

Crown LCD Leadership Meeting Notes May 26, 2020

Action Items (May):

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

Action Items (Prior):

What?	Who?	When?
Send Natalie photographs for the website	Everyone	As available
Think about how you (and your organization) wants to be identified on the website Your name? Org name? Logo? All the above? Not at all?	Everyone	By 26 May Leadership Team call. Email Natalie, Mary and/or Sean if you have input before.
Create a map and GIS file of the Crown LCD Project Area	Phil and Sean	Before May Technical Team call (5/12)

Identify any plans or planning documents we've missed that should be included in integration assessment. See attached spreadsheet for working list.	Everyone	As soon as is reasonable possible; Email Natalie, Aubin and/or Sean
Think about your organizations highest priority Features and be prepared to provide input to Feature Selection process in May.	Everyone	By 26 May Leadership Team call.
Convene the Vision Statement Sub-committee (Chad Willms, Mary McClelland, Anne Carlson, Kris Tempel, Danielle Pendlebury, plus other volunteers)	Natalie	At least 1 discussion before 26 May Leadership Team call.
Follow up on recommendations for additional stakeholders	Sean	Before 26 May call
Follow up with Mike D, CSKT and other Tribes & First Nations	Sean	Before 26 May call
Review and synthesize key elements from existing plans	Analysts and Technical Team	Before April Leadership Team call

Meeting Notes and Materials:

Recording: <https://meet39041854.adobeconnect.com/p7p0wql26dah/>

Presentation Slides: Attached (Crown_LCD_LeadershipTeam_5-26-2020.pdf)

Next Call: June 23, 2020 at 11 am

Attendees

Mary Riddle: Glacier National Park and CMP

Natalie Poremba: Conservation Priorities Coordinator, Crown Managers Partnership

Kris Tempel: Habitat Conservation Biologist, Montana Fish, Wildlife and Parks

Katie Morrison: CPAWS Southern Alberta

Constanza von der Pahlen: Critical Lands Program Director, Flathead Lakers

Tracy Lee: Miistakis Institute

Kris Inman: Wildlife Conservation Society, Strategic Partnerships and Engagement

Claudia Regan: USGS Northern Rocky Mountain Science Center

Hilary Young: Yellowstone to Yukon Conservation Initiative
Anne Carlson: The Wilderness Society
Phil Matson: Flathead Lake Biological Station, Crown Managers Partnership
Erin Sexton: Flathead Lake Biological Station
Chad Willms: AB Environment and Parks
Aubin Douglas: USFWS - Div of Realty
Greg Watson: US Fish and Wildlife Service
Kim Pearson: Parks Canada
Linh Hoang: US Forest Service
Mary T. McClelland: West Glacier Visioning Project, Gateway Project
Mike Durglo: CSKT
Tara Carolin, CCRLC, Glacier NP
Mary McFadzen: Science Outreach, MSU
Sean Finn: Science Coordinator, US Fish and Wildlife Service

Agenda

1. Quick review of agenda, any additions?
2. Updates
 - a. Project Area map
 - b. Funding
3. Review prior action items
4. Feature Selection
 - a. Review to date
 - b. Process for selecting
 - c. Getting the analysis team started
5. Social, Cultural, Economic Features
 - a. How do we get there?
6. Other topics

Updates (slide 3):

Project Area Map

Funding:

Sean briefly displays the Crown LCD Project Area map & thanks the Leadership Team for the deliberation and decision. Sean then describes funding award through US Fish and Wildlife Service's Science Applications program that will support the LCD through calendar year 2021.

Feature Selection (slide 5-14):

- a. Review to date
- b. Process for selecting
- c. Getting the analysis team started

Sean leads Leadership Team in review and evaluation of the proposed landscape feature review process. For this first cycle we intend to focus on ecological features (and hold off for now on social, cultural and economic features) since the proposed process is well-supported in the literature for identification and selection of ecological features and most of the Analysis Team, Technical Team and Leadership Team expertise is in natural (rather than cultural) resources. Sean summarizes the plan review process (also see attached CrownLCD_Feature_Selection_Report_DRAFT2_6-10-2020.pdf)

Chat box Comments:

Linh Hoang (R1, USFS): we might think about grouping some species - like mesocarnivores or ungulates etc

Constanza von der Pahlen, Flathead Lakers: Some of the smaller species may fall within a larger species range and habitat, appearing to be 'covered'. It would be interesting to see if any do not fall under a larger 'priority' species range/habitat and would therefore not be well represented in a cons. plan. Sort of an umbrella species analysis.

Constanza von der Pahlen, Flathead Lakers: add floodplains to riparian systems.

Linh Hoang (R1, USFS): The CMP has identified through a wind tunneling exercise with partners on the conservation priorities for the crown (2014 climate change forum) - these might be good to look at for this selection process (cold water fish, WBP, invasives, mesocarnivores, fire)

Tracy Lee: Small point - all for reducing number of possible features - but white bark pine has same value as last two on your top 10 species list. So maybe need to consider this in top 10 since artificial cut off based on order of list :)

Mary Riddle: agree Tracy

Linh Hoang (R1, USFS): I didn't see listed in the criteria - relative vulnerability/threats and our ability to actually make a change given the current and future stressors. If there is low relative vulnerability - do we spend our capacity to do analysis rather than concentrate on more vulnerable species / processes?

Constanza von der Pahlen, Flathead Lakers: will pollinators make it into the fine filter list..? or under focal ecological processes > ecosystem services

Erin Sexton: Just a note for later homework, Sean - but will be good to look back and see where the Great Northern Landscape Conservation Cooperative, Rocky Mountain region ended up with for their final features. Just a note to reference earlier initiatives that have gone through similar processes (America's Great Outdoors too).

Kris Inman: Or thinking about how the work of this group, takes what is learned by some other entities monitoring effort to an on-the-ground action to increase species presence and abundance or ecosystem function.

Aubin Douglas (USFWS): it would be interesting to see ecosystem services as target features as part of the process (though by definition, ecosystem services are the benefits people receive from nature, so it'd be important to look at the servicesheds of each of the services)

Constanza von der Pahlen, Flathead Lakers: One habitat that is missed is shallow groundwater, often associated with floodplains, and threatened by gravel mining, impervious surface, and other land uses (both tied to population growth) - a concern Dr. Stanford always raise in the Flathead.

Following fruitful discussion among LT, Sean (representing the AT) requested the LT to identify a feature(s) the AT can get started on. The idea is to allow the AT to start 'working the problem' of how to

prep a feature for evaluation, data compilation and modeling. The selected feature(s) should be one that is very likely to part of the final list of landscape features for the design analysis (Slide 14).

Chat box Comments:

Mary Riddle: or maybe easier for first run would be climate refugia and cold water fish (BT and WCT)

Phil Matson: A decent website for US data - <https://www.usgs.gov/core-science-systems/science-analytics-and-synthesis/gap>

Linh Hoang (R1, USFS): though I think climate refugia is process for many species not just fishes

Katie Morrison: I like the fish and refugia as there might be less overlap between other ecological or process indicators that we might also want to address separately or with other species assemblages.

Tracy Lee: I vote for cold water fish

Anne Carlson: Also leaning toward fish and climate refugia...

Tracy Lee: I think it might be helpful to understand the decision making process for selecting features, as stated together they should be representative of the Crown – so hard to pull out one when they are a complement. Are you going to use the table to narrow down a list and we all vote?

Linh Hoang (R1, USFS): fish would be an easier one to start with

Kris Tempel: Modeling of coldwater fish and refugia has been done:

<https://www.fs.usda.gov/rmrs/science-spotlights/mapping-climate-refugia-preserve-cold-water-biodiversity-using-crowd-sourced>

Katie Morrison: fish should also extend beyond just refugia as there are various non-climate threats to fish as well

Linh Hoang (R1, USFS): 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

Kris Inman: good point Linh

Anne Carlson: There is also a USGS interactive, web-based tool that lines out all of the current threats to each conservation population of bull trout and westslope cutthroat across the Crown using both empirical data on existing threats and climate models looking into future threat levels:

<http://ice.ecosheds.org/cce/>

Linh Hoang (R1, USFS): the FS tried to do this with what we called integrated resource planning - and it failed for us with all the different specialist

Linh Hoang (R1, USFS): efficiency is not always what we need for sustainability

[some verbal interactions describing what we get from optimization modeling and that model outputs are tools to help us develop effective and efficient strategies ... more than just efficiencies]

Kris Inman: Makes sense Sean

Kris Tempel: Good contact for fish and refugia: <https://www.fs.usda.gov/rmrs/people/disaak>

Mary Riddle: Didn't Shannon's Human Modification Index get at this?

Linh Hoang (R1, USFS): for the folks starting on the fish/refugia analysis - please keep in mind that concentrating solely on management of refugia may not be the most important places to act or manage - and maybe the moderately vulnerable reaches that are connected to their refugia may be more important. As fish folks have told me - that just managing the refugia will not be enough for sustaining the fish over time

Mary Riddle: Good point Linh.

Social, Cultural and Economic Features (slide 15):

We endeavor to include social, cultural and economic features into the spatial models. However, we believe we will need to adjust model inputs and parameters since Marxan is inherently ecology-focused software. There will be a lot of work to keep the AT busy in the meantime but we should all start to think about social, cultural and economic features, how we might handle them, and where we might find expertise among our collective colleagues and networks. As of right now, we are at a 'heads up' place.

Chat box Comments:

Chad Willms: I have a social-scientist on my team as well. I'll connect with you directly on this Sean.

Linh Hoang (R1, USFS): I will talk to our social scientist and see about her interest and capacity

Linh Hoang (R1, USFS): there are some other RMRS social scientist I will connect you with to see if they can help

Constanza von der Pahlen, Flathead Lakers: I think of water quality as an ecosystem service...

Mary Riddle: Agree Constanza.

Mary Riddle: And air quality.

Constanza von der Pahlen, Flathead Lakers: right!

Mary Riddle: Sean, thanks. I am signing off a few minutes early. I have another call at 12:30.

Kris Inman: Thanks Sean.

Constanza von der Pahlen, Flathead Lakers: Thanks Sean/ Excellent presentation and discussion.

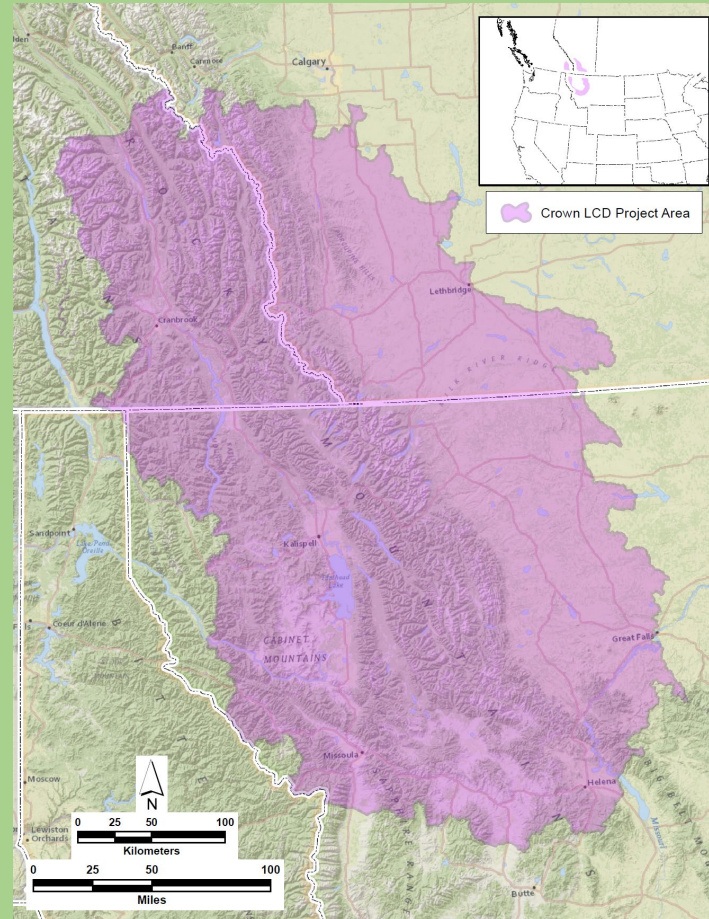
Mary T. McClelland: thank you all for this forward thinking work!

Linh Hoang (R1, USFS): thanks Sean - always stimulating to get on a call with you and this group

Call adjourns at 12:30 pm.

Crown of the Continent Landscape Conservation Design

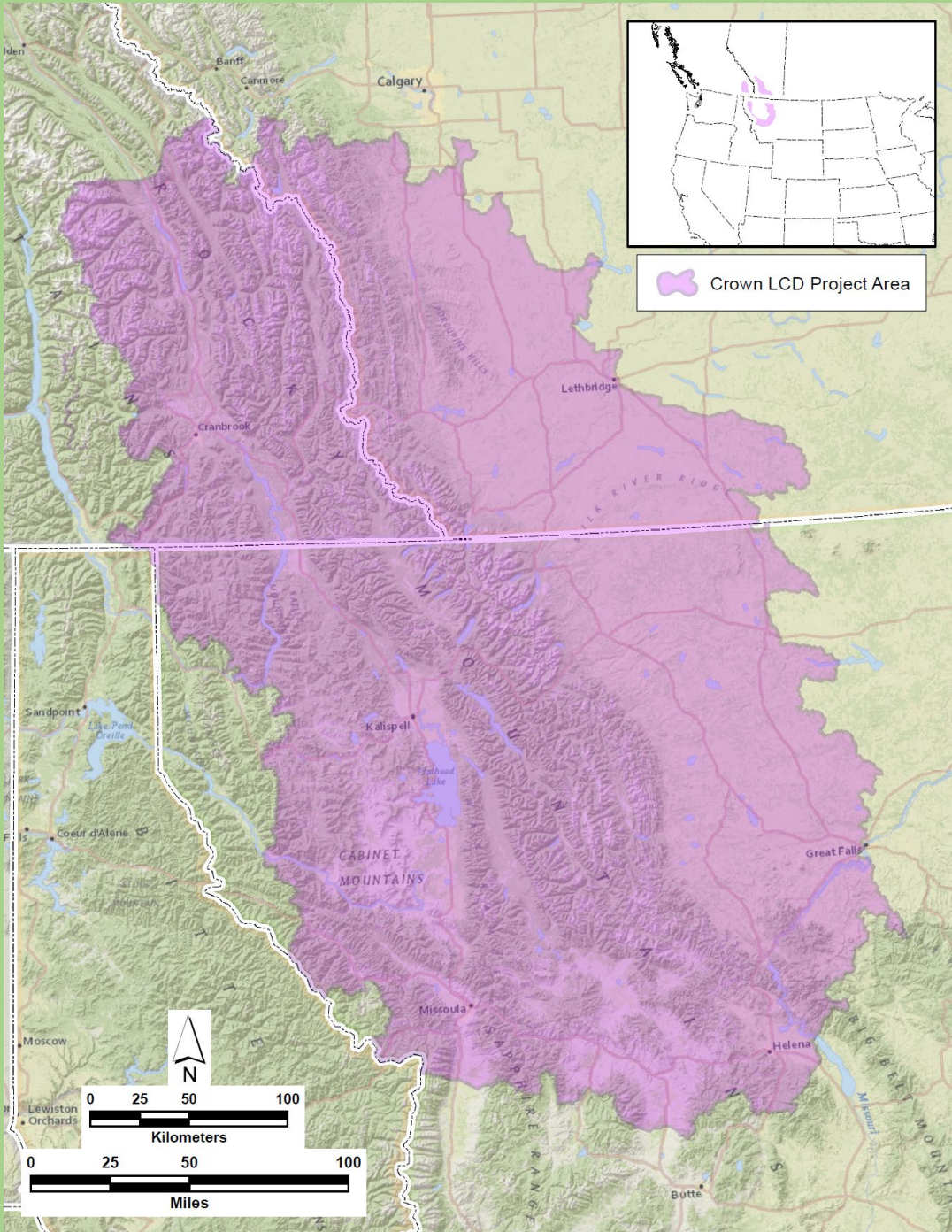
Leadership Team call -- 26 May 2020



Agenda

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 - b. Funding
3. Review prior action items
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 - c. Getting the analysis team started
5. Social, Cultural, Economic Features
 - a. How do we get there?
6. Other topics

Project Area selected!



Outstanding Action Items

Send Natalie photographs for the website	Everyone	As available
Think about how you (and your organization) wants to be identified on the website -- Your name? Org name? Logo? All the above? Not at all?	Everyone	On Tech By 26 May Leadership Team call
Create a map and GIS file of the Crown LCD Project Area ✓	Phil & Sean	Before 24 March
Identify any plans or planning documents we've missed that should be included in integration assessment. See attached spreadsheet for working list.	Everyone	As soon as is reasonable possible
Think about your organizations highest priority Features; Be prepared to provide input to Feature Selection process in May.	Everyone	By 26 May Leadership Team call
Convene the Vision Statement Sub-committee	Natalie	By 26 May Leadership Team call

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

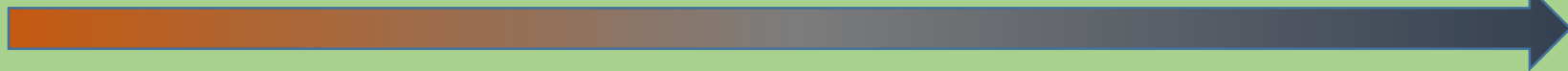


Criteria to Consider:

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

How do we treat Landscape Features?

Current Condition



Desired Future Condition

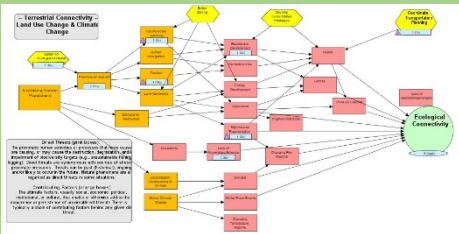
Conceptual Models

Key Attributes & Indicators

Measurable Objectives

Barriers to Objectives (aka 'Costs')

Spatial Models



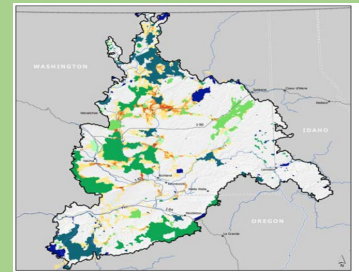
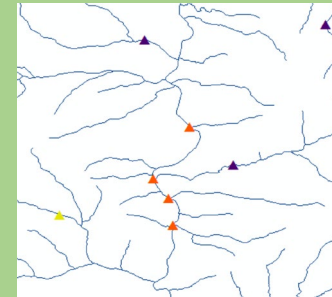
Viability and Integrity Summary

Focal System or Species	Landscape Context	Condition	Size	Viability/Integrity
Shrub Steppes and Dry Grasslands	Fair	Fair	Poor	Fair
Riverine Systems	Unknown	Unknown	Unknown	Unknown
Depressional Wetlands	Fair	Fair	Fair	Fair
Dunes	Poor	Fair	Poor	Poor
Transitional Woodlands	Fair	Fair	Poor	Fair
Ciffs, Talus and Cores	Good	Unknown	Good	Good ¹
Grassland	Poor	Poor ²	Poor	Poor
Borrowing Animals	Poor	Poor	Fair	Poor
Overall Viability/Integrity				Fair ³

¹This overall score assumes that the condition of the riparian is not around 50%, and that new systems is to come from other forest dependent conditions. ²See Note 1. ³Population growth rates for Sharp-shinned Hawks are high, due in part to translocation of birds from other states. However, future growth rates for Sharp-shinned Hawks are low, particularly in the West Coast (see Appendix: Future Growth Projections).

⁴The overall viability/integrity of the system cannot be considered "fair" under all possible scenarios of integrity of the riparian system (i.e. if the riparian system's integrity were found to be poor, fair, good or even very good).

Key Ecological Attribute	Indicator	Poor	Fair	Good	Very Good	Information Source
Absolute Size	Patch size (percentage of shrub wetland)	Small (<40 ac; 16 ha)	40-500 ac; 16-202 ha	Large (500-1,000 ac; 202-405 ha)	Very Large (>1,000 ac; 405 ha)	Expert opinion (ALI 2014)
Landscape Pattern and Structure	Aggregate of land surrounding large patches that is in semi-natural condition	Subsided: Natural or semi-natural habitat makes up <20% of land in a 500 m buffer around the patch	Fragmented: Natural or semi-natural habitat makes up 20-60% of land in a 500 m buffer around the patch	Unfragmented: Natural or semi-natural habitat makes up 60-90% of land in a 500 m buffer around the patch	Intact: Natural or semi-natural habitat makes up 90-100% of land in a 500 m buffer around the patch	Fisher-Langston et al. 2008; Conner and Hill 2009
Connectivity	Aggregate of land in large patches connected to other large patches	Isolated: No patches within 30 km east-west weighted distance (50% dispersal capacity of grassland species; larger movement species target)	Partially connected: Within 30 km east-west weighted distance (50% dispersal capacity of grassland species; larger movement species target)	Connected: Two or more patches are within 1 km east-west weighted distance (100% dispersal capacity of grassland species; larger movement species target)	Intact: Natural or semi-natural habitat makes up 90-100% of land in a 500 m buffer around the patch	Fisher-Langston et al. 2008; Conner and Hill 2009
Fire Regime	Departure from historic fire regime	>20% of total acreage of patches is in LANDFAC Vegetation Condition Class (VCC) 3	Most (>60%) of total acreage of patches is in LANDFAC Vegetation Condition Class (VCC) 2	Most (>80%) of total acreage of patches is in VCC 1	>80% of total acreage of patches is in VCC 1	Based on ALI calculations; see Appendix for details.
Relative Size	Aggregate of shrub wetland patches in landscape	Shrub wetland target is severely reduced from its original natural extent (<20% remaining)	Shrub wetland target is moderately reduced from its original natural extent (20-50% remaining)	Shrub wetland target is only modestly reduced from its original natural extent (50-80% remaining)	Shrub wetland target is not reduced or is increasing (>80% remaining)	Fisher-Langston et al. 2008




Leadership Team

Technical Team

Subject Matter Experts

Analysis Team

Selecting Features Collaboratively



Middle Rockies
Rapid Ecoregional Assessment

FINAL MEMORANDUM II-3-C
MIDDLE ROCKIES
RAPID ECOREGIONAL ASSESSMENT



United States Department of Agriculture



Flathead National Forest Land Management Plan
Flathead, Lake, Lewis and Clark, Lincoln, Missoula, and Powell Counties, Montana




Climate Change Strategic Plan

September 2013
Flathead Reservation

Forest Legacy Project
Lost Trail Conservation Project
Marion, Flathead County, Montana

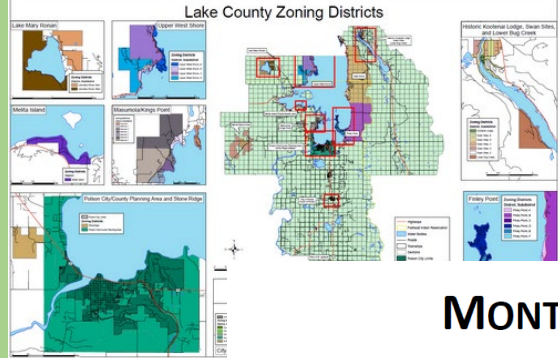


Waterton Lakes
National Park of Canada



2010

Lake County Zoning Districts



Draft Comprehensive Conservation Plan and Environmental Impact Statement

National Bison Refuge

MONTANA'S

STATE WILDLIFE ACTION PLAN

MONTANA FISH, WILDLIFE & PARKS
2015

Ministry of
Forests, Lands, Natural
Resource Operations
and Rural Development

2019/20 - 2021/22
SERVICE PLAN

February 2019

South Saskatchewan
Regional Plan

2014 - 2024

Amended May 2018



General Management Plan

GLACIER NATIONAL PARK

A Portion of Waterton-Glacier International Peace Park
Flathead and Glacier Counties, Montana

Review Existing Plans across the Crown

A	B	C	D	
Lead Organization	Document Title		Year	Weblink
Montana Fish, Wildlife and Parks	Lost Trail Conservation Project		2019	http://fwp
Montana Fish, Wildlife and Parks	Kootenai Forestlands Conservation Project		2019	ht http://fw
Northwest Power and Conservation Council	Flathead Subbasin Assessment		2018	https://ww
Northwest Power and Conservation Council	Kootenai Subbasin Plan		2004	https://ww
Montana Fish, Wildlife and Parks	Montana Action Plan - SO 3362			
Alberta Environment and Parks	Livingston-Porcupine Hills Land Footprint Management Plan			https://ope
Alberta Tourism, Parks and Recreation	Bob Creek/Black Creek		2011	https://open
US Forest Service	Flathead National Forest Land Management Plan		2018	https://ww
US Forest Service	Kootenai National Forest Land Management Plan		2015	https://ww
US Forest Service	Lewis and Clark National Forest Plan		1986	https://ww
Montana Fish, Wildlife and Parks	Montana State Wildlife Action Plan		2015	http://fwp
US Fish and Wildlife Service	National Bison Range Comprehensive Conservation Plan		2019	https://ww
US Fish and Wildlife Service	Lost Trail Comprehensive Conservation Plan		2005	https://ww
Crown Managers Partnership	Strategic Conservation Framework 2016-2020		2016	https://stati
Roundtable on the Crown of the Continent	Adapting to Change in the Crown of the Continent		2015	http://larg
Ministry of Forests, Lands, Natural Resource Operations and Rural Dev	Action Plan			https://ww
Alberta Government	South Saskatchewan Regional Plan		2018	https://ope
Glacier National Park	General Management Plan		1999	https://par
Waterton Lakes National Park	Management Plan		2010	https://ww
Waterton Lakes National Park	State of the Park Assessment		2019	https://ww
Bureau of Land Management	Middle Rockies Rapid Ecoregional Assessment			https://lan
Confederated Salish and Kootenai Tribes	Climate Change Strategic Plan		2013	http://www
Canadian Parks and Wilderness Society – Southern Alberta Chapter	Southern Eastern Slopes Conservation Strategy project			http://www
Glacier National Park	Foundation Document		2016	https://ww
Castle Provincial Park and Castle Wildland Provincial Park	Castle Management Plan		2018	https://ww
Alberta Environment and Parks	Livingston-Porcupine Hills Recreation Management Plan		2017	https://ope
US Forest Service	Climate change vulnerability and adaptation in the Northern Rocky Mountains Part 1		2018	https://ww

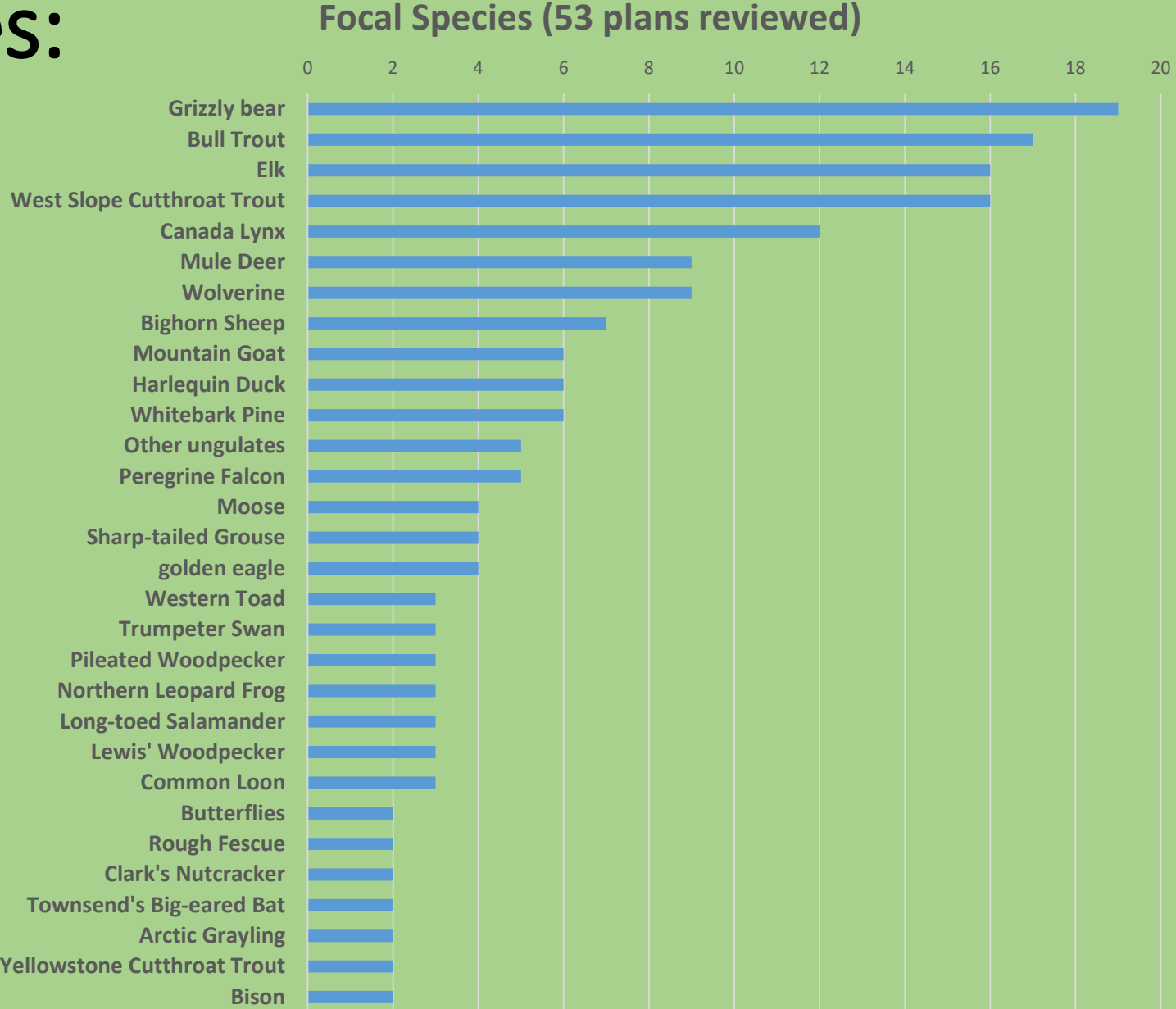
To Date:

Identified = 57

Reviewed = 53

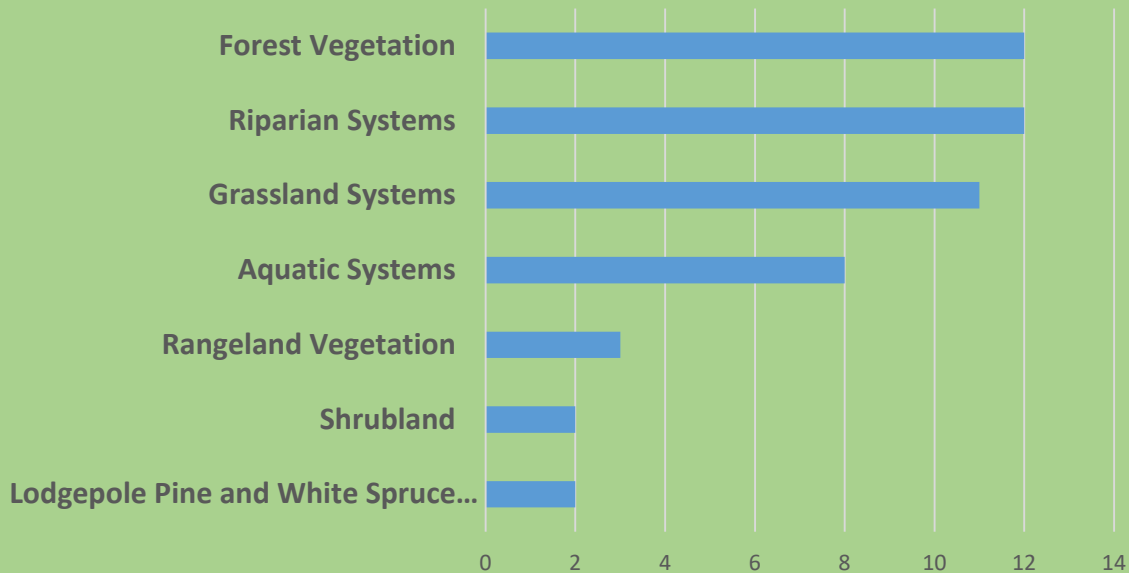
Stakeholder Priorities: Species

**180 Species identified in
one or more plans**

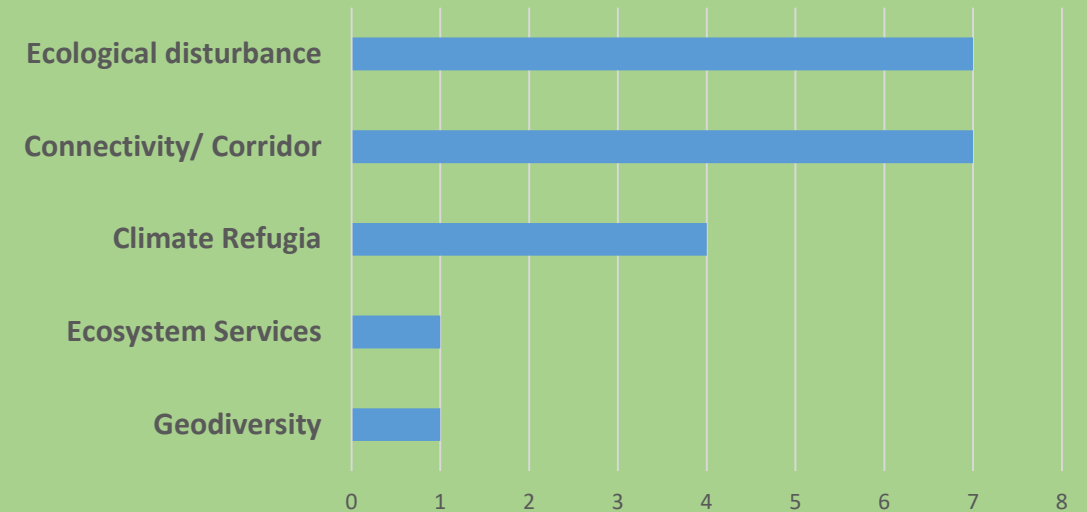


Stakeholder Priorities (preliminary)

Focal Habitats (53 plans reviewed)



Focal Ecological Process (53 plans reviewed)



Two broad types of features are:

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.

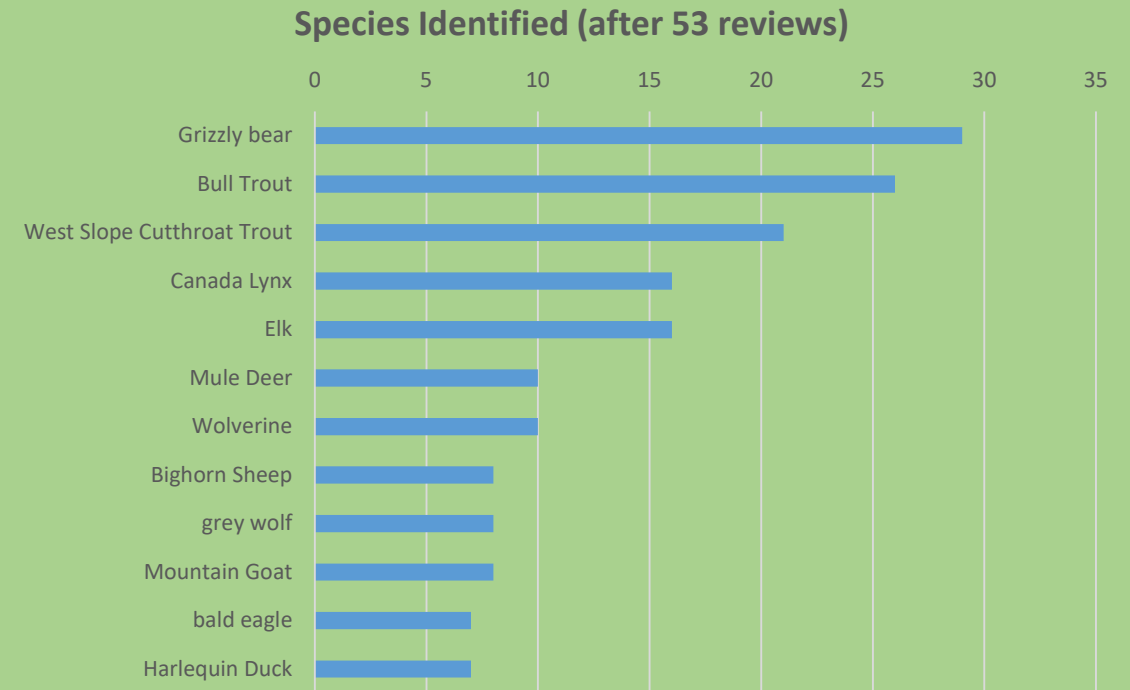
Coarse feature: An aggregate or collection of fine features (for example, a habitat type) that serves to both encompass multiple fine features and compensate for our incomplete knowledge of all biodiversity.

Proposed Selection Process

Start with Species List:

- “Top 10” 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
- Report back to Leadership Team in June

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



Selection Process

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?

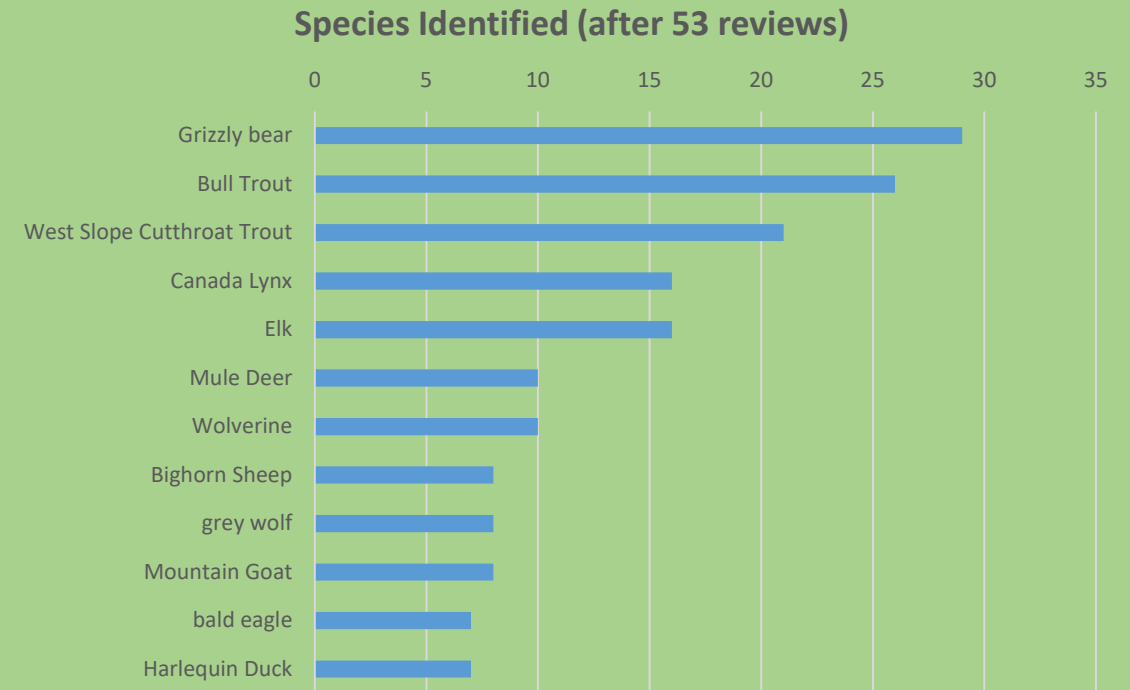
Source of Information – thorough documentation!

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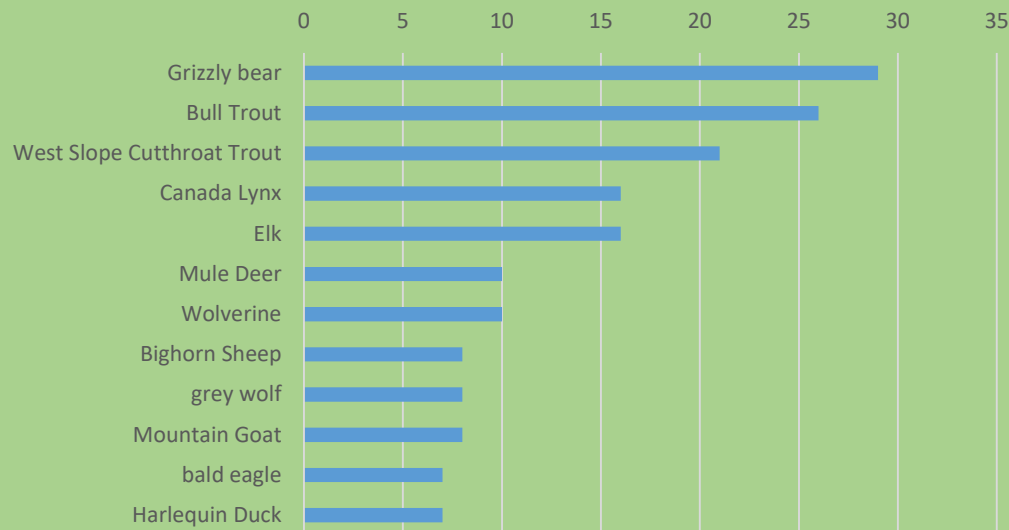


Getting Started

Analysis Team request the Leadership Team allow us to get started on one fine feature and one coarse feature

- Get analyses underway
- 'Test drive' concepts
- Evaluate data
- Stress test computational power

Species Identified (after 53 reviews)



Focal Ecological Process (53 plans reviewed)

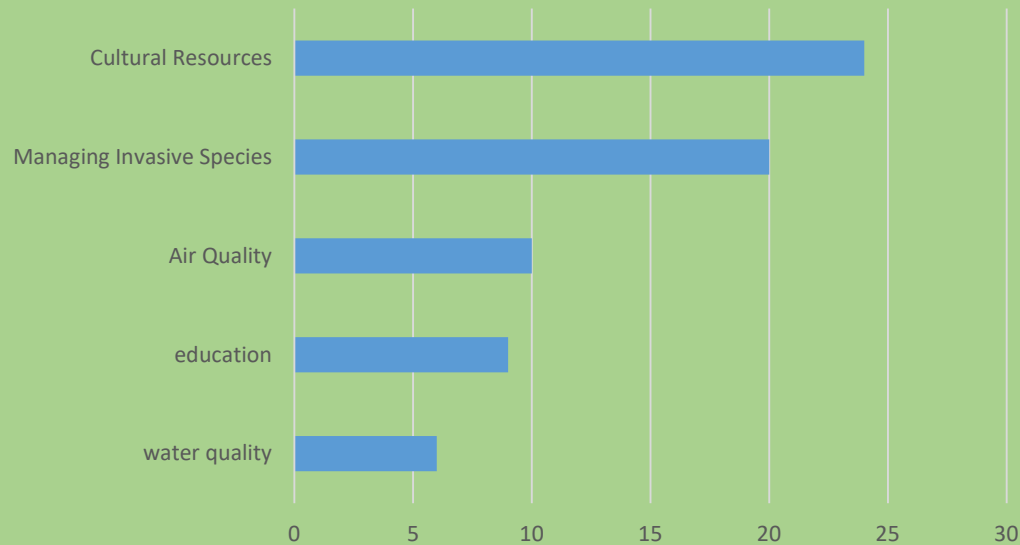


Social, Cultural and Economic Features

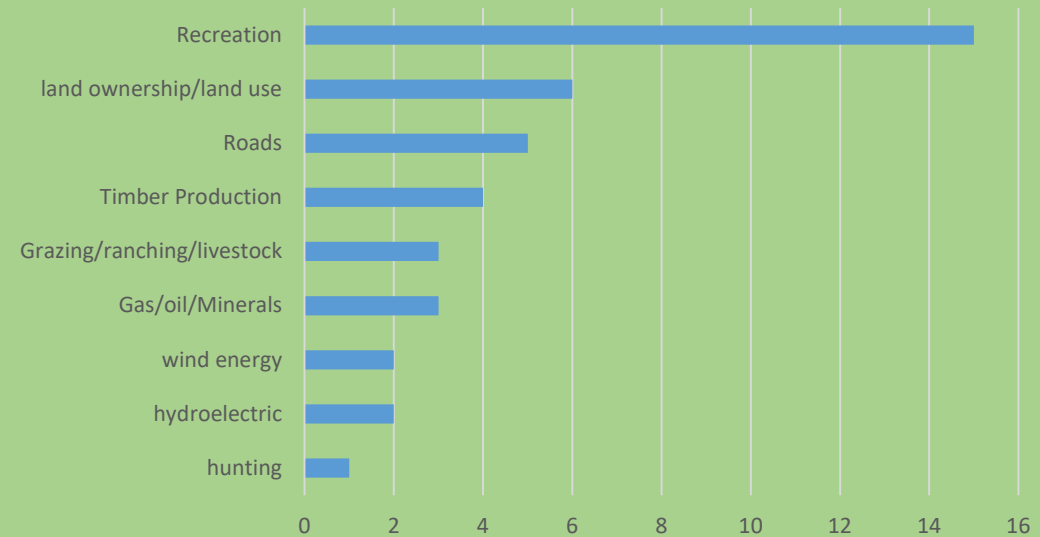
Recognized we've been biased toward Ecological Features to this point

- Expertise on Analysis Team, Technical Team mostly in ecology
 - More familiar with concepts and application
 - Orgs we work for focus (mostly) on ecosystems
- Few other LCDs have tackled social, cultural or economic features
- Reviewed Plans mostly NR management (though we are adding cultural plans)

Cultural Resources (53 Plans Reviewed)



Economies (53 plans reviewed)



Propose an focused Social, Cultural and Economic Working Group to guide how we address these Features

Other Topics

Discussion, Comments, Questions ...

How do we treat Landscape Features?

Current Condition



Desired Future Condition

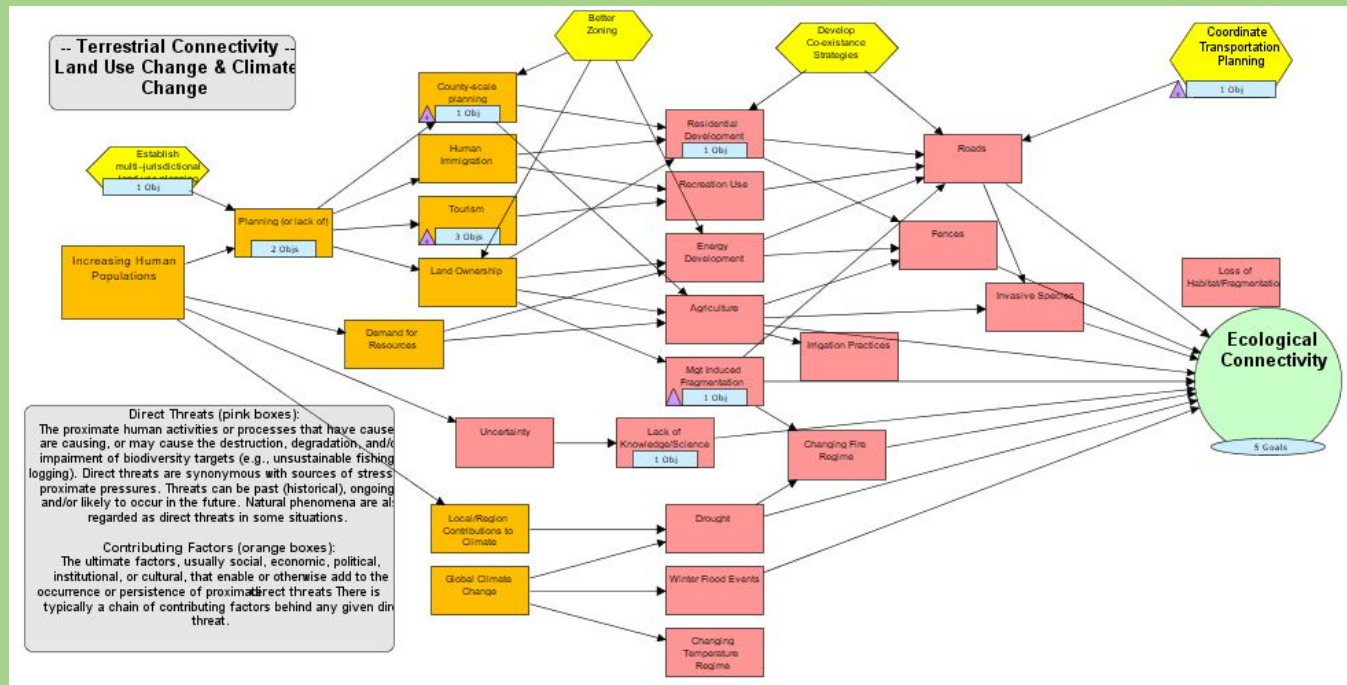
Conceptual Models

Key Attributes & Indicators

Measureable Objectives

Barriers to Objectives (aka 'Costs')

Spatial Models



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Depressional Wetlands	Fair	Fair	Fair	Fair
Dunes	Poor	Fair	Poor	Poor
Transitional Woodlands	Fair	Fair	Poor	Fair
Cliffs, Talus and Caves	Good	Unknown	Good	Good ¹
Grouse	Poor	Poor ²	Poor	Poor
Burrowing Animals	Poor	Poor	Fair	Poor
Overall Viability/Integrity				Fair ³

¹ This overall rank assumes that the condition of the vegetation in and around cliffs, talus and cave systems is no worse than other focal systems' condition – i.e. fair.

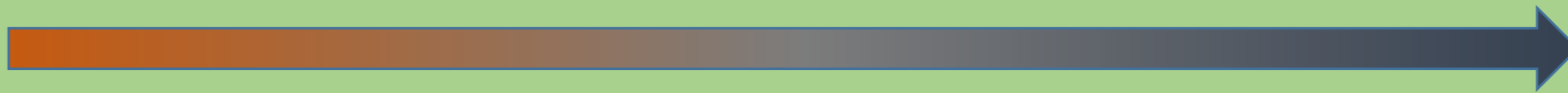
² Population growth rates for Sharp-tailed Grouse are high, due in part to translocation of birds from other states. However, natural growth rates for Sage-grouse are low, particularly in the Joint Base Lewis-McChord Yakima Training Center population.

³ The overall viability/integrity of the system would be considered "fair" under all possible scenarios of integrity of the riverine systems (i.e. if the riverine systems' integrity were found to be poor, fair, good or even very good).

Key Ecological Attribute	Indicator	Poor	Fair	Good	Very Good	Information Source
Absolute Size	Patch size (acreage of shrub steppe)	Small (<40 ac; 16 ha)	(40-500 ac; 16-202 ha).	Large (500-1,000 ac; 202-405 ha)	Very Large (>1,000 ac; 405 ha)	Expert opinion (ALI 2014)
Landscape Pattern and Structure	Acreage of land surrounding large patches that is in semi-natural condition	Relictual: Natural or semi-natural habitat makes up <20% of land in a 500 m buffer around the patch	Fragmented: Natural or semi-natural habitat makes up 20-60% of land in a 500 m buffer around the patch	Variegated: Natural or semi-natural habitat makes up 60-90% of land in a 500 m buffer around the patch	Intact: Natural or semi-natural habitat makes up 90-100% of land in a 500 m buffer around the patch	Faber-Langendoen et al. 2008; Comer and Hak 2009
Connectivity	Acreage of land in large patches connected to other large patches	Isolated: No patches within 20 km cost weighted distance (100% dispersal capacity of grouse - larger movement species target)	Partially connected: One or more patches are within 20 km cost weighted distance (100% dispersal capacity of grouse - larger movement species target)	Connected: Two or more patches are within 1 km cost weighted distance (~100% dispersal capacity of burrowing animals - smaller movement species target). ³		Follows rationale developed for WWHCWG's Statewide Analysis (WHCWG 2010)
Fire Regime	Departure from historical fire regime	>50% of total acreage of patches is in LANDFIRE Vegetation Condition Class (VCC) 3	Most (>60%) of total acreage of patches is in LANDFIRE VCC 2; <30% of total acreage of patches is in VCC 3	Most (≥60%) of total acreage of patches is in VCC 1; <10% of total acreage in VCC 3 ⁴	>80% of total acreage of patches is in VCC 1	Based on ALI calculations; see ALI 2014 for details.
Relative Size	Acreage in shrub steppe ecological systems	Shrub steppe (target) is severely reduced from its original natural extent (<50% remains)	Shrub steppe (target) is substantially reduced from its original natural extent (50-80% remains)	Shrub steppe (target) is only modestly reduced from its original natural extent (80-95% remains)	Shrub steppe (target) is not reduced or is minimally reduced from natural extent (>95% remains)	Faber-Langendoen et al. 2008

How do we treat Landscape Features?

Current Condition



Desired Future Condition

Conceptual Models

Key Attributes & Indicators

Measurable Objectives

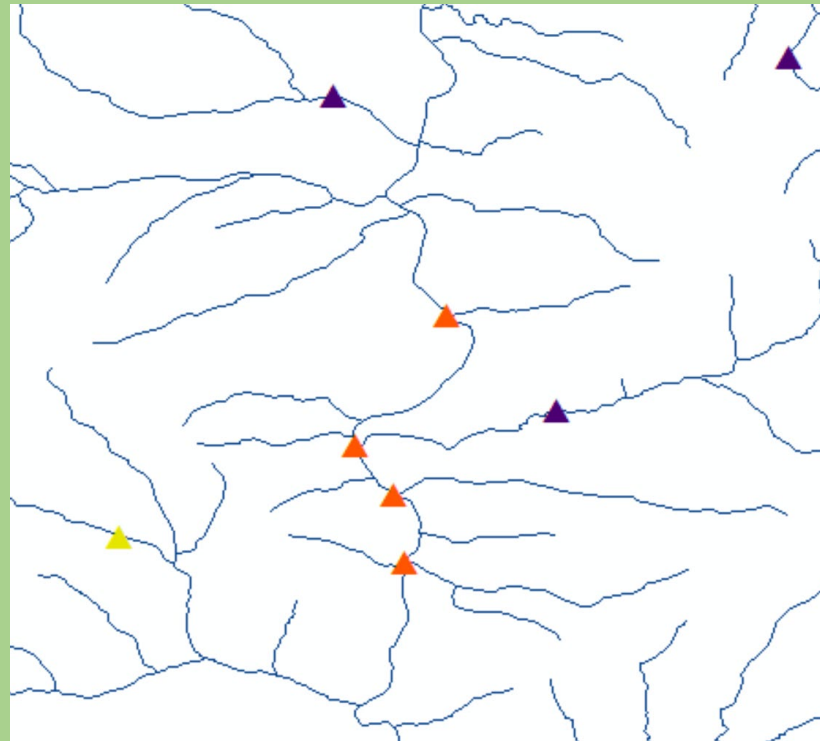
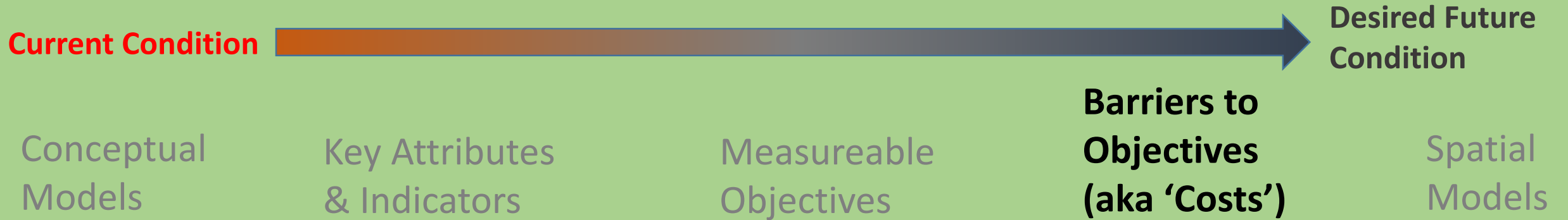
Barriers to Objectives (aka 'Costs')



Spatial Models

Key Ecological Attribute	Indicator	Poor	Fair	Good	Very Good	Information Source
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“Desirable”

How do we treat Landscape Features?



-  Dam
-  Road Culvert
-  Waterfall

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

