

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.

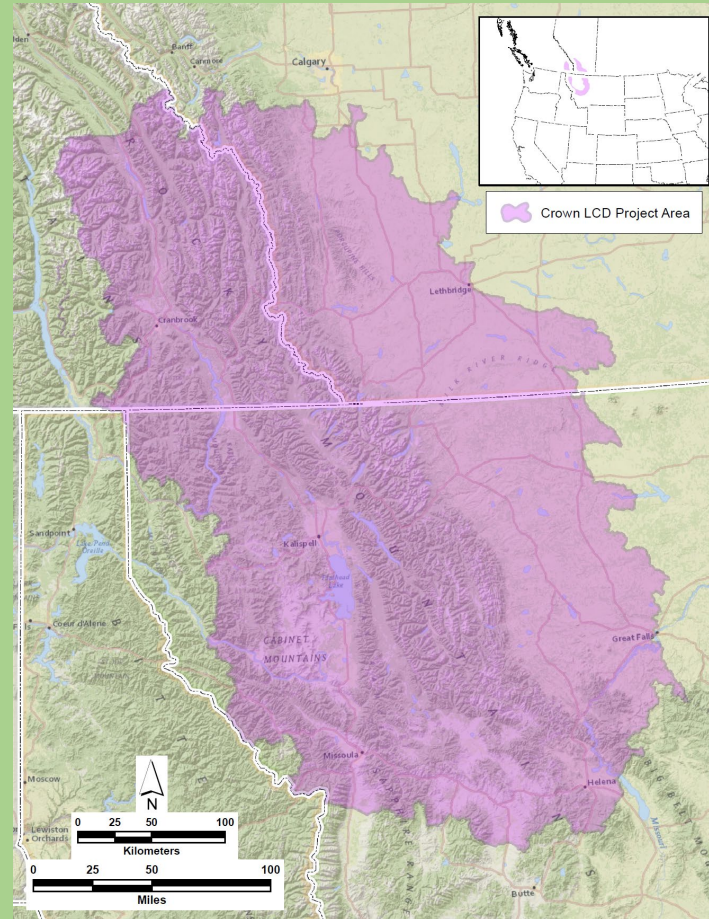
Mary T. McClelland: thank you all for this forward thinking work!

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

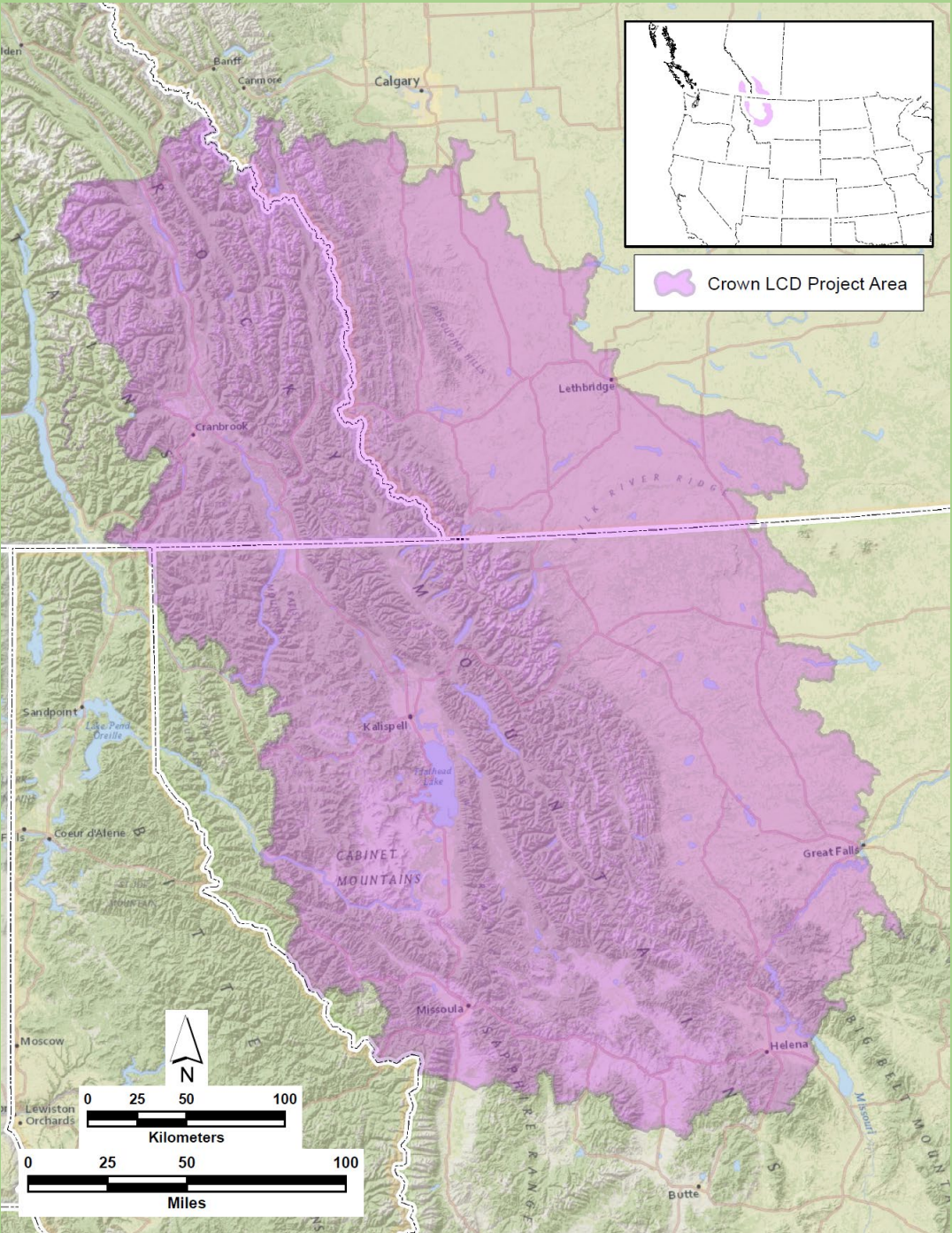
Leadership Team call -- 26 May 2020



Agenda

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
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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

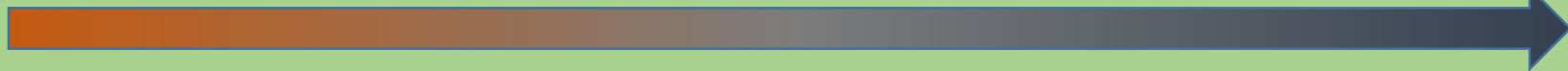


Criteria to Consider:

- **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

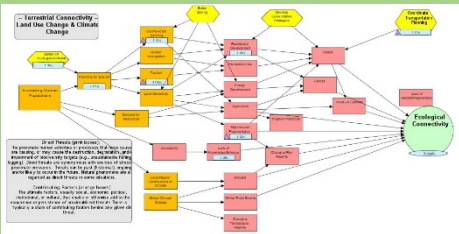
Conceptual Models

Key Attributes & Indicators

Measurable Objectives

Barriers to Objectives (aka 'Costs')

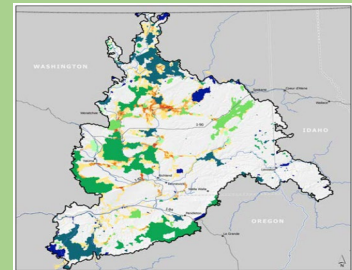
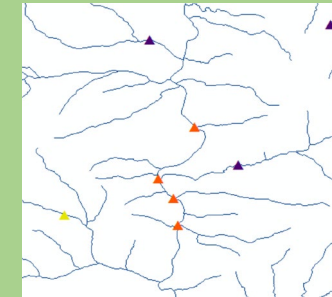
Spatial Models



| 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 Anemids | Poor | Poor | Fair | Poor |
| Overall Viability/Integrity | | | | Fair ³ |

¹ This overall rank assumes that the condition of the region is not around 50%, and that new systems is to come from other forest types. Condition 1 is Not Population 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 (West Coast) Forests. Current population.
² The overall viability/integrity of the system cannot be considered "fair" under all possible scenarios of integrity of the riverine system (i.e. if the riverine 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 covered) | 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 target) | Partially connected: 1-29 patches within 30 km east-west weighted distance (50% dispersal capacity of grassland species target) | Connected: Two or more patches are within 1 km east-west weighted distance (50% dispersal capacity of grassland 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 | 100% of total acreage of patches is in VCC 1 | Based on ALI calculations; see ALI 2014 for details. |
| Relative Size | Aggregate of shrub in large patches | Shrub target is less than 50% of original natural extent (50-50% scenario) | Shrub target is 50-75% of original natural extent (50-75% scenario) | Shrub target is 75-90% of original natural extent (75-90% scenario) | Shrub target is 90-100% of original natural extent (90-100% scenario) | Fisher-Langston et al. 2008 |



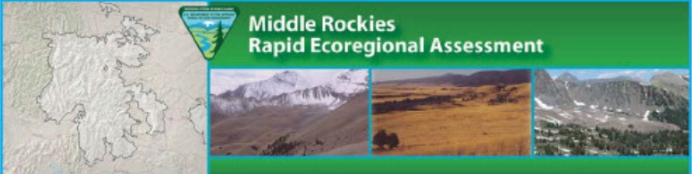
Leadership Team

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

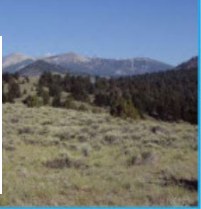
Flathead National Forest Land Management Plan
Flathead, Lake, Lewis and Clark, Lincoln, Missoula, and Powell Counties, Montana



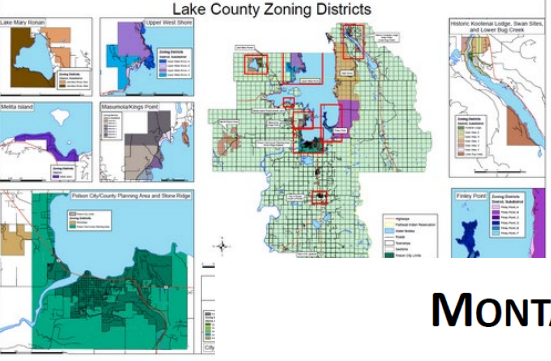
Climate Change Strategic Plan

September 2013
Flathead Reservation

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




Lake County Zoning Districts




U.S. Fish & Wildlife Service

Draft Comprehensive Conservation Plan and Environmental Impact Statement

National Bison Refuge



Waterton Lakes
National Park of Canada



2010

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 |

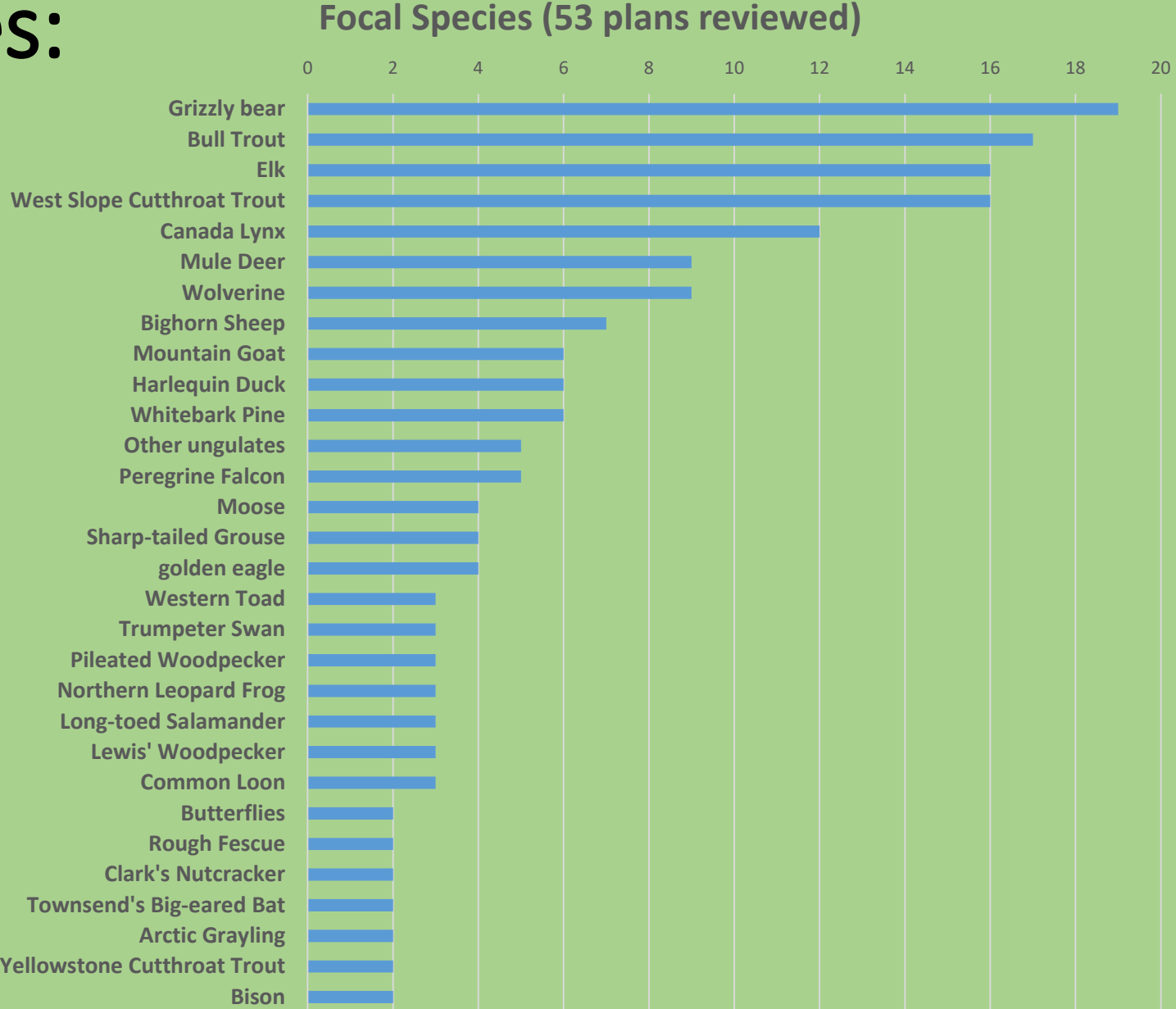
To Date:

Identified = 57

Reviewed = 53

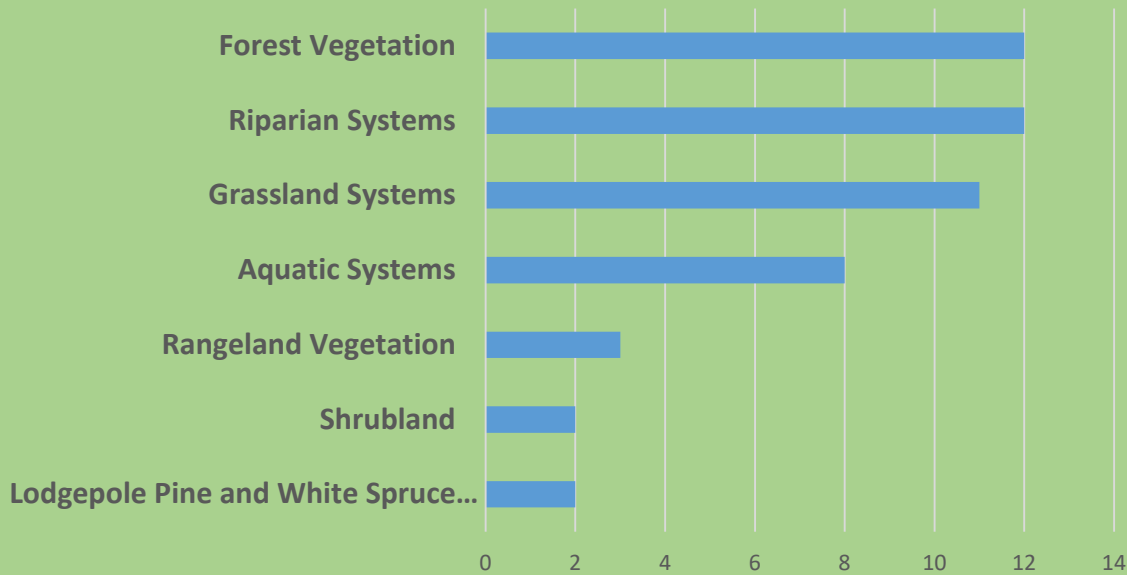
Stakeholder Priorities: Species

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

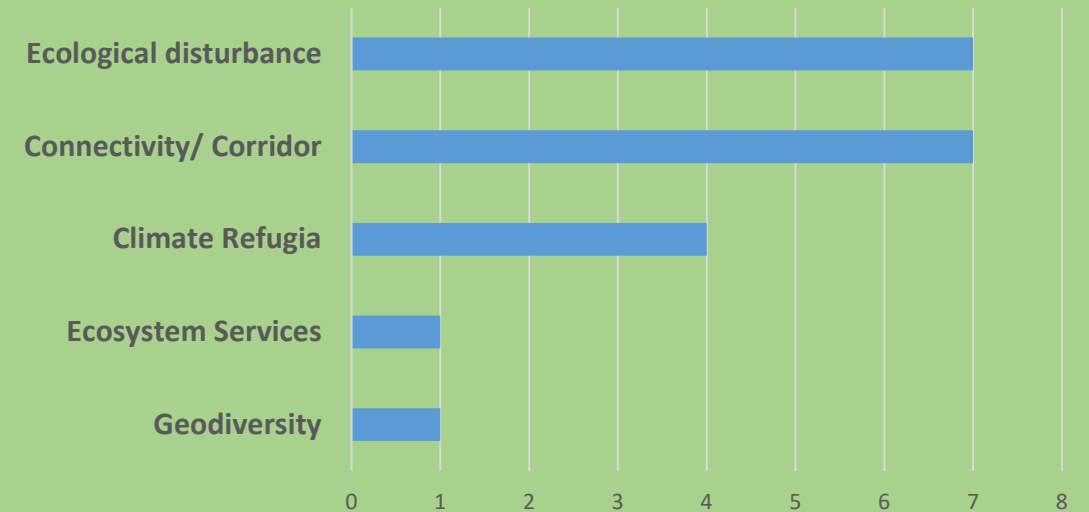


Stakeholder Priorities (preliminary)

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.

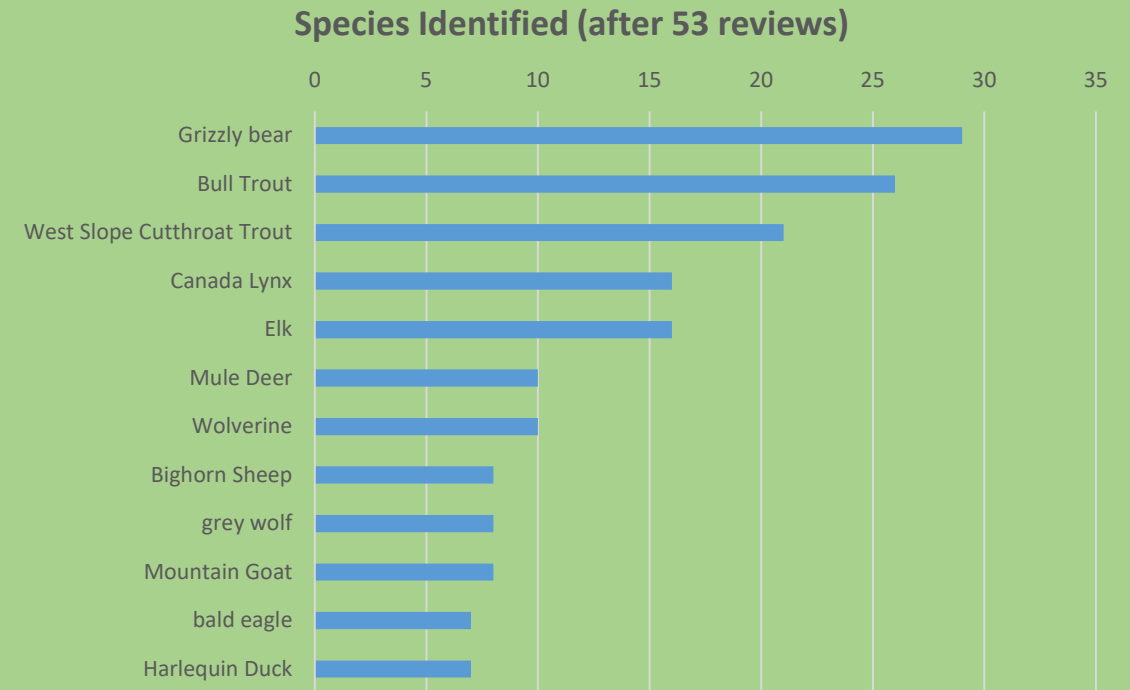
Coarse feature: An aggregate or collection of fine features (for example, a habitat type) that serves to both encompass multiple fine features and compensate for our incomplete knowledge of all biodiversity.

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?

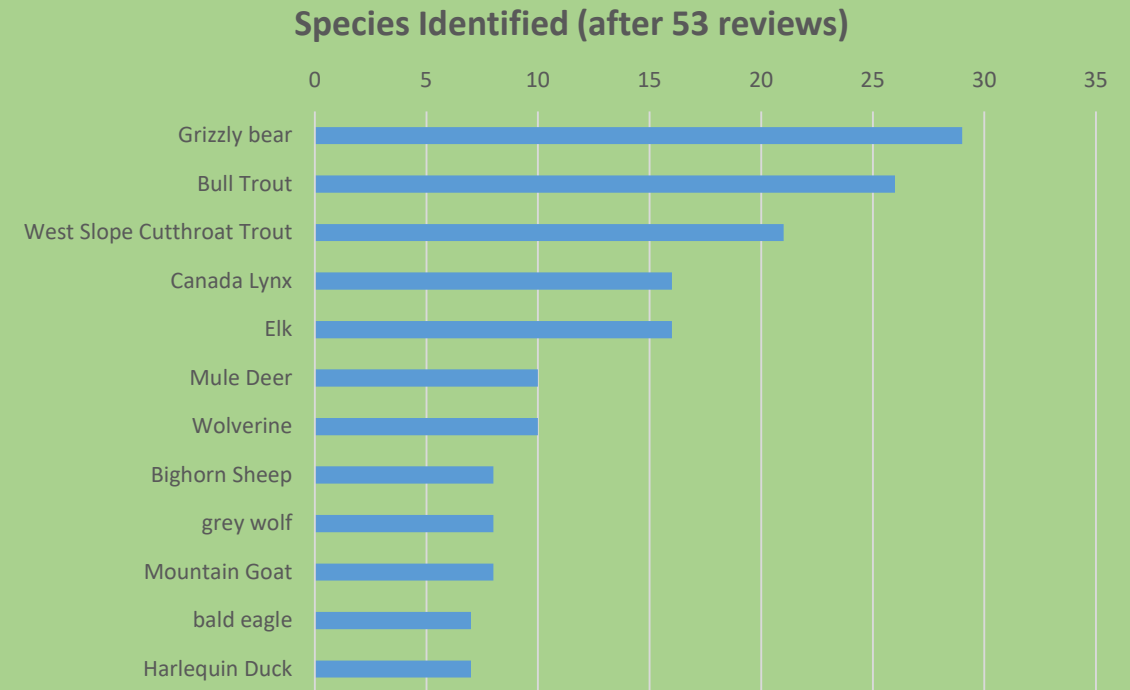
Source of Information – thorough documentation!

Proposed Selection Process

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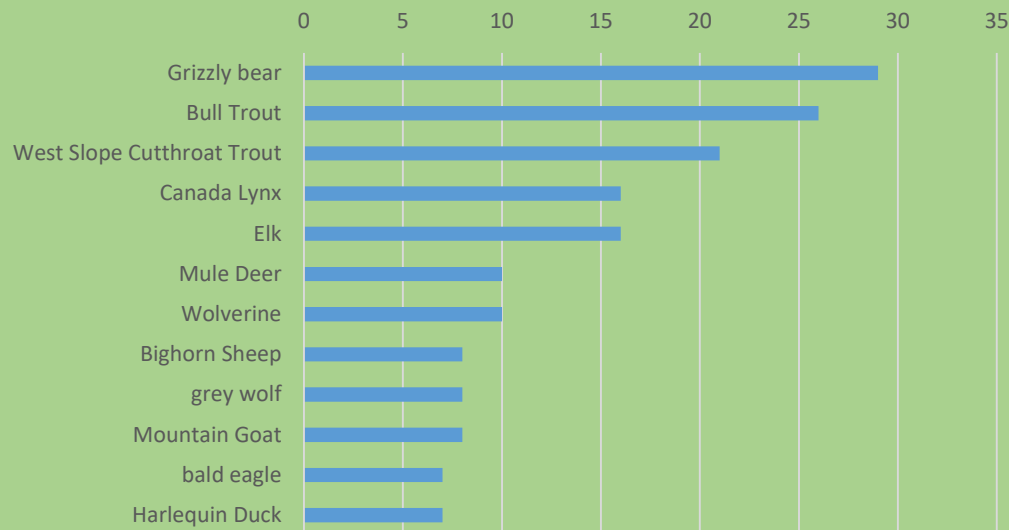


Getting Started

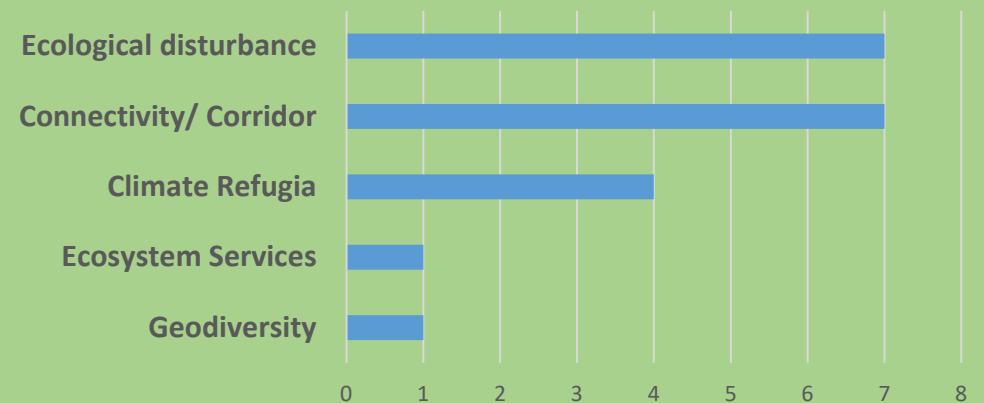
Analysis Team request the Leadership Team allow us to get started on one fine feature and one coarse feature

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

Species Identified (after 53 reviews)



Focal Ecological Process (53 plans reviewed)

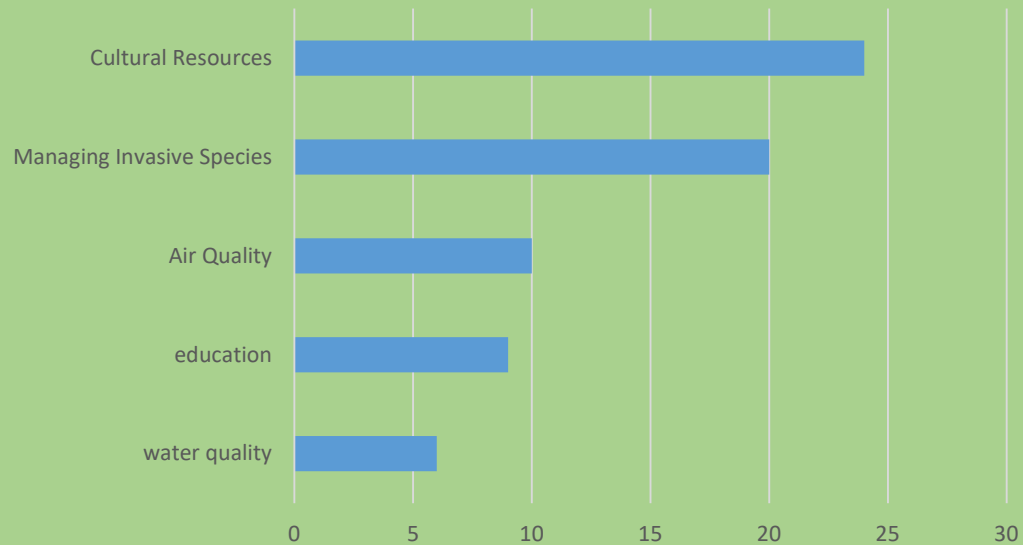


Social, Cultural and Economic Features

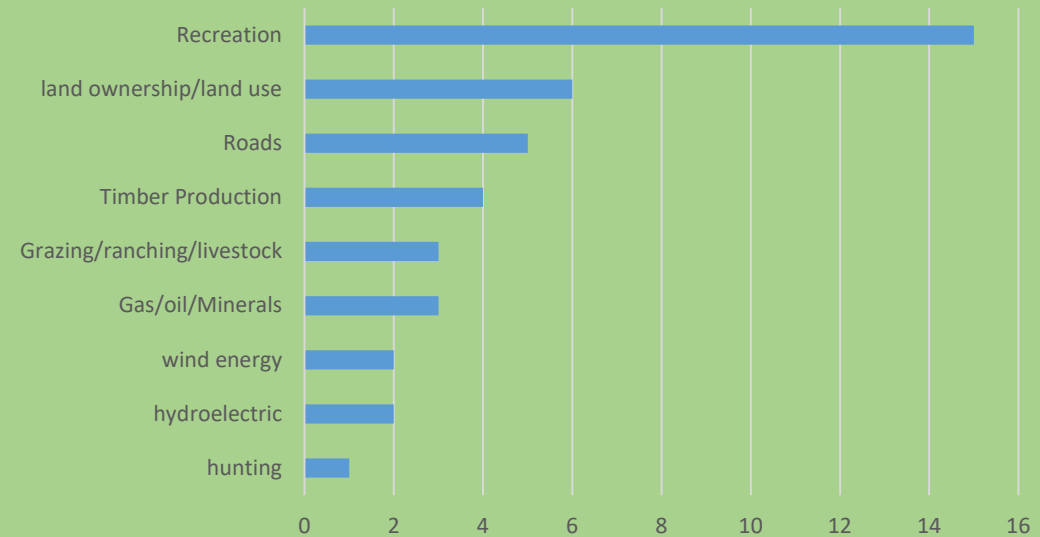
Recognized we've been biased toward Ecological Features to this point

- 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

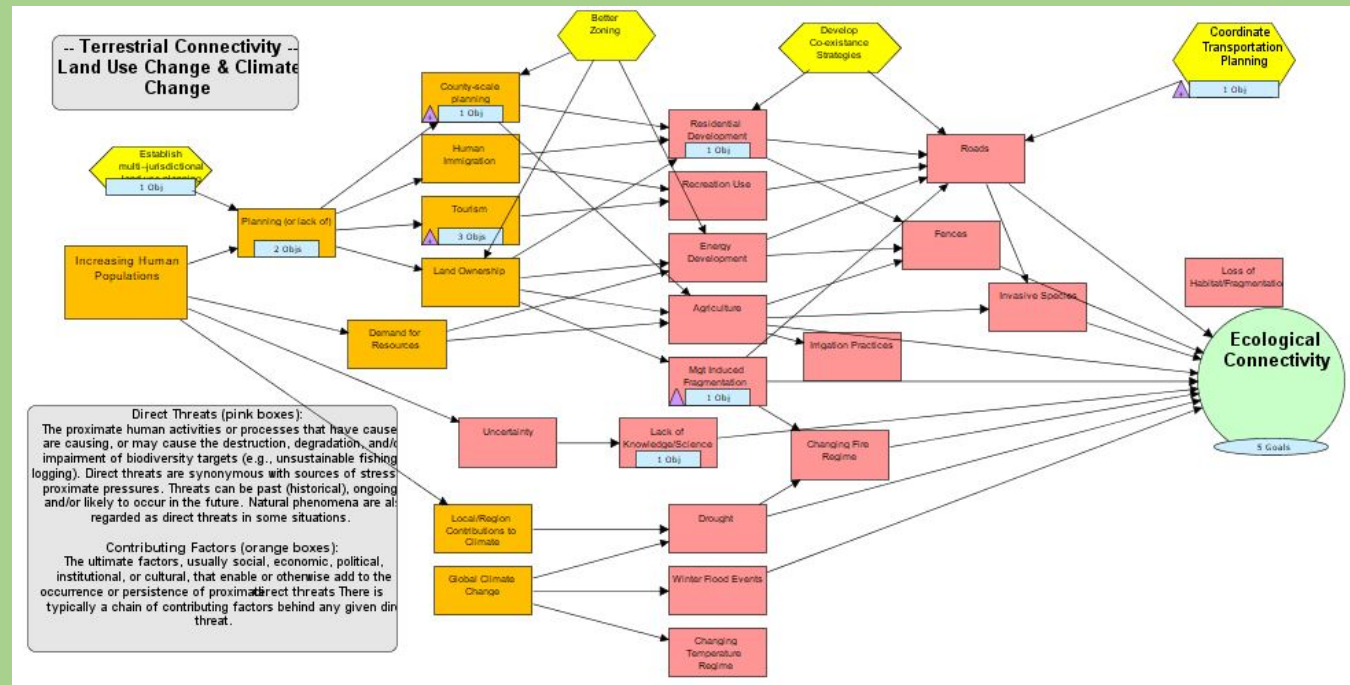
Conceptual Models

Key Attributes & Indicators

Measureable Objectives

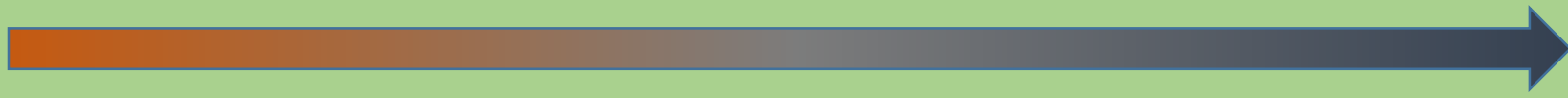
Barriers to Objectives (aka 'Costs')

Spatial Models



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Viability and Integrity Summary

| Focal System or Species | Landscape Context | Condition | Size | Viability/Integrity |
|---------------------------------|-------------------|-------------------|---------|---------------------|
| Shrub Steppe 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 |
| 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 |

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Measurable Objectives

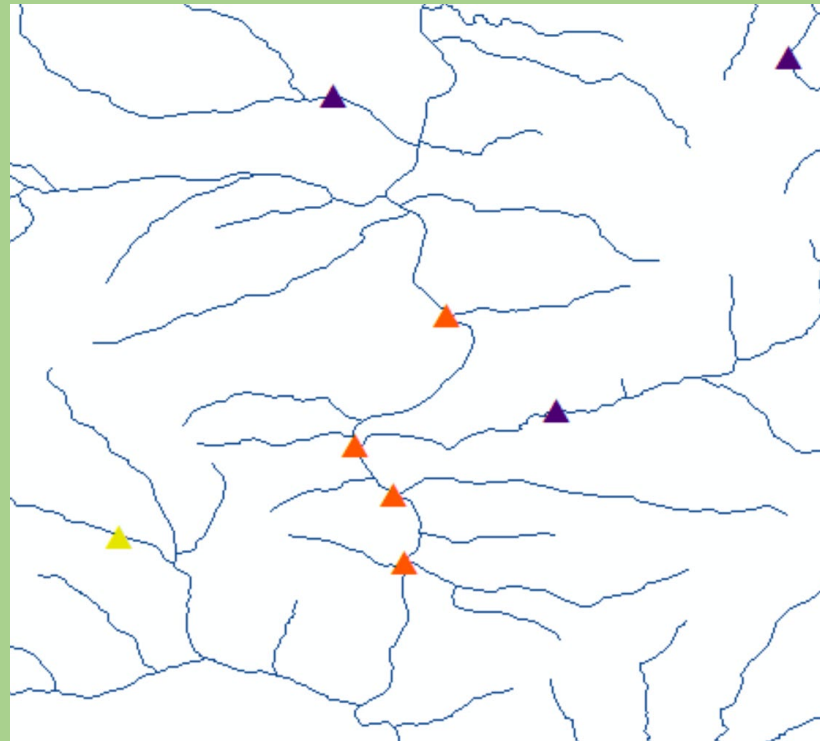
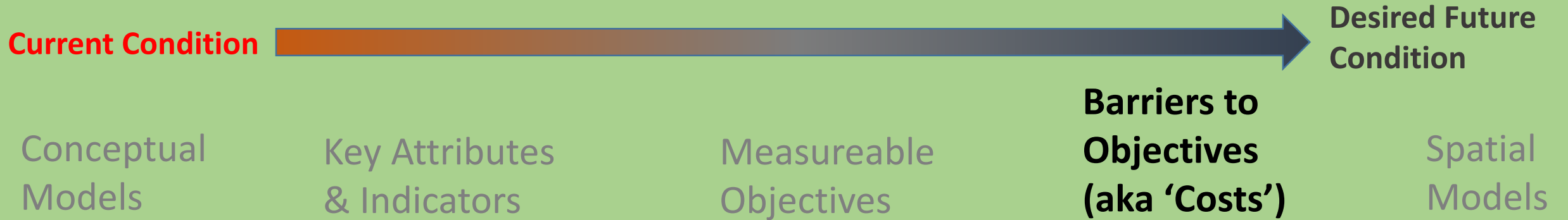
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“Desirable”

How do we treat Landscape Features?



-  Dam
-  Road Culvert
-  Waterfall

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