Recognizing Sites for Effective Mitigation in Sage-Grouse Habitat – Its More than Quality Sagebrush Habitat

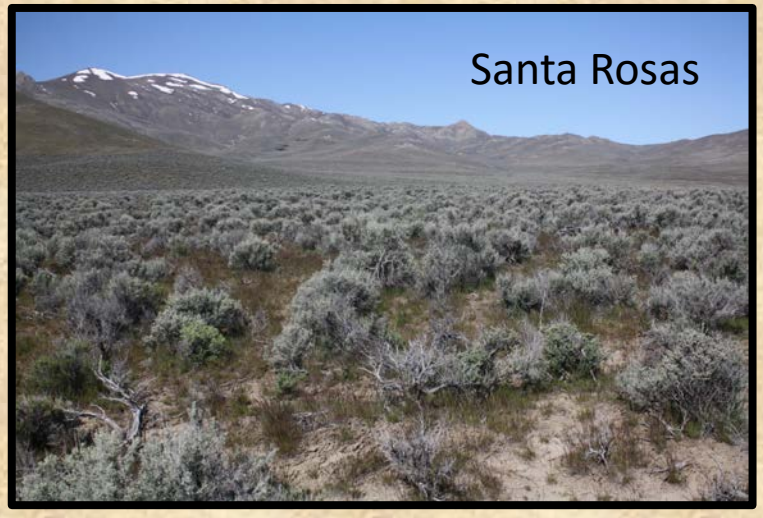
Brad Schultz
Extension Educator
University of Nevada Cooperative Extension
Winnemucca, NV

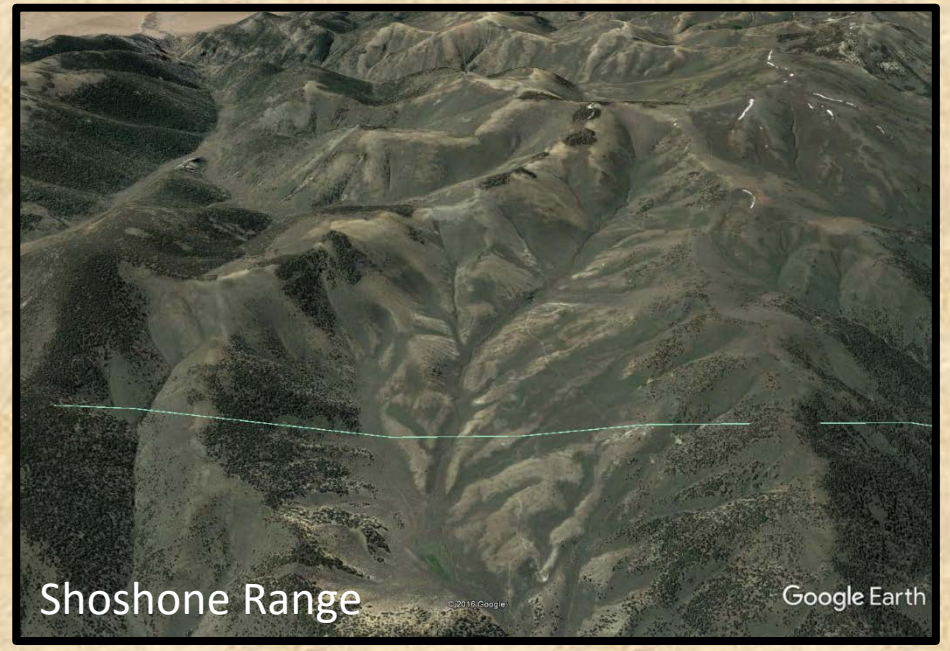
University of Nevada Cooperative Extension

University of Nevada, Reno — College of Agriculture, Biotechnology & Natural Resources
SUSTAINABLE SCIENCE FOR LIFE.

An Emphasis on “Quality Sagebrush Habitat” Can Miss the Bigger Picture

- What does “Quality Sagebrush Habitat mean? A nebulous undefined term
- Topographic and climatic influences at large spatial and temporal scales important
- Critical elements within sagebrush landscapes
- Spatial distribution of important habitat elements
- Change focus to “quality landscapes” and the elements that create a quality landscape





Other Important Landscape Level Characteristics – Lek Locations

Community Type	Percent
Big Sagebrush shrub-land	30
Big Sagebrush shrub-steppe	20
Low Sagebrush	20
Mountain Sagebrush	*9*
All Sagebrush	79
Riparian	2

From: Knick et al. (2013)

Topography and Climate	
Slope	*3.1 %[a]*
Terrain Ruggedness Index	1.0
Precipitation (mean)	*13.1 inches*

[a] Baxter et al. (2017) found strong selection by broods for slope < 20%
Gibson et al. (2016) had about 90% or more of nests on slopes < 20%, and well over 50% on < 10% slope

Suggests architecture (structure) of the landscape has more overall importance than the specific "quality" of individual components. Individual components matter, but exceptional quality for one component can't mitigate absence (or nearly so) of another.

How Does Topography Relate to Sage-Grouse Density

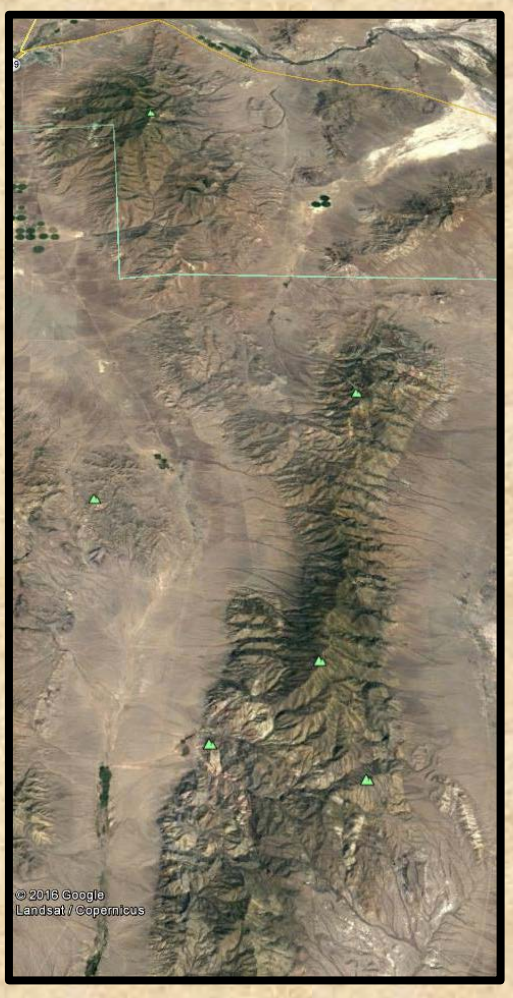
PMU	MLRA	Topographic Classification	Population Estimate	Acres in PMU	Acres/Bird
Lone Willow	MHP	1 (n=5)	9,200	476,533	52
Islands	OHP	1	3,127	270,163	86
Sheldon	MHP	3 (n=2)	3,186	476,850	150
O'Neil Basin	OHP	1	5,863	1,014,660	173
Gollaher	OHP	1	4,852	912,217	184
Black Rock	MHP	4 (n=9)	1,100	223,177	203
North Fork	OHP	4	7,762	1,731,231	223
Santa Rosa	OHP	4	4,196	938,793	224
Vya	MHP	1	2,199	501,230	228
Snake	OHP	4	2,336	538,120	230
Reese River	CNBR	2 (n=32)	5,135	1,348,382	263
Massacre	MHP	3	4,242	1,135,260	268
Diamond	CNBR	2	3,125	841,396	269
South Fork	OHP	2	3,277	1,369,936	418
Desotoya	CNBR	2	858	512,000	597
Sonoma	HUMBT	2	587	541,596	923

Montana Mountains
What Can We Learn by Comparison

- ✓ Relatively long in the N-S
- ✓ Broader than most in the E-W
- ✓ Nearly flat top, but a gentle rolling micro-topography

Classic Basin and Range – Tall (usually) Steep, and Deep canyons

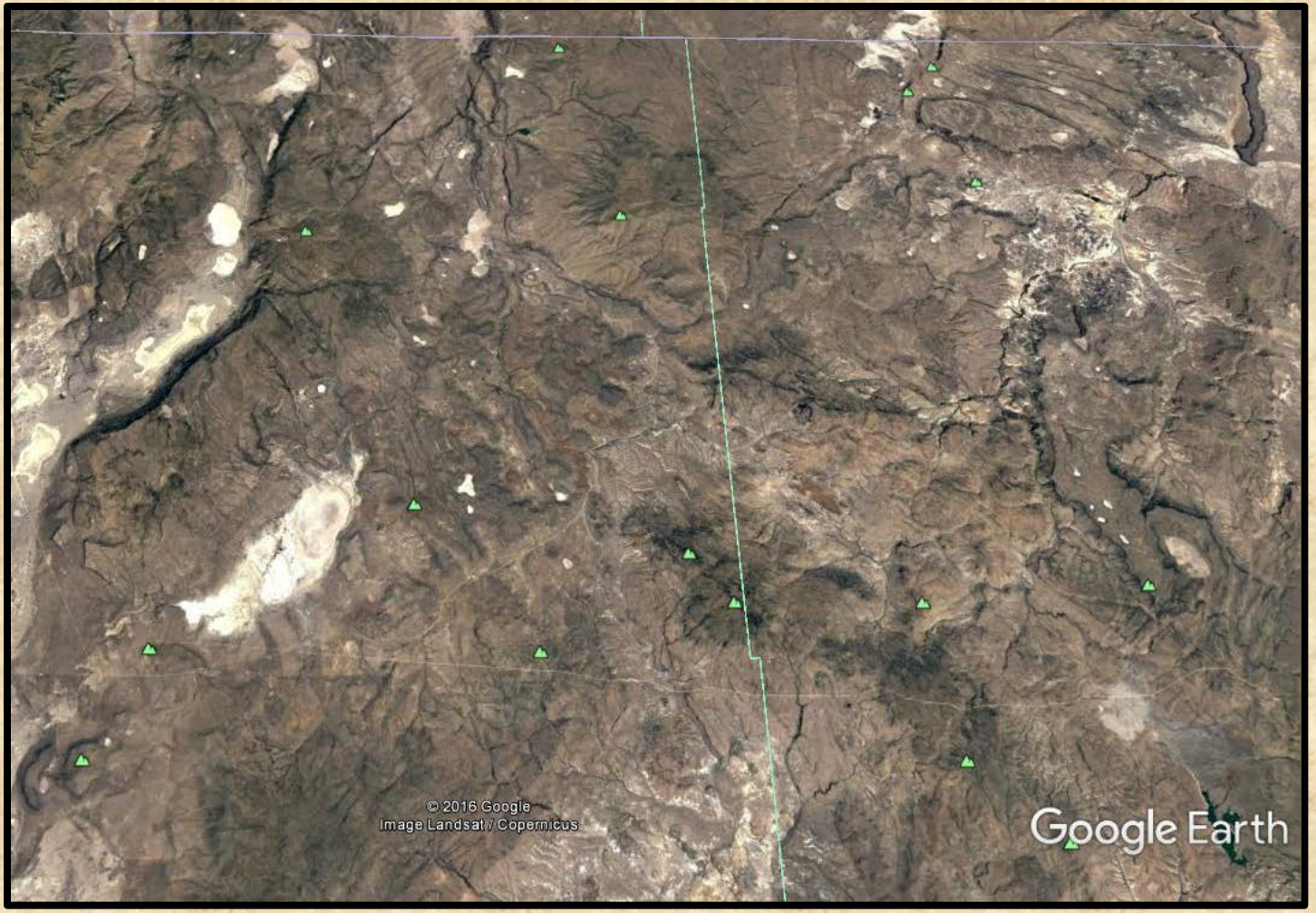
Humboldt



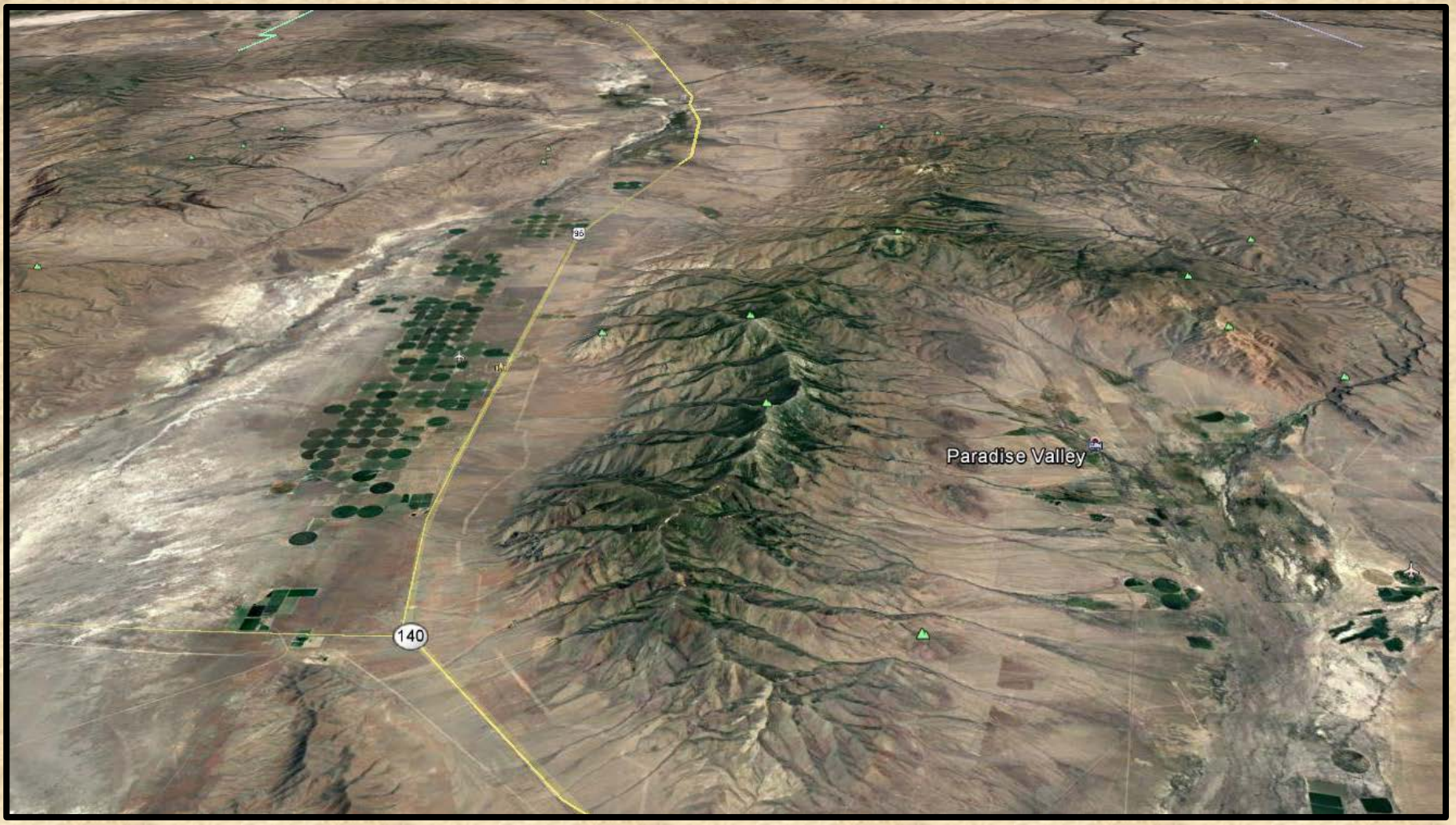
Sonoma

Trinity

Sheldon– Largely Plateaus and Mesas – Shallow Dissection



Santa Rosa PMU
A Combination of Landforms



Snow Depth and Melt Out Influence Availability of Nesting Habitat

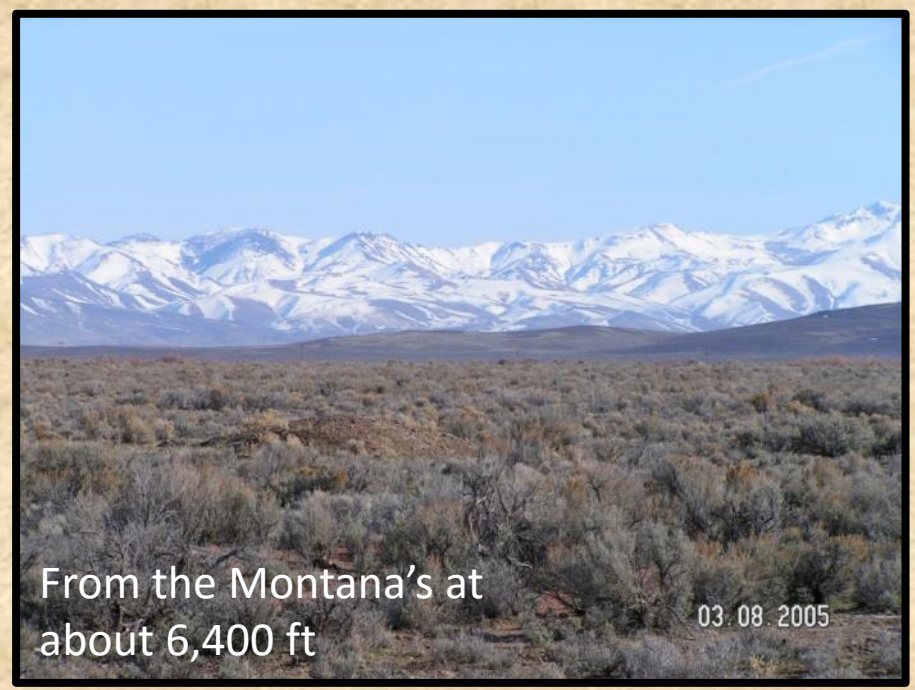
- Fifty percent of the time, the Central Nevada Basin and Range (CNBR) MLRA generally has a shallow snow depth, or no snow at elevations below 7,400 to 7,600 ft, and deep snow depth above 7,800 ft.
- Fifty percent of the time, the Malhuer High Plateau (MHP) generally has a shallow snow depth or no snow cover below 6,400 to 6,600 ft elevation.
- Fifty percent of the time, the Owyhee High Plateau (OHP) has substantially shallower snow depth below about 6,500 ft., than above 6,500 ft.
- South facing slopes at all elevations open up much earlier than north facing slopes

Montana Mountains Snow Accumulation and Melt Patterns

- How much of the open area is generally < 20% slope?
- Where will forbs be in April and early May, and late May and June?

- What is the travel distance between the north and south slopes? Think predation risks.
- What is common in the bottom of the gentle drainages? It's about meadow type and density.

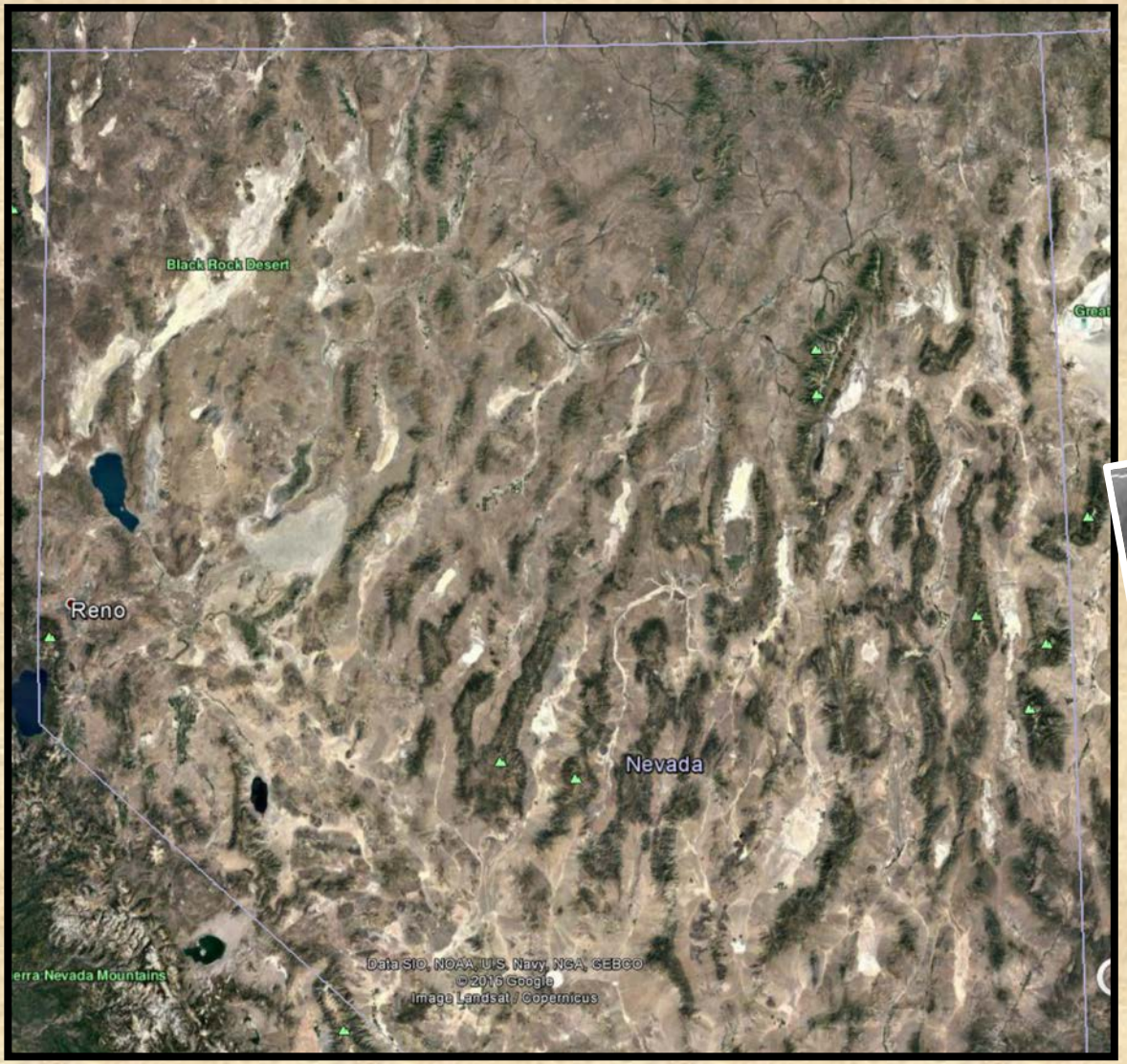
Classic Basin and Range Snow Accumulation and Melt



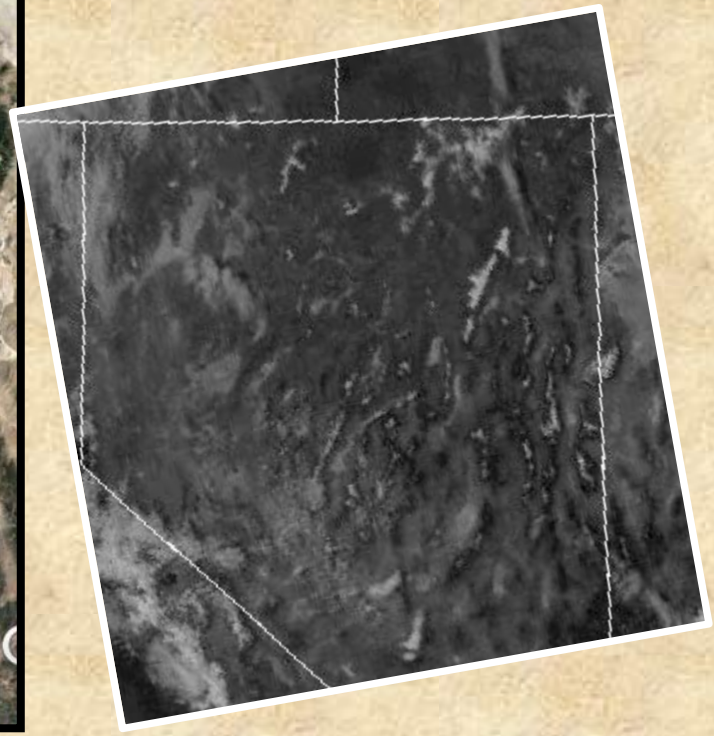
- Where will forbs be in April and early May, and late May and June?
- What types of riparian areas are common in the bottom of the deep drainages?
- Without meadows on the arid fans how important is sagebrush habitat quality here?

- What is the travel distance between the north and south slopes? Think predation risks.
- How much of the open area is generally < 20% slope?

Where is Most of the Mid-Elevation, Gentle Sloped Topography



There are landscape level reasons the Malhuer High Plateau and Owyhee High Plateau have higher densities of sage-grouse



Landscape Level Factors that Influence Prioritization

- Landscape scale factors affect the location, spatial structure, abundance and availability of areas inhabited by breeding SG
  - ✓ Large acreage under snow during nest initiation when much of the landscape is above 7,000 feet – dramatically limits nesting areas
  - ✓ But strongly influenced by topography, ecological site (low sage melts before big sage) and total precipitation
- Optimal belt is roughly 6,000 to 7,000 feet
  - ✓ Where landscape largely snow-free mid-March to early April, but
    - Gentle rolling slopes
    - Very heterogeneous mix of Low SB and Mountain SB ecological sites with potential for abundant forb production on most sites
    - Abundant perennial grasses – insects and site resilience
    - Many low gradient drainages with wet meadows nearby, preferably with large perimeter to area ratio
- Further from 'optimum' – less the landscape potential for SG, ***but*** most landscapes have small areas (1-3 mi^2) that approach 'optimum'

Ecological Sites and their Potential are Important But Highly Variable

Humboldt MLRA	Sites	Forb Prod	Elevation Range
Wy SB[1]	11	30-90	5,000-7,000
Low SB	2	50-80	5,500-9,500
Mtn SB	4	100-340	6,500-9,500
Central NV BR MLRA	**Sites**	**Forb Prod**	**Elevation Range**
Wy SB	13	30-80	5,000-7,500
Low SB	6	50-60	6,300-9,500
Mtn SB	10	50-120	6,400-9,500

Malhuer High Plateau MLRA	Sites	Forb Prod	Elevation Range
Wy SB[1]	20	30-110	4,500-6,700
Low SB	10	70-100	5,500-9,000+
Mtn SB	17	100-340	5,500-8,500
Owyhee High Plateau MLRA	**Sites**	**Forb Prod**	**Elevation Range**
Wy SB	9	30-80	5,200-6,500
Low SB	6	40-105	5,500-8,000+
Mtn SB	9	70-150	5,500-9,000+

1 Includes sites with mixes of Mountain SB

Once Sagebrush Is Present, Many Studies Have Clearly Identified the Importance of Forbs

- Important for habitat selection, nest selection, nest survival, and chick survival
- Factors that limit or promote forb distribution, availability and abundance at critical life stages of SG are important
- Availability and abundance of forbs result from interactions among topography, geomorphology, snow accumulation and snowmelt patterns, and ecological sites/soils
  - ✓ Not everyplace has good potential for forbs from nest initiation to mid to late summer
  - ✓ Shorter distance SG must move to easily obtain forbs from nest initiation to late summer the better off for the population

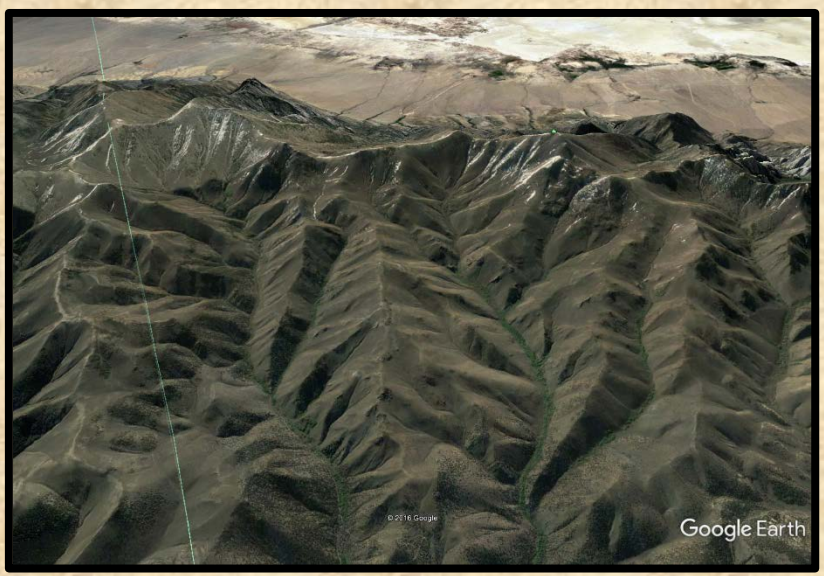
Forbs

- Maintaining/restoring PH meadows a priority
  - ✓ Green high nutrient forage longer into summer
  - ✓ Literally can't have too many, but topographic location and relationship to perches for raptors can help prioritize
  - ✓ Large perimeter to area is usually better – more likely for entire meadow to be near hiding cover
- The locations on a landscape for where forbs are abundant often changes from nest initiation to late brood rearing
  - ✓ The greater the distance the lower quality the habitat
- Need to understand the intrinsic ability to produce forbs across the landscape
  - ✓ When breeding SG require large amounts of them – below snowline
  - ✓ Where breeding and broods are likely to be abundant (<20% slope),
  - ✓ Areas with deep snow and steep slope should be lower priority

Ecological Sites; Their Type and Spatial Arrangement; and the Type and Distribution of Riparian Areas

Montana Mountains

Humboldt Range



Toiyabe Range

What Has Been Lost at Low Elevation?

Contiguous stands of sagebrush on alluvial fans does little for sage-grouse unless the meadows that were established during settlement also are re-established.

Prioritizing Riparian Areas

Perennial herbaceous riparian areas adjacent to level benches with good forb/bunchgrass understory offer great potential for meeting breeding and brood rearing

Perennial herbaceous riparian area boxed in by steep canyon walls is better than nothing, but not the best option

Prioritizing Areas in Basin and Range

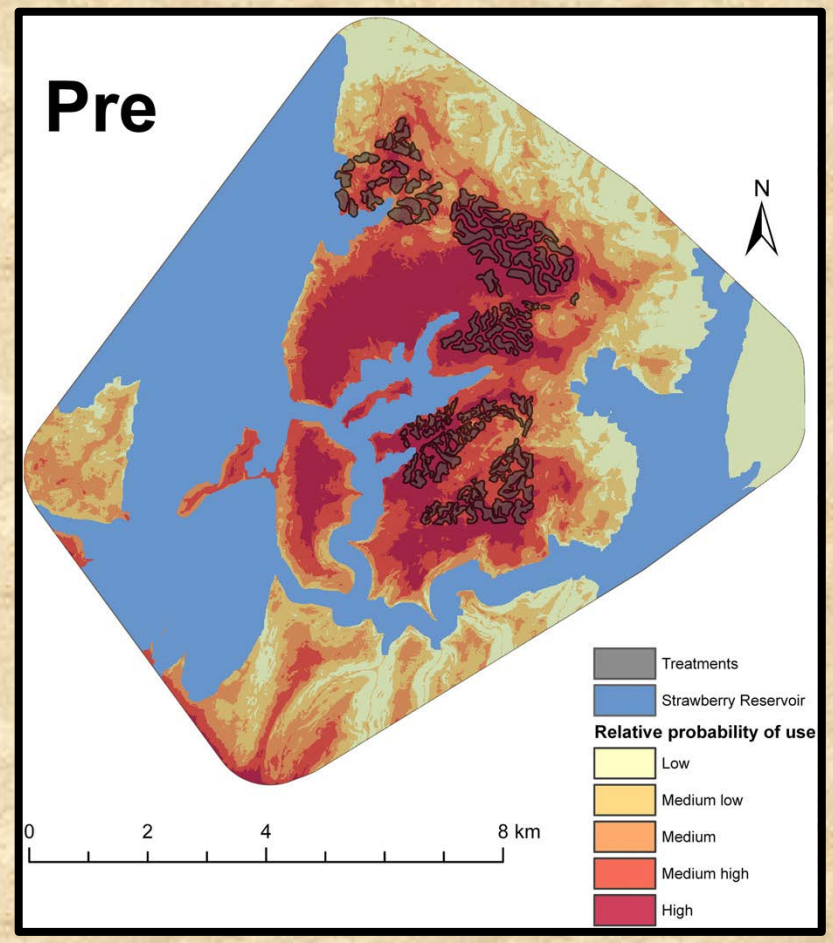
- Does the area occur where snow is largely absent at nest initiation?
- Is the slope of most of the areas less than 20%
- Are herbaceous meadows adequately embedded in the landscape matrix
- Does the understory have sufficient resilience

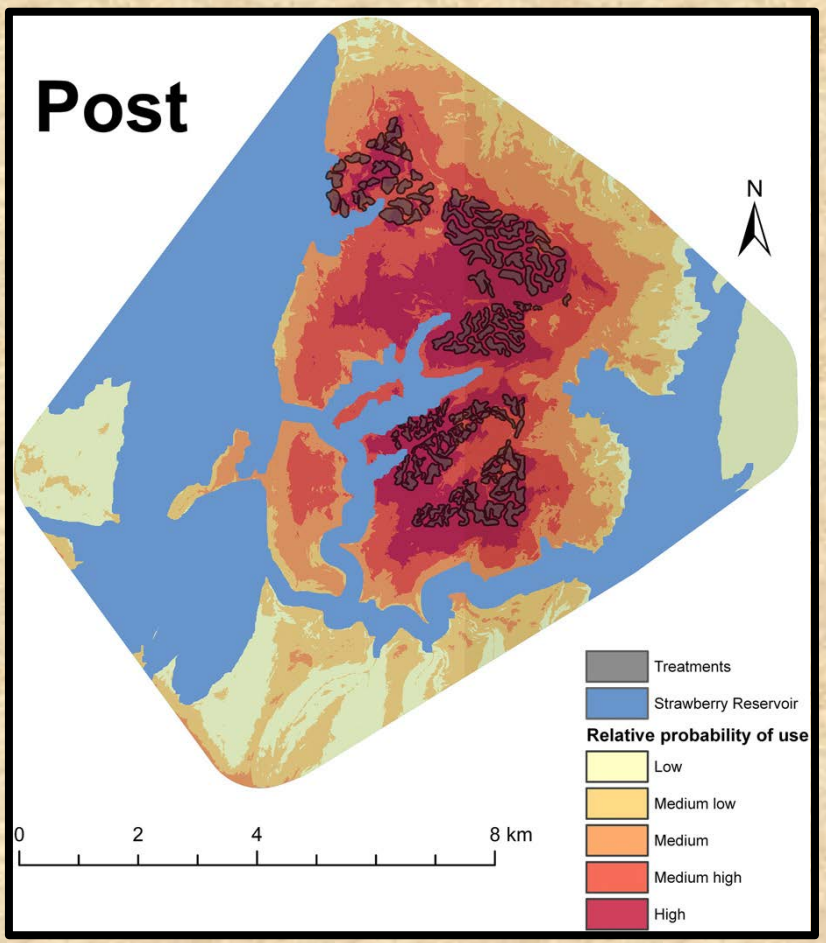
Prioritizing Better Areas Within Large Low Density Areas

Sonoma Range

Santa Rosa's Westside

Targeted and Scaled SB Removal Can Change SG Use Patterns





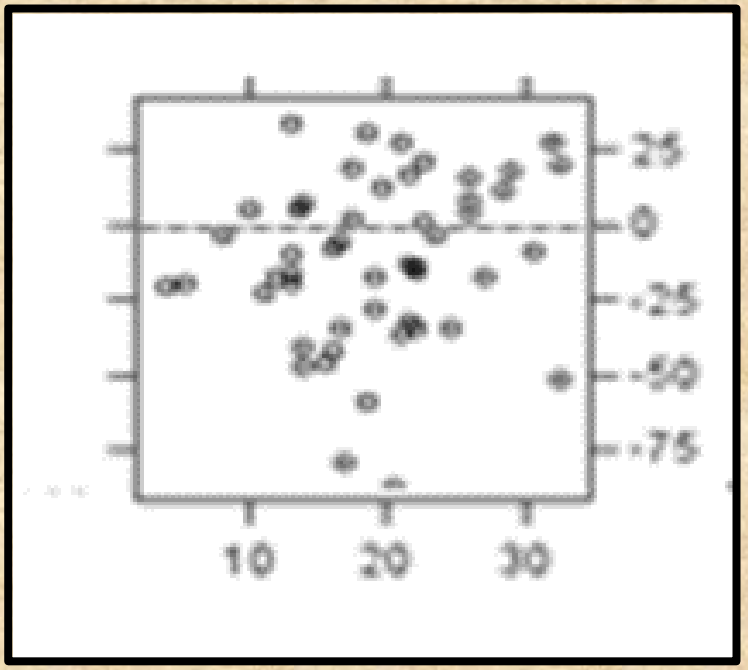
Baxter et al. (in press)

Its Hard to Eat What's Hard to Find

Size, shape, density of treated areas, and relationship to other critical habitat elements are important

Resilience is the Most Important Attribute, Not Grass or Forb Height

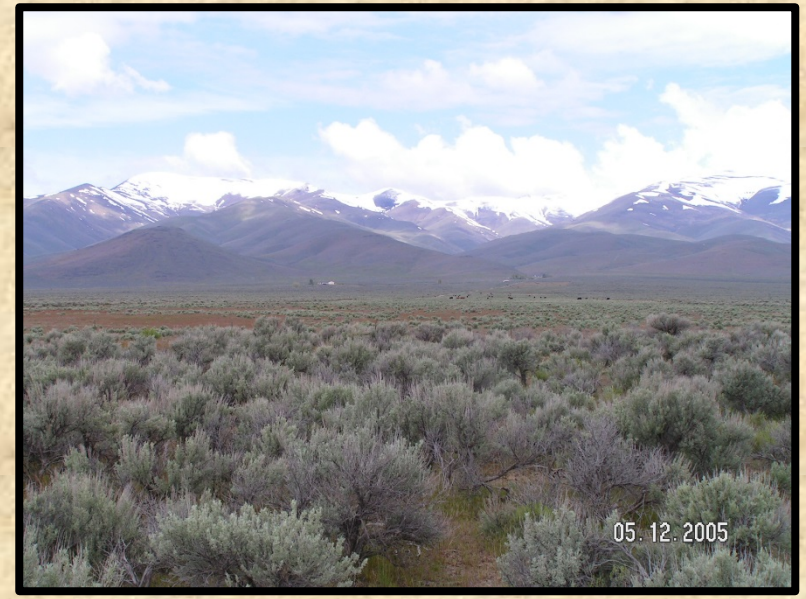
Sagebrush Foliar Cover, Fire and Resilience



Sagebrush Foliar Cover (%)

From: Swanson et al (accepted REM)

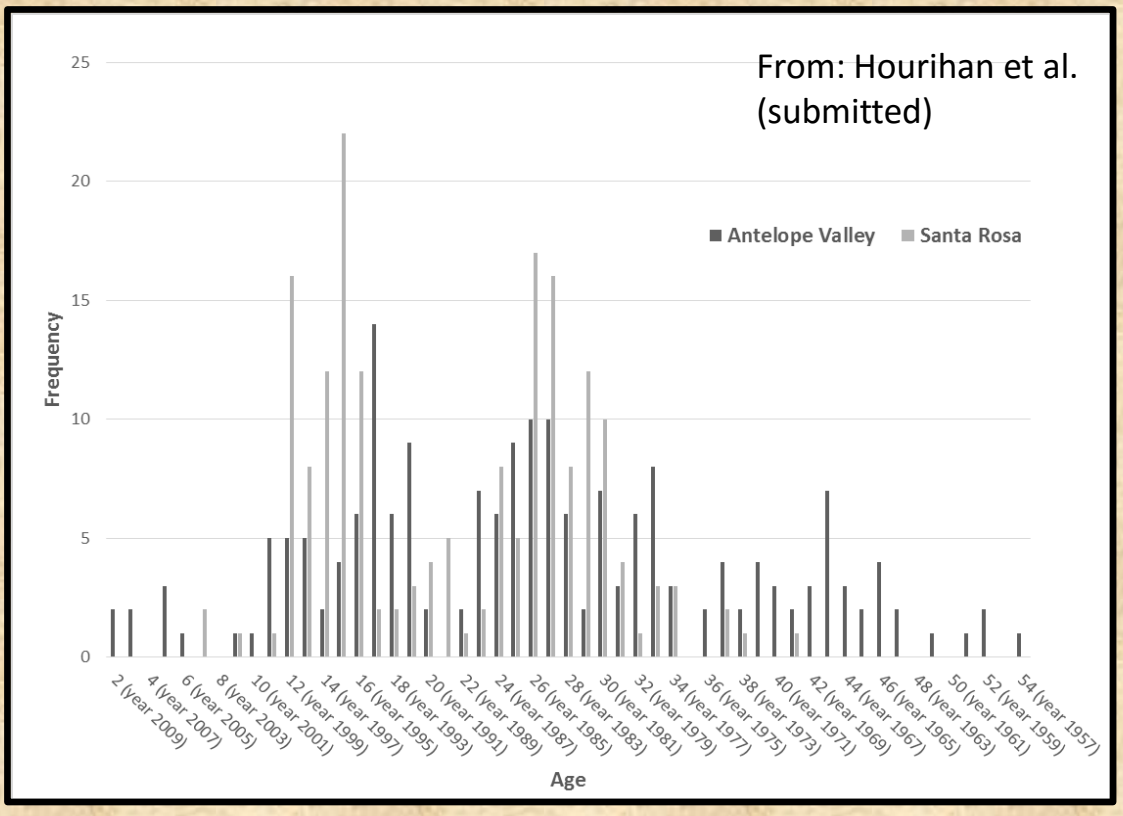
Fuel Reduction Zones Can Reduce Risk, But…



Fuel Break Priorities

- Match fuel break density, width, structure, composition to the scale of the risk for area of concern
  - ✓ What's really needed to reduce large fires
  - ✓ Do fuel breaks 20 miles apart reduce fire size or just become access points for back fires
  - ✓ Need to be constructed with fire management or control as the priority
  - ✓ Connect with natural barriers
- Where perennial herbaceous resilience is lacking annual/regular maintenance plan is essential
  - ✓ Trading heavy fuel for flashy annual fuels is questionable
- Periodic shrub control is essential
  - ✓ Sprouting rabbitbrush
  - ✓ Rapid regrowth of young sagebrush not killed by treatment

Restoring Sagebrush into Perennial Grasslands Depends on Seasonal Needs



- Nesting/Brood rearing areas need forb producing sites close by
- Winter habitat – meadows and forbs less important
- Shrub establishment is episodic – it's a pulse system

Important Side-Boards for Prioritization

- Understand the intrinsic landscape potential of areas inhabited by, or potentially inhabited by sage-grouse, and recognize differences in potential in and among areas inhabited (PMU's)
- Understand the primary risks to sage-grouse in each PMU or landscape area of concern and manage accordingly
  - ✓ Is my focus to protect something from an external risk, improve the quality of an important landscape element, or both
- Prioritize the landscapes and areas within those landscapes, where changes in management, specific management actions, or "specific projects" are more likely to improve landscape resistance and resilience to inevitable disturbances
- Match the scale (size, space, and time) of projects/management actions to the specific risks that affect the target SG populations/habitat.
- If you do not have resources for M&O, question if the action or project should occur

Questions

Montana Mountains