

Ecosystem Sustainability and the Cheatgrass Fire Cycle

EXHIBIT C – LANDS
Document consists of 18 slides.
Entire Exhibit provided.
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SUSTAINABLE ECOSYSTEMS

Research & Management Strategies

- Understand causes and effects of environmental change
- Determine what makes the environments that we live in sustainable
- Prioritize and implement management activities
- Develop effective collaborations



History of Invasion

- Heavy grazing beginning with settlement through the early 1900s
 - Decrease in native perennial grasses and forbs (fine fuels)
 - Increase in shrubs and trees (woody fuels)
 - Decrease in fire frequency
- Invasive annual grasses introduced from Eurasia after settlement (cheatgrass, red brome, medusahead)
 - Rapid spread through rangelands
 - Increase in flammable fine fuels with high rate of spread
- *Initiation of annual grass/fire cycle*
- *5 to 7% of land area dominated by annual grasses; 50%+ invaded; 80% susceptible*



History of Invasion

- Cheatgrass is “pre-adapted” to Great Basin climate
 - Winter annual – germinates in fall, winter or spring
 - Active growth prior to natives and early maturation
- Highly responsive to disturbances that increase water and nutrients
 - CO₂ enrichment
 - Urban & energy development
 - Removal of native vegetation
 - Fire



Effects on Ecosystems & Species

- Conversion of native vegetation to cheatgrass dominance
 - Altered surface reflectance & temperatures may change the weather
 - Decreased carbon sequestration in sagebrush ecosystems
- Loss of biological diversity
 - 20% of sagebrush associated species at risk
- Loss of ecosystem services
 - Forage for livestock
 - Recreational opportunities



Vulnerabilities

- Cheatgrass Die-off
 - Restoration Opportunity?
 - In northern Nevada, 500,000 acres have died off
 - Result is soil erosion and secondary weed invasion
- Most likely causes are fungal or soil pathogens and interactions with weather
- Research projects are determining ~
 - Extent of the die-off
 - Potential to use pathogens for biocontrol
 - Restoration approaches



- *Supported by USDA Initiatives, Joint Fires Sciences Program & BLM Great Basin Restoration Initiative*
- *Contact: Susan Meyer, US Forest Service, RMRS (smeyer@fs.fed.us)*

Differences in Susceptibility

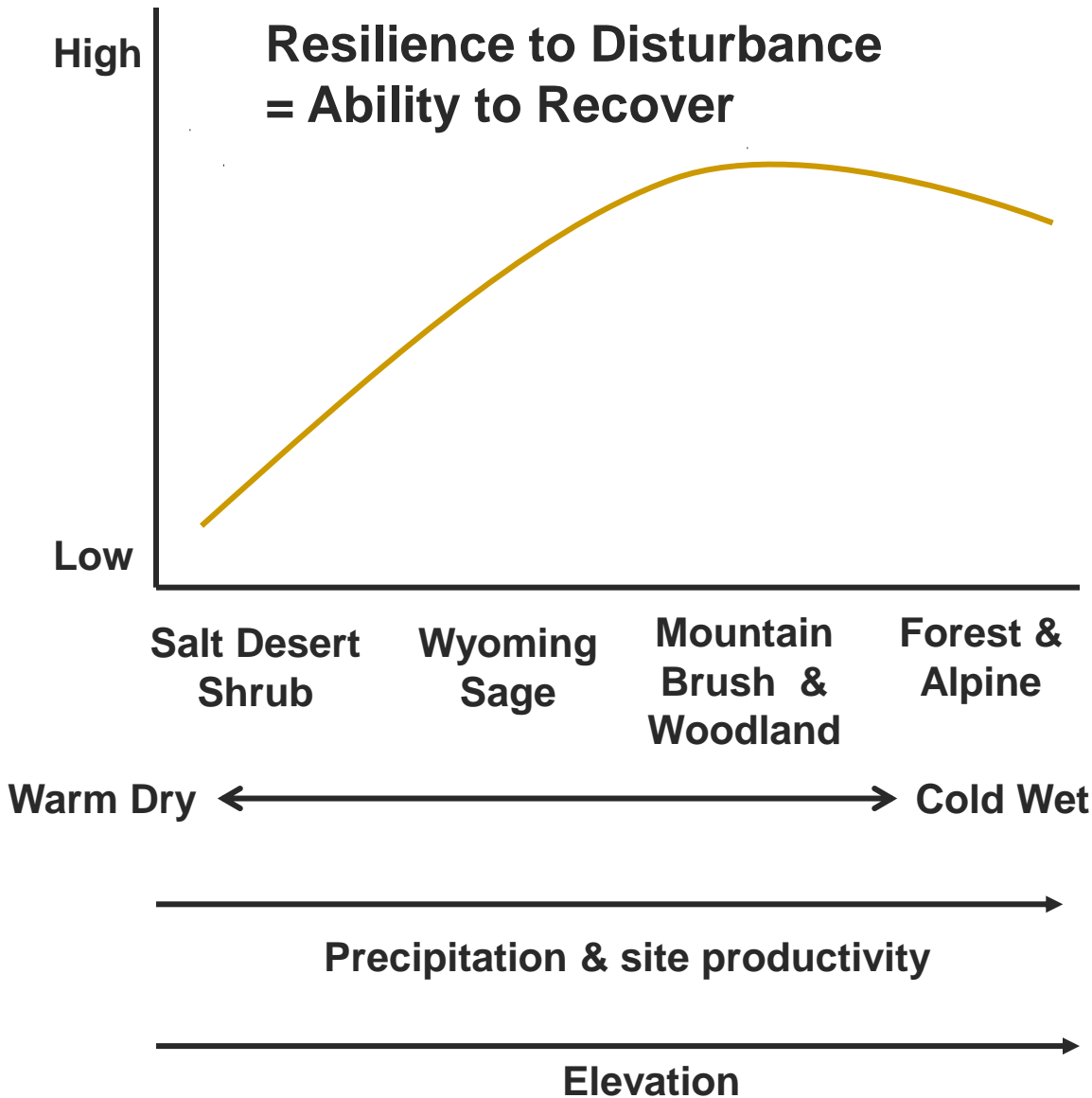
- Great Basin ecosystems differ ~
 - Resilience to disturbances like fire and management actions
 - Resistance to cheatgrass
- Understanding these differences is important for management
 - Prioritize areas for treatment
 - Select the best treatment methods
- Research projects are studying ~
 - Factors that determine resilience and resistance
 - Implications for prioritizing and selecting management approaches



- *Supported by USDA Initiatives, Joint Fires Sciences Program & National Fire Plan*
- *Contact: Jeanne Chambers, US Forest Service, RMRS (jchambers@fs.fed.us)*

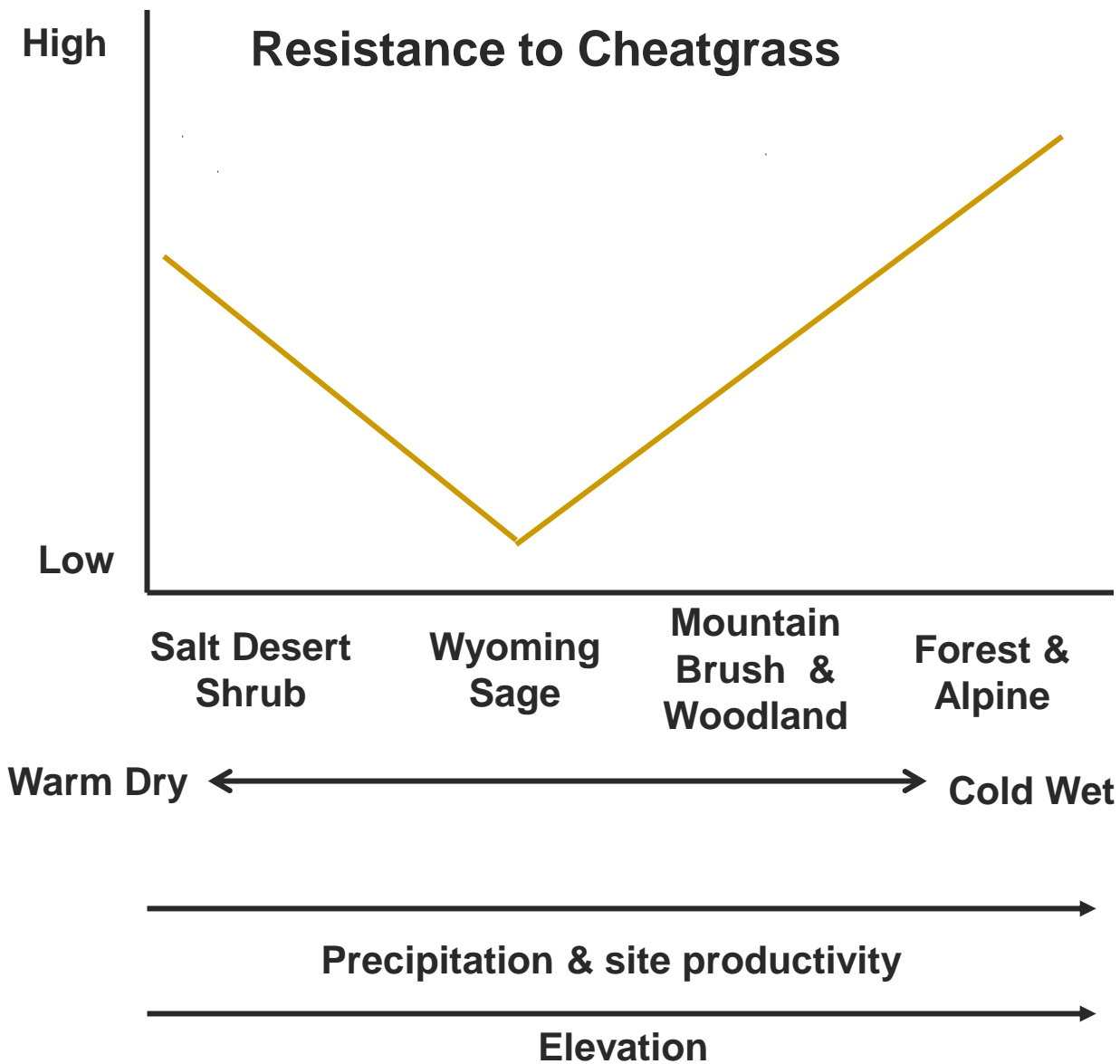
Great Basin Vegetation Types





***Resilience to disturbance
increases with elevation***

- Higher precipitation & more favorable growing conditions
- More rapid recovery after disturbance
- Increased capacity to compete with invaders



Resistance to cheatgrass differs

- *Higher in desert and cold alpine environment*
- *Lowest in Wyoming sage*
- *Increased by native grasses and forbs*

(Chambers et al. 2007)

PRIORITIZING MANAGEMENT ACTIVITIES

Protection

- Protect areas with inherently low resilience to disturbance and resistance to invaders, and areas of high conservation value
- Eliminate stressors like overgrazing by livestock and repeated fire
- Control surface disturbances
- Increase efforts to detect and eradicate invasive species



PRIORITIZING MANAGEMENT ACTIVITIES

Preventative Management

- Maintain or increase resilience and resistance in areas with declining ecological conditions
 - Reduce fuel loads & decrease risk of severe fire
 - Reduce risk of cheatgrass invasion
- Focus on areas with high resilience & resistance that we know will recover
- Use fire and fuels treatments



PRIORITIZING MANAGEMENT ACTIVITIES

Restoration/Rehabilitation

- Restore or rehabilitate severely disturbed areas, e.g., those dominated by cheatgrass
- Prevent repeated burning

- Lower priority than protection & prevention, except ~
 - Post-fire rehabilitation seeding
 - Fire breaks
 - Wildland-urban interface
 - Critical habitat for T&E species



UNDERSTANDING TREATMENT EFFECTS

***Sagebrush Treatment Evaluation
Project (SageSTEP) - sagestep.org***



- Large-scale, interdisciplinary research & management project developing information on where and how to treat
 - Increase resistance of sagebrush ecosystems to cheatgrass (mowing and herbicides)
 - Increase resilience of pinyon and juniper encroached systems (prescribed fire and mechanical removal of trees)
- Sites located across the region for broad applicability
- Providing needed guidelines for restoration & management
- *Supported by Joint Fires Sciences Program, BLM, FS; most of the region's universities involved*
- *Contact: Jim McIver, Oregon State University (james.mciver@oregonstate.edu)*

DEVELOPING PLANT MATERIALS & REVEGETATION METHODS

***Great Basin Native Plant Selection and Increase Project -
<http://www.fs.fed.us/rm/boise/research/shrub/greatbasin.shtml>***

- Regional research & management project developing plant materials and revegetation methods
 - Seed planting zones for native species
 - Agricultural production of native seed
 - Methods for establishing native species
 - Demonstration areas, guides, popular publications and websites
- *Supported by BLM Great Basin Restoration Initiative & RMRS; agency & university partners*
- *Contact: Nancy Shaw, RMRS
(nshaw@fs.fed.us)*



SHARING INFORMATION ON FIRE AND RESTORATION

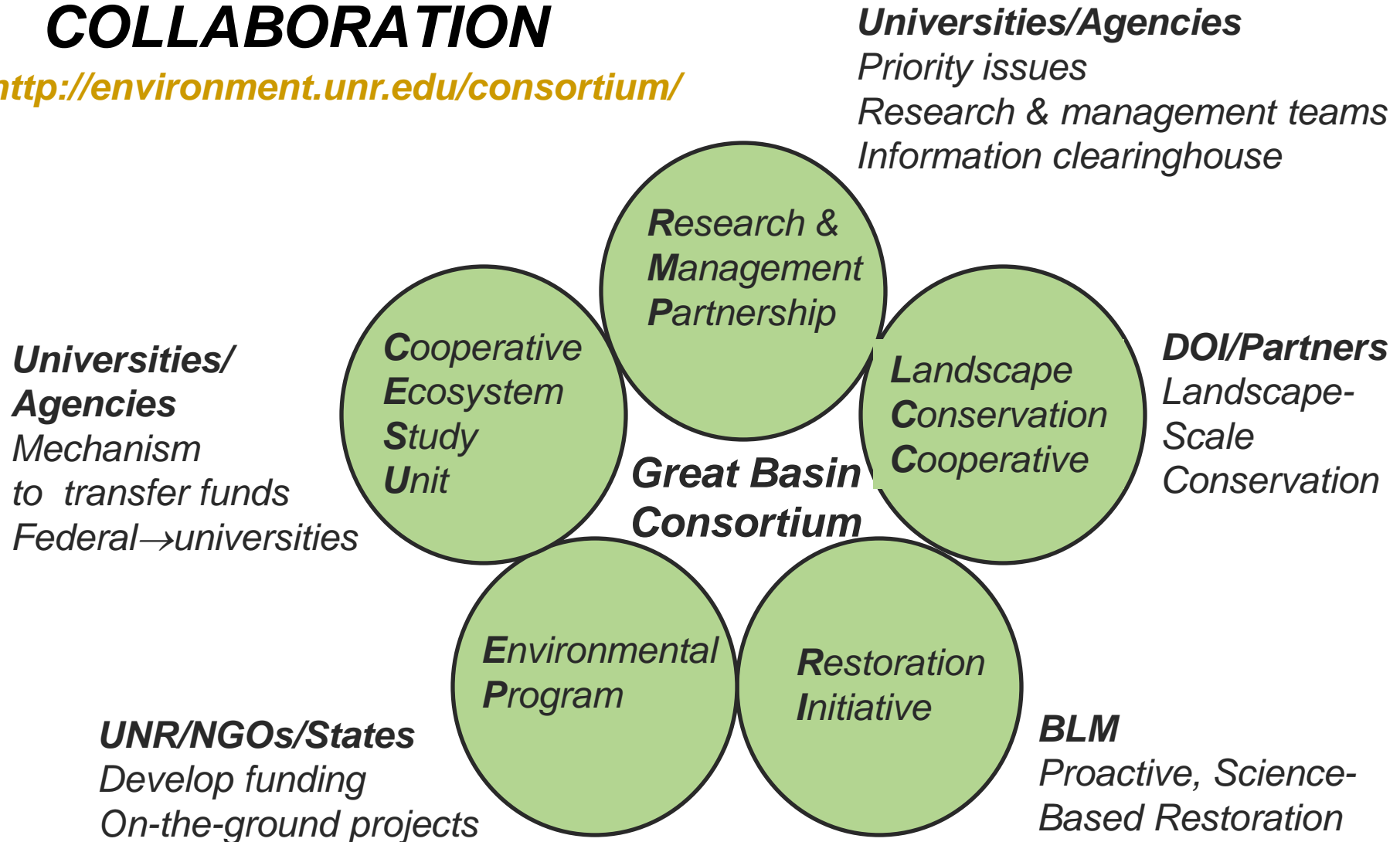
***Great Basin Science Delivery Project –
www.gbfiresci.org***

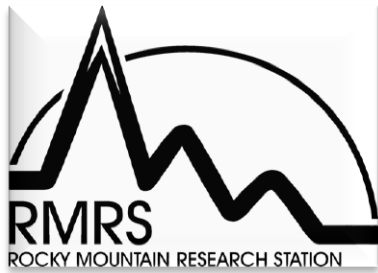


- Identifying technical needs with respect to fire, fuels, and post-fire vegetation management
- Synthesizing the necessary information and developing the technical tools
- Making fire and resource information more accessible
 - Webbased clearinghouse of information
 - Webinars
 - Workshops
 - Restoration cadres
- *Supported by Joint Fire Sciences Program; BLM, FS, RMRS, USGS, UNR, U of I active participants*
- *Contact: Mike Pellant, BLM (mike_pellant@blm.gov)*

INCREASING COLLABORATION

<http://environment.unr.edu/consortium/>





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