecoregion

Contribution to ALI targets

- H — Shrub steppe & dry grassland
  - H — *Dry grassland*
  - H — *Scabland*
  - H — *Shrub steppe*
  - H — *Shrubland*
- N P — Inland dunes
- M L — Cliffs, caves, and talus
- H — Depressional wetlands
- H — Transitional woodlands
- N P — Greater Sage-Grouse
- N P — Sharp-Tailed Grouse
- N P — Townsend's Ground Squirrel
- H — Washington Ground Squirrel
- M L — Under-protected targets index

Connectedness

- N P — Greater Sage-Grouse network
- N P — Sharp-Tailed Grouse network
- N P — Townsend's Ground Squirrel network
- H — Washington Ground Squirrel network
- M H — General permeability to movement

Current threats

- M — Invasive annual grasses
- M — Road density

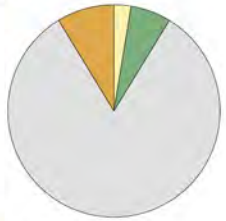
Fire risk

- M L — Vegetation departure
- M L — Probability of burning
- M L — Future fire frequency

Future non-climatic threats

- M — Development pressure
- N P — Wind power potential
- L — Agricultural conversion pressure

Ownership



BLM	7,554.9 ac
FWS (100.0% GAP 1 or 2)	17,919.7 ac
Private/Other	240,233.0 ac
State DNR	25,396.1 ac

Climate Change Vulnerability

- H — Overall vulnerability
- H — Exposure
  - H — *Temperature climate velocity*
  - M H — *Multivariate climate velocity*
- M H — Sensitivity
  - N P — *Sage-grouse contraction*
  - N P — *Sharp-tailed grouse contraction*
  - M — *Big sagebrush contraction*
  - H — *Climate sensitive targets index*
  - M — *Vegetation instability*
- M — Adaptive capacity
  - M — *Climate change resilience*
  - H — *Percent permanently protected*
  - M — *Landscape condition model*

Ranks based on relative values of PCAs, broken into quintiles

VALUES		THREATS
L	Low (bottom 20%)	L
M L	Medium-low	M L
M	Medium	M
M H	Medium-high	M H
H	High	H
N P	No data, not present, or N/A	N P

Brief Review of LCD Objectives: Strategic Design

Why Planners Should Integrate Local Planning with the Blueprint

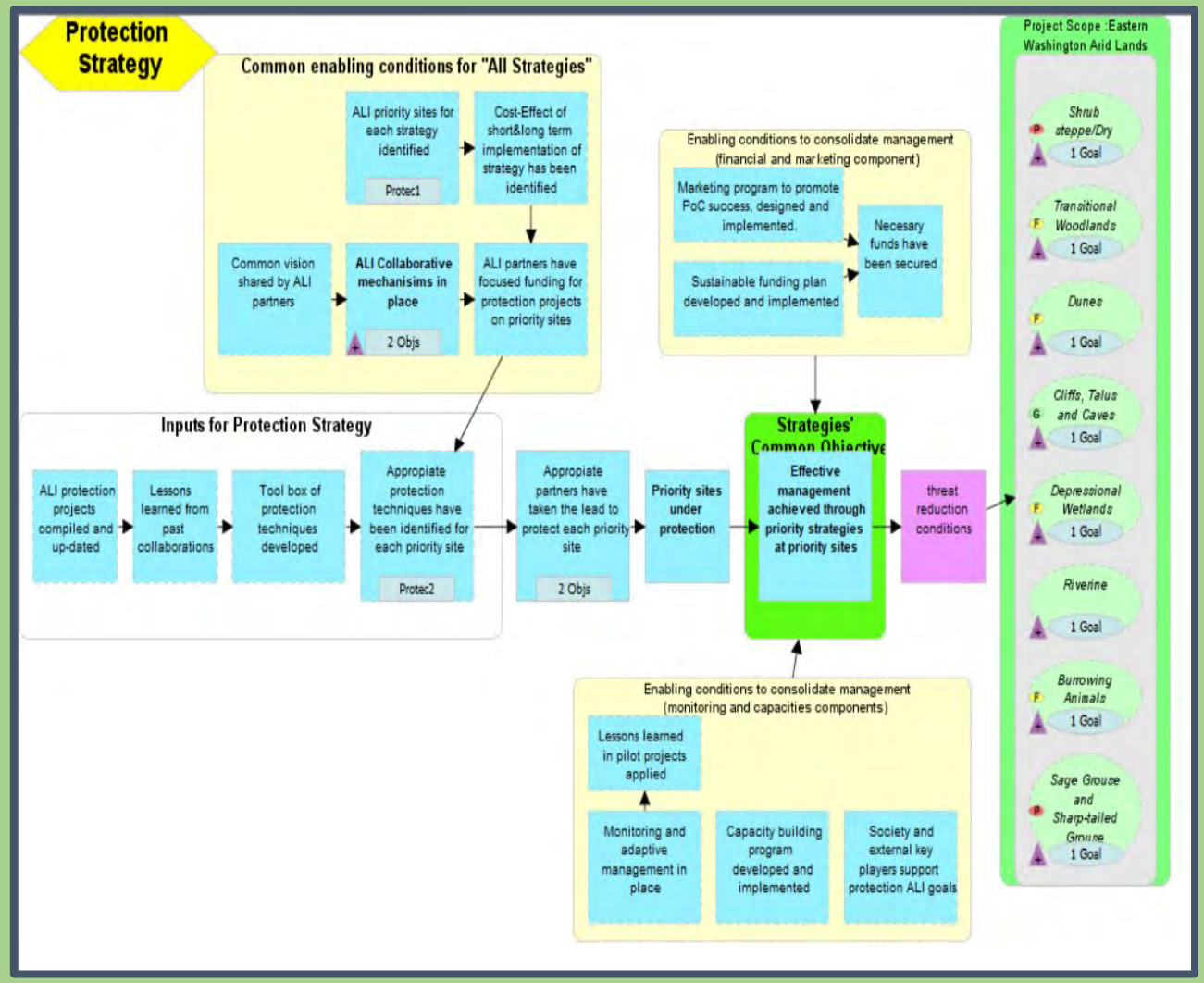
Co-Benefits of Environmental Conservation for Planning

Environmental conservation is often only one of many competing priorities for local planners, if it is even a priority at all. However, even if conservation is not identified as a focus within a community, successful conservation efforts can result in a host of desirable co-benefits that help accomplish goals related to economic development, social equity, community health, and other broad priorities.

Conservation Activity	Results	Community Benefits
Source water protection	Improved water quality Flood mitigation Storm water protection Wildlife habitat enhancement Biodiversity Recreational opportunities	Reduced need for water treatment facilities Increased tourism revenue
Flood mitigation/storm water management	Reduced frequency of flood events Smaller areas of flood events Improved water quality	Less costly public drainage infrastructure Reduced flood-related costs for property owners
	Reduced erosion Reduced sedimentation	
Open space and farmland preservation	Flood control Water quality Recreational opportunities	Continued production Increased tourism revenue
Forest preservation and enhancement	Wildlife habitat enhancement Timber source Carbon storage Stormwater retention Recreational opportunities Increased shade	Reliable sources of wood fiber Increased tourism revenue Higher property values Lower energy use
Restoring coastal features	Wildlife habitat enhancement Recreational opportunities Improved water quality	Increased tourism revenue Higher property values

Figure 4 This table summarizes several conservation activities, the results of those activities, and their benefits for cities and people. (Naturally Resilient Communities, 2017 and National Association of Conservation Districts, 2010).

Southeast Conservation Adaptation Strategy



Columbia Plateau LCD

Landscape Features

We define **focal landscape features** as representations of the Crown's full complement of biodiversity, ecosystem elements, social and cultural components and economies.

We use these representations or focal features because the full complement of features across sectors are far too complicated to analyze and model in any meaningful way.

Identify Landscape Features

What to Focus On?

Select Landscape Features:

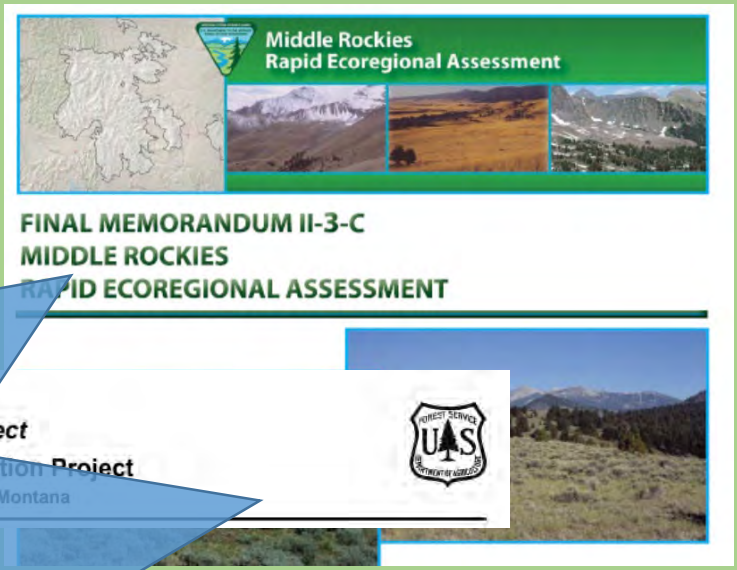
- **Ecology**
  - Species
  - Habitat Types
  - Processes (i.e., connectivity)
- **Social**
  - Economies
  - Recreation
- **Cultural**
  - Traditional Uses
  - Historic Value

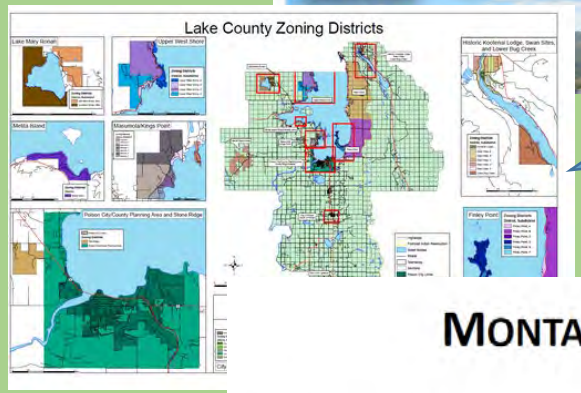
Criteria to Consider:

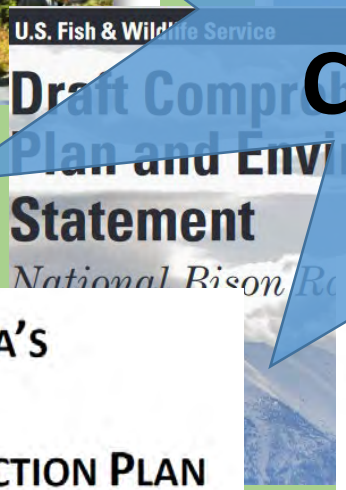
- **Representative**
- **Comprehensive**
- **Extent / Range**
- **Impact, Importance**
- **Context** (do we know enough?)
- **Contentiousness** (low)
- **Data Available**

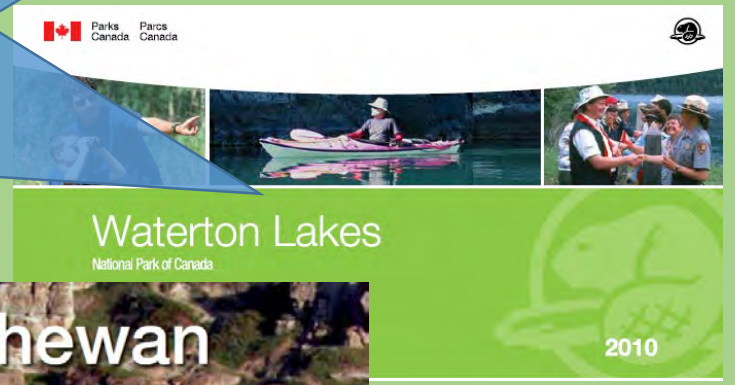
Selecting Features Collaboratively

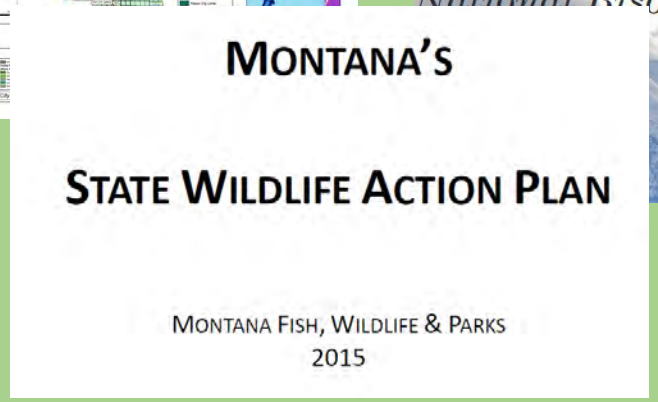
Reviewed 60 Resource Management & Conservation Plans











Plan Review Breakdown

Geography	# Plans
Montana	37
Alberta	14
British Columbia	4
Transboundary	5

Feature	Identified as Priority
Species/Taxa	175
Habitat-Ecosystem	9
Ecological Process	6
Ecosystem Services	6
Cultural Resources	6
Economies	8

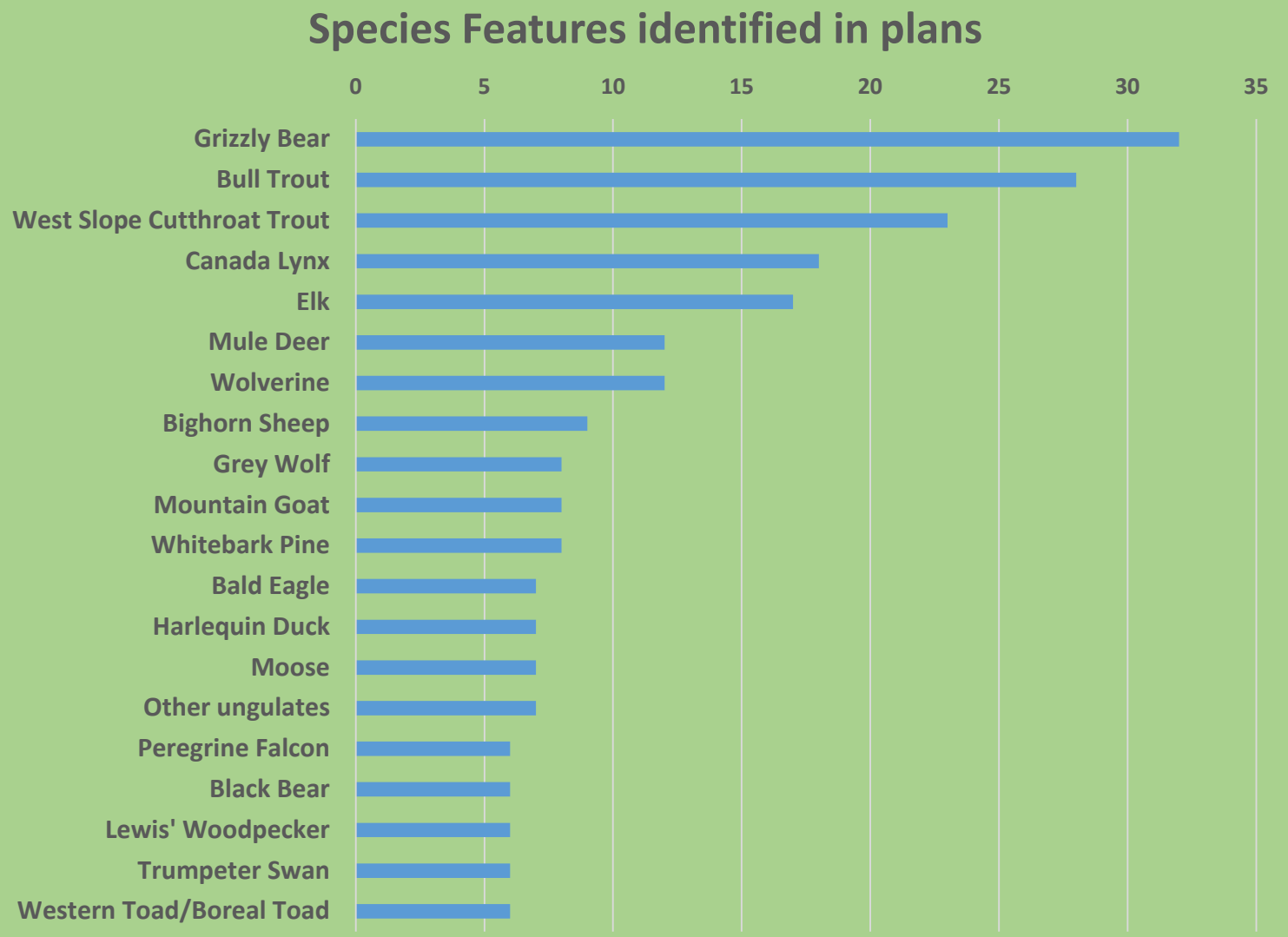
Two broad types of features:

Fine feature: A discrete representation of biodiversity (for example, a species) which may not be well represented by a coarse feature and for which we have good knowledge of key attributes related to ecosystem health and function.

Coarse feature: An aggregate or collection of fine features (for example, a habitat type) that serves to both encompass multiple fine features and compensate for our incomplete knowledge of all biodiversity.

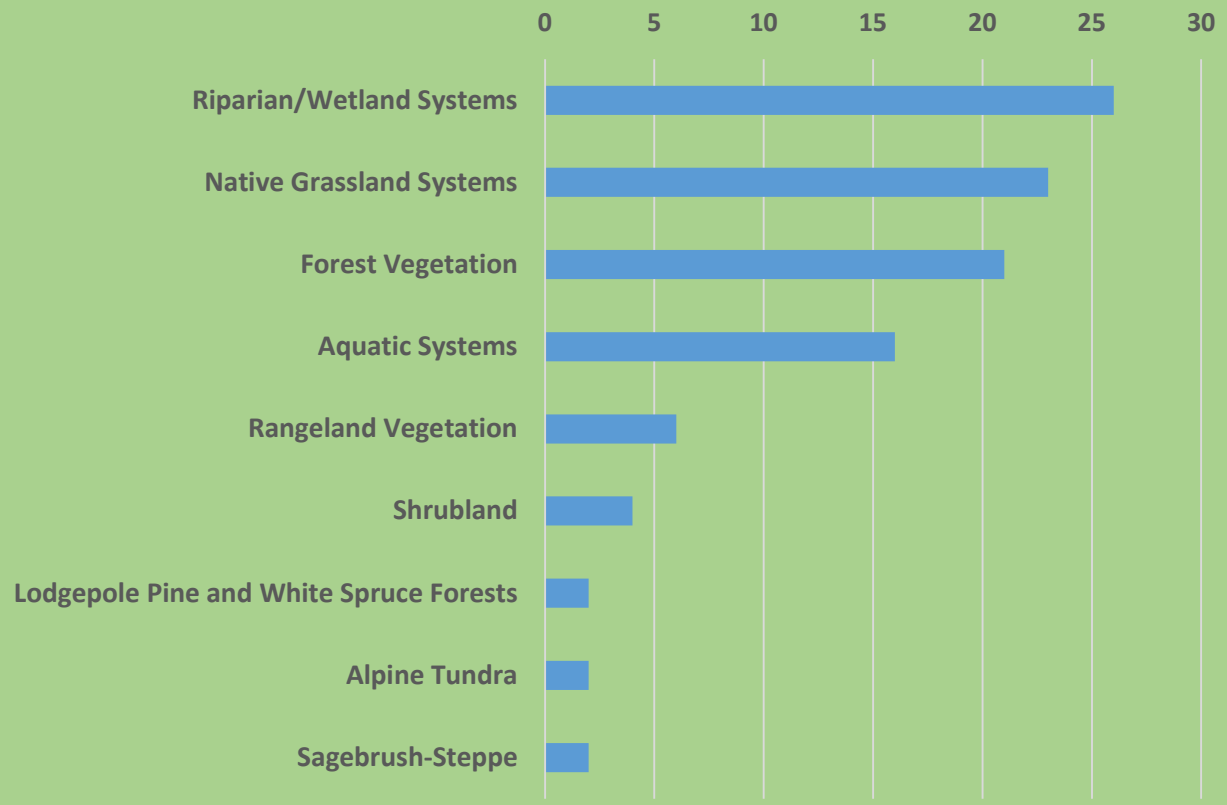
Stakeholder Priorities: Species

175 Species identified in one or more plans

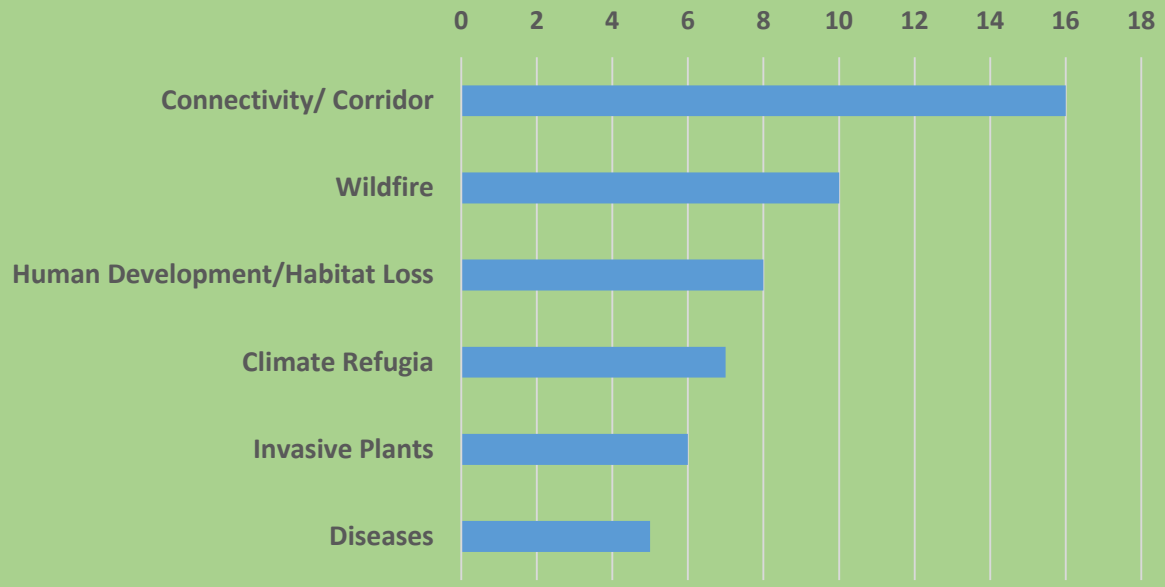


Stakeholder Priorities:

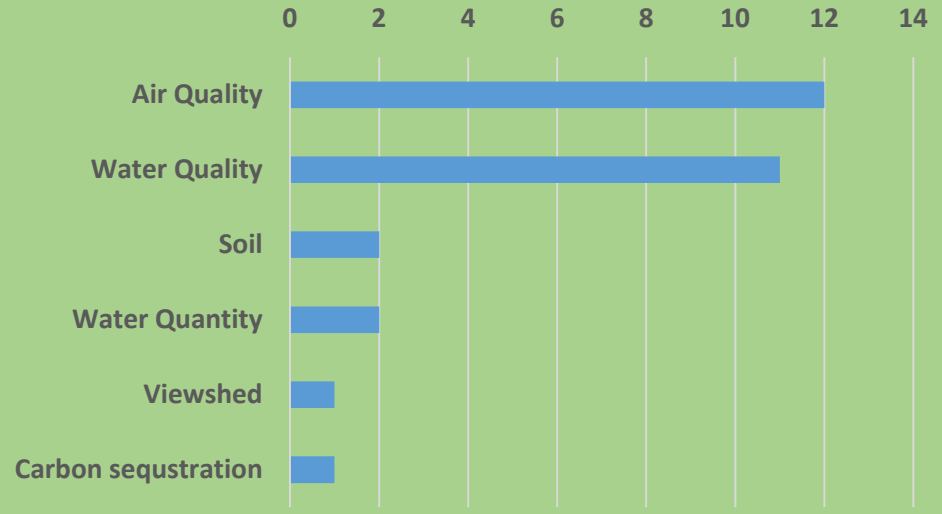
Habitat/Ecosystem Features



Ecological Process Features



Ecosystem Services Features



Proposed Selection Process

Start with Species List:

- "Top 20" species List
- Lump species into Habitat Guilds --- link with habitat ecosystem
- Lump into Life History Guilds --- link with ecological processes
- **Comparative evaluation of candidate Features** using a set of quantitative and qualitative metrics to understand candidate feature:
    - Relative level of protection & vulnerability
    - Basic understanding of feature and it's ecological setting
    - Data availability and amount of monitoring underway

- Report back to Leadership Team in June

Assemble ad hoc teams, Steering Committee, colleagues and subject matter experts

Habitat Guilds

Riparian/Wetland Systems	Native Grassland Systems	Forest Vegetation	Aquatic Systems (Lentic)	Shrubland/Sagebrush-steppe/Rangeland Vegetation	Lodgepole Pine and White Spruce Forests	Alpine Tundra
Bull Trout	Elk	Canada Lynx	Bald Eagle	Canada Lynx	Canada Lynx	Wolverine
Westslope Cutthroat Trout	Mule Deer	Grey Wolf	Moose	Elk	Gray Wolf	Bighorn Sheep
Harlequin Duck	Sharp-tailed Grouse	Whitebark Pine	Trumpeter Swan	Golden Eagle	Moose	Mountain Goat
Moose	Spalding's catchfly	Black Bear	Common Loon	Mountain Lion	Black Bear	Whitebark Pine
Lewis' Woodpecker	Prairie Falcon	Mountain Lion	Shorebirds	Sharp-tailed Grouse	White-tailed Deer	Golden Eagle
Trumpeter Swan	Chestnut-collared Longspur	Limber Pine	Waterfowl	Prairie Falcon		Clark's Nutcracker
Western Toad / Boreal Toad	Ferruginous Hawk	Bobcat	Burbot	Ferruginous Hawk		
Arctic Grayling	Pronghorn	Northern Goshawk	Rainbow Trout	Pronghorn		
Beaver	Bobolink	Pileated Woodpecker	White Sturgeon	Greater Sage-Grouse		
Columbia River redband trout	Long-billed Curlew	White-tailed Deer		Townshend's Big-eared Bat		
Long-toed Salamander	Rough Fescue	Clark's Nutcracker		Loggerhead Shrike		
Waterfowl	Sprague's Pipit	Olive-sided Flycatcher				
Northern Leopard Frog	Townsend's Big-eared Bat	Ponderosa Pine				
Water Howellia	Black-footed Ferret					
Yellowstone Cutthroat Trout	Loggerhead Shrike					
Columbia spotted frog	Mountain Plover					
arbled odwit	hite-tailed rairie Dog					
ainbow						
ver Ott						
Whitefish						
Willow flycatcher						

[coming]

Ecosystem Process-
Life History Guilds

Comparative Evaluation

Potential Feature	Relative Concern (Plans)	Relative Protected Status	Available Data Evaluation	Ongoing Monitoring	Ease of Monitoring	Inclusive of Finer Targets?	Finer Target useful as Indicator?	Source of Information
COARSE FILTER								
A								
B								
C								
D								
FINE FILTER								
E								
F								
G								
H								
I								

Relative Concern (Plans) – Simple tally of number of plans that identify feature as important

Relative Protected Status – Quick GIS overlay analysis comparing % of spatial distribution of feature in GAP Status 1 or 2 vs. Gap Status 3-5. Provides brief evaluation of the "amount" of the feature already protected.

Available Data Evaluation – deep dive into data availability

Ongoing Monitoring – Who is monitoring what? How and Why? What are metrics? Sensitivity?

Ease of Monitoring – best guess of how easy it would be to monitor proposed feature, attribute and indicator

Inclusive of Finer Targets? – Does this coarse feature encompass (fully or partly) a high-priority finer feature?

Finer Target useful as Indicator? – Would a finer feature serve as a useful indicator of the status/trend of this feature?

Source of Information – thorough documentation!

Candidate Feature	Relative Concern (Plans)	Relative Protected Status (%)	Published Conservation Status				Available Data Evaluation	Ongoing Monitoring	Ease of Monitoring	Inclusive of Finer Targets?	Finer Target useful as Indicator?	Information Source
FINE FILTER			**IUCN**	**MT**	**AB**	**BC**						
Grizzly Bear	32	13.8	G4	S2S3	SS							
Bull Trout	28	10.2	G5	S2	HC						Riparian	
West Slope Cutthroat Trout	23	10.3	G5T4	S2	HC						Riparian	
Canada Lynx	18	6.9	G5	S3							LP & WS Forest	
Rocky Mountain Elk	17	9.7	G5	S5							Grass/Shrub	
Mule Deer	12	9.0	G5	S5								
Wolverine	12	11.4	G4	S3	IA						Alpine	
Bighorn Sheep	9	15.6	G4	S4							Alpine	
Grey Wolf	8	9.8	G5	S4							Forest	
Mountain Goat	8	25.5	G5	S4							Alpine	
Whitebark Pine	8	25.3	G3?	S3	HC							
Bald Eagle	7	9.0	G5	S4							Riparian/Aquatic	
Harlequin Duck	7	11.7	G4	S2B	SS						Riparian	
Moose	7	11.8	G5	S4							Wetlands	
Other Ungulates	7	9.0										
Peregrine Falcon	6	9.0	G4	S3	IA							
Black Bear	6	12.4									Forest	
Lewis' Woodpecker	6	11.6		S2	SS						Riparian	
Trumpeter Swan	6	0.2	G4	S3	SS						Aquatic	
Western/Boreal Toad	6	10.6	G4		SS						Wetlands	
INFORMATION SOURCE	Mgt Plan Review (This document)	World Database on Protected Areas; NatureServe	NatureServe (2006)	Montana Field Guide	Waterton Bio. Res. (2015)							

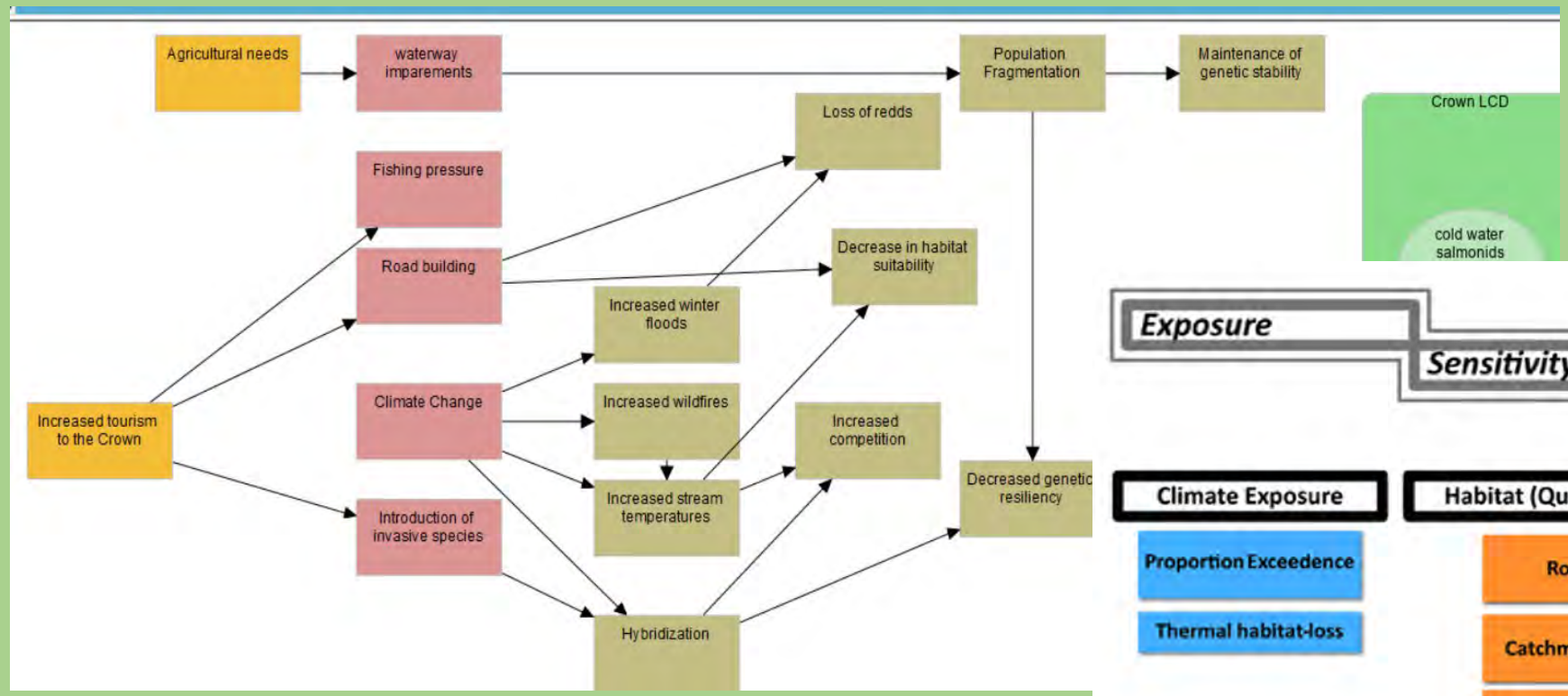
Potential Feature	Relative Concern (Plans)	Relative Protected Status	Published Conservation Status	Available Data Evaluation	Ongoing Monitoring	Ease of Monitoring	Inclusive of Finer Targets?	Finer Target useful as Indicator?	Source of Information
COARSE FILTER									
Habitat/ Ecosystem									
Riparian	26						20	5	
Wetland	26						20	2	
Grassland	23						17	1	
Forest	21						13	2	
Aquatic (lake)	16						9	2	
Shrubland/Rangeland/Sagebrush-steppe	6						11	1	
Lodgepole Pine and White Spruce Forests	2							1	
Alpine Tundra	2						6	2	
Ecological Process									
Connectivity/Corridor	15								
Wildfire	10								
Climate Refugia	7								
Invasive Plants	6								
Diseases	5								
Human Dev/Habitat Loss	5								
Geodiversity	2								
INFORMATION SOURCE	Mgt Plan Review (This document)	World Database on Protected Areas; CMP Landcover layer							

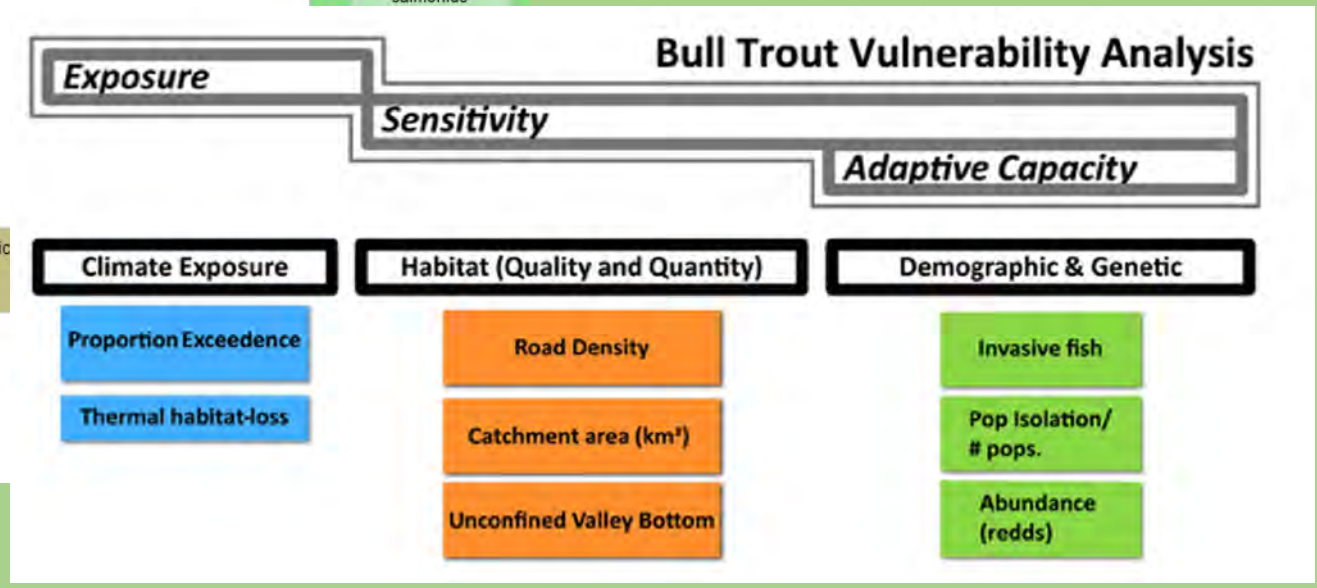
Discussion

- What's missing
- What needs adjustment?
  - Tease out Wetlands and Riparian
- What information do you need as we select 8-12 focal features from this list of 35 candidates?

Getting Started: Cold Water Salmonids

- Literature Review
- Consulting Experts
- Draft Conceptual Model
- Integrating climate (refugia)
- Assembling Subject Matter team

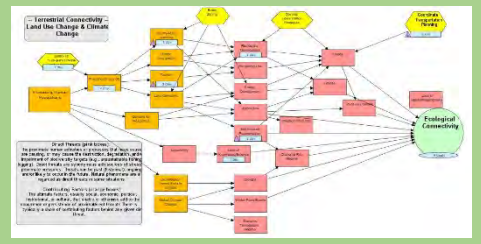




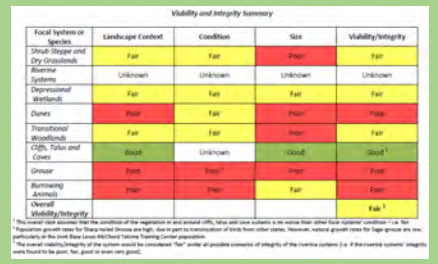
How do we treat Landscape Features?

Current Condition → **Desired Future Condition**

Conceptual Models

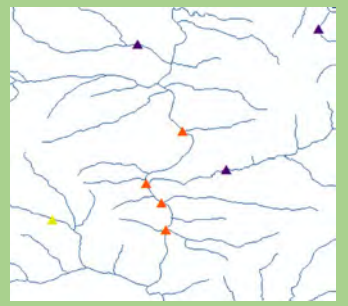


Key Attributes & Indicators

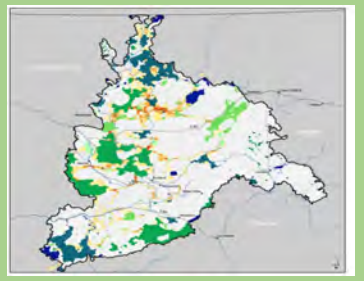


Measureable Objectives

Barriers to Objectives (aka 'Costs')



Spatial Models



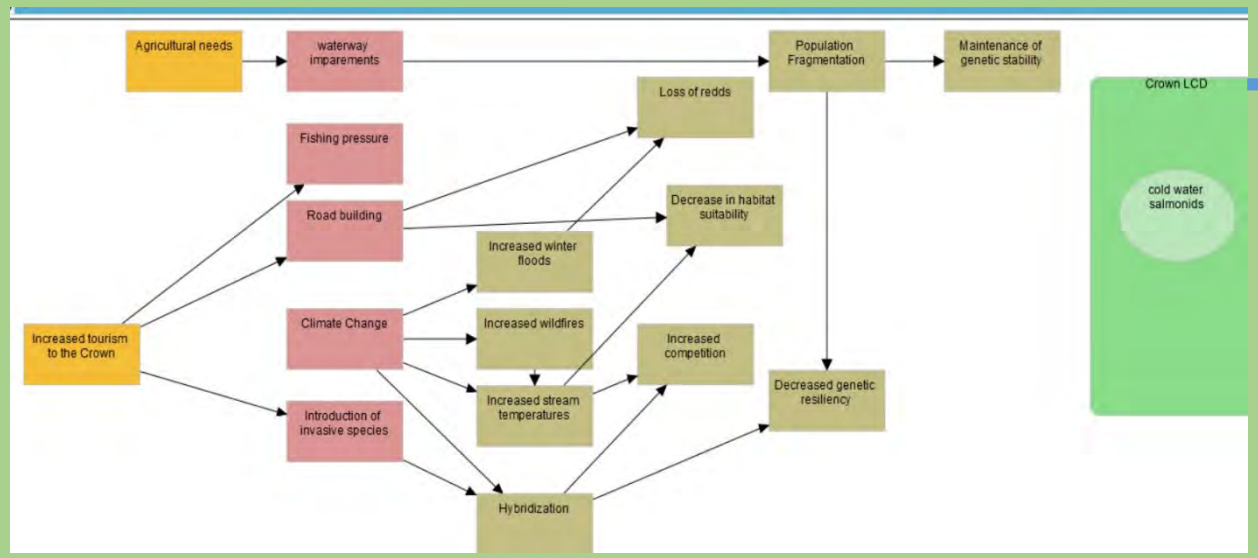
Leadership Team

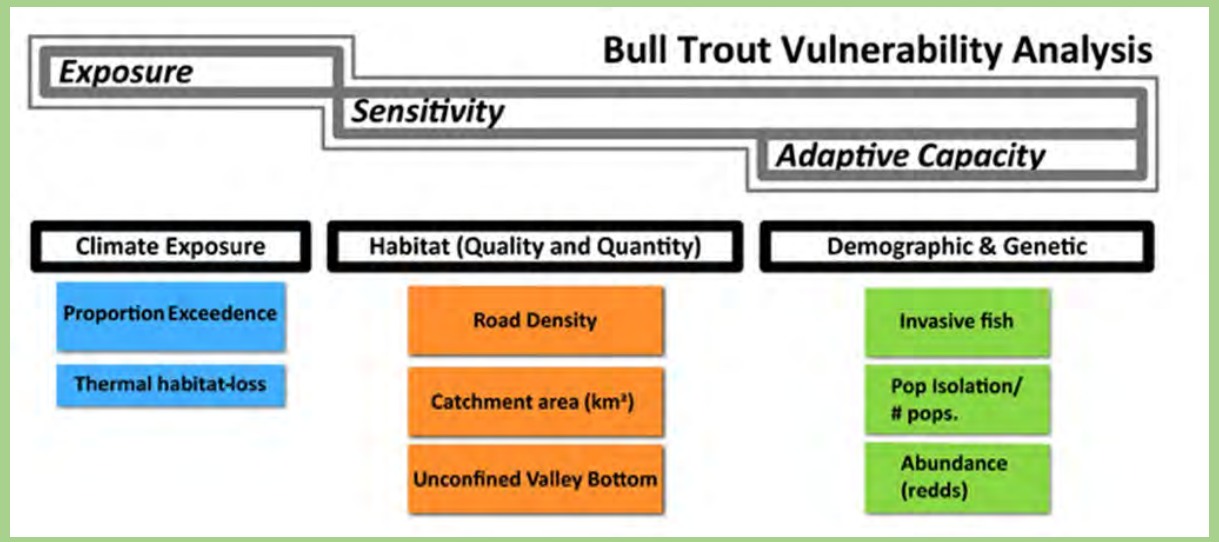
Technical Team

Subject Matter Experts

Analysis Team

Getting Started: Cold Water Salmonids





- Key Ecological Attribute
  - Demographic / Genetic
  - Habitat Quality
  - Landscape Context (e.g., connectivity, refugia)
- Indicators for Attributes
  - Measurable
  - Manageable
  - Meaningful
- Desirable State (Range of Variation)
- Costs (Barriers) to achieving desired conditions

Modeling an Optimized Landscape

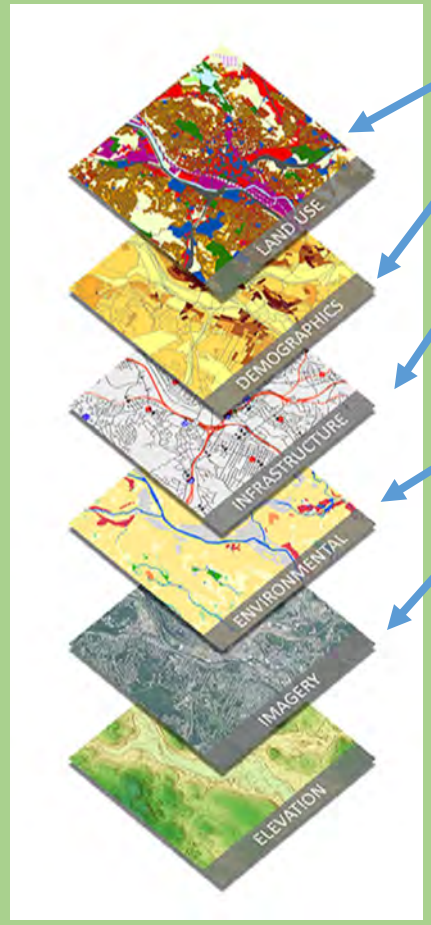
Software: Marxan

Sum of selected Planning Unit Costs…

Total perimeter of selected Planning Units

Total penalty' you'll 'pay' for not meeting all targets (i.e., how "good" is solution?)

$$\underbrace{\sum_{PUs} Cost}_{1} + \underbrace{\text{BLM} \sum_{PUs} Boundary}_{2} + \underbrace{\sum_{Con.Targ.} SPF \times \text{Penalty}}_{3} = \textbf{Marxan Score}$$



Spatial data for landscape features

Barriers or "Costs" to achieving targets

A Solution – **but is it a good one?**

Iterations of iterations …..

Discussion, Comments, Questions …