



## Some Challenges of Large Scale Wildfire Stabilization and Rehabilitation Efforts within the Great Basin

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Utah Bureau of Land Management

Milford Flat Wildfire - July, 2007

## The Great Basin (GB)

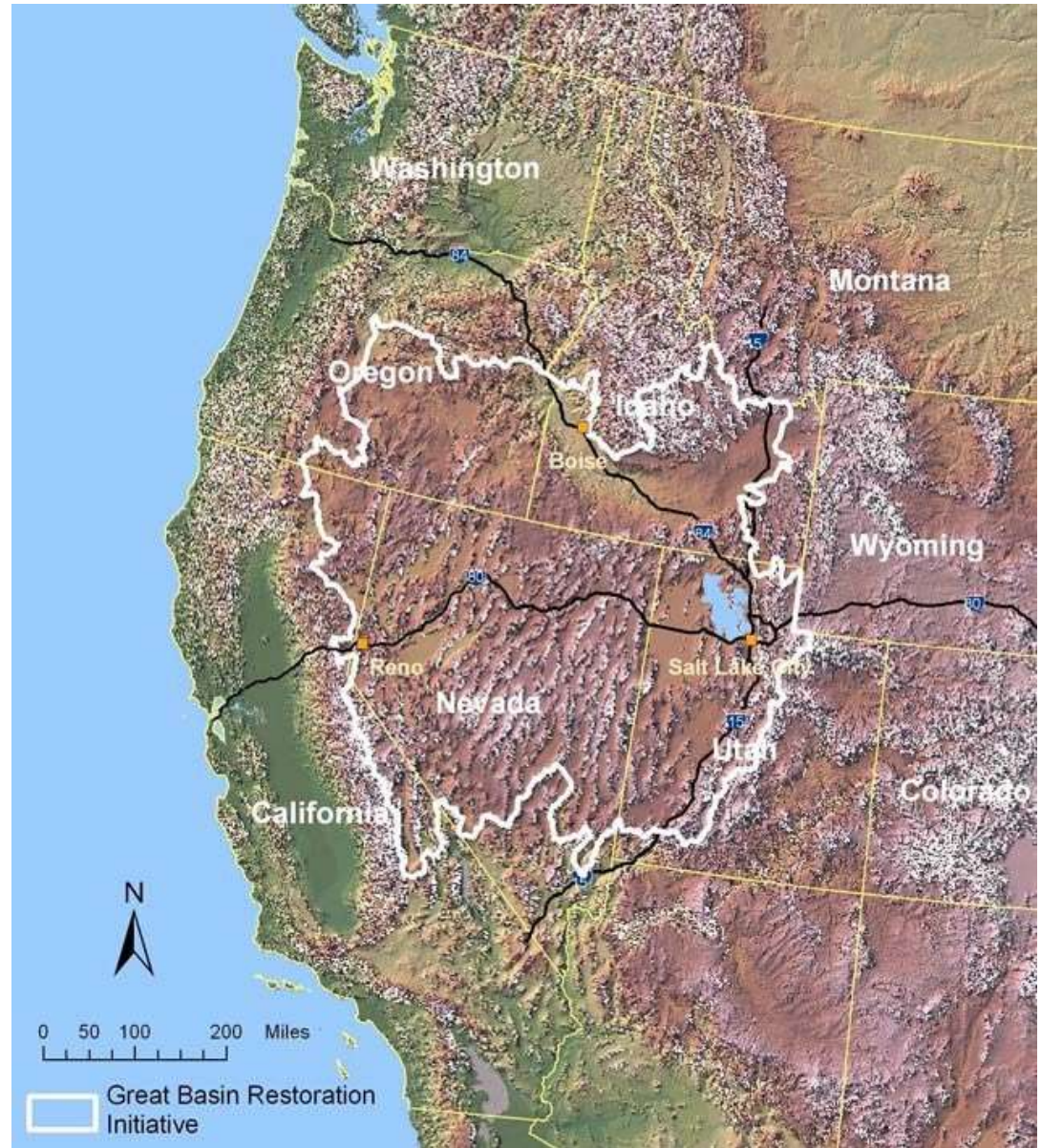
North America's northernmost and largest desert lying between the Rocky and Sierra Nevada Mountains.

The Native ecosystems of this desert were altered significantly by the introduction of domestic livestock and invasive plant species in the late 1800's and more recently by increases in wildfire and human occupation and recreation.

According to The Nature Conservancy, the GB is one of the most imperiled ecosystems in the country.

Disastrous wildfires in 1999 set in motion an initiative to promote proactive restoration of the GB to resolve three vegetation/fire issues:

1. Cheatgrass (*Bromus tectorum*)  
Wildfires
2. Conifer Encroachment
3. Perennial Invasive Species



# We have here a fragile environment...”

(Samuel G. Houghton, “A Trace of Desert Waters: The Great Basin Story”)

- The GB is a land of fierce extremes, sun-baked in July, bitterly cold in January, and everything in between the remainder of the year.
- It takes a special and hearty kind of animal, plant and human to make this rugged, harsh land home.
- The GB is in serious ecological decline. Exotic annual grasses and noxious weeds, introduced during 150 years of settlement, combined with recent serious wildfire seasons, have left much of the GB on the verge of ecological disaster.
- The Nature Conservancy lists the GB as one of the most imperiled ecosystems in the US.

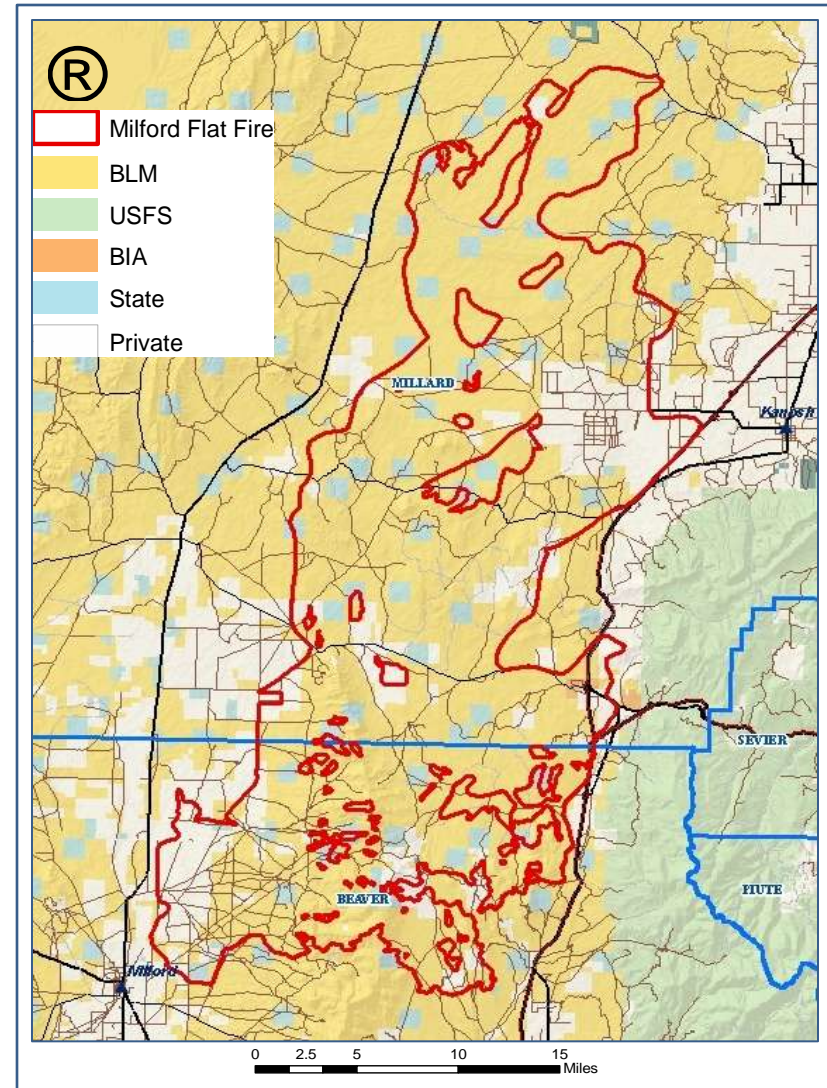
# Milford Flat Fire

Dates: July 6<sup>th</sup> – July 15<sup>th</sup> 2007  
Location: Started 3 miles No. of Milford, UT  
Total area: ~363,000 acres Millard & Beaver Counties  
Cause: Lightning  
Conditions: Drought, high winds, high temps, abundant invasive annual weeds  
Fuels: salt desert scrub, sagebrush, and juniper, annual weeds

Biggest fire in UT history  
Fast moving  
Some small unburned islands, mostly contiguous burn  
Portions of I-15 and I-70 temporarily closed



Ownership	(acres)	
BLM	270,125	75%
BIA	595	0.2%
State	30,295	8%
Private	62,037	17%
<b>Total</b>	<b>363,052</b>	



Stoner, et al. 2009 "Monitoring Post-Fire Revegetation of the 2007 Milford Flat Fire, Utah"

# Stabilization & Rehabilitation Stat.'s

- 363,000 acres burned (567 sq. miles)
- 200,000 acres treated (312 sq. miles)
- 127,310 ac. aerial seeded with  
63,441 ac. single chained
- 129,412 ac. aerial seed on snow
- 72,639 ac. drill seeded (44,639  
Fed./State & 28,000 private lands)
- 840 ac. Imprinted
- 1,150 ac. Green stripping
- 138,070 ac. Cultural Survey
- 826 Cultural Sites Identified
- \$27 M spent
- 1.5 M lbs of seed
- \$10.7 M for seed
- \$37/ac. for seed
- \$85/ac. with application
- 11 separate seed mixes
- Mostly Grasses with a few Forbs & Shrubs
- 28 plant species
- 17 native species
- 11 non-native species
- 14 grass species
- 9 forb species
- 5 shrub species
- 30 % Natives by weight (Estimated)
- 60 % of the Cost for Natives (Estimated)
- 74 miles of burned fence to remove and  
replace
- 78 miles of new fence necessary
- 315 Sediment Basins needed

# Seeded Species

## Native Grasses

- Mountain Brome
- Sand Dropseed
- Indian Ricegrass
- Bottlebrush Squirreltail
- Bluebunch Wheatgrass
- Snake River Wheatgrass
- Thickspike Wheatgrass
- Western Wheatgrass
- Basin Wildrye

## Non-Native Grasses

- Intermediate Wheatgrass
- Pubescent Wheatgrass
- Siberian Wheatgrass
- Tall Wheatgrass
- Russian Wildrye

# Seeded Species (Continued)

## Native Forbs

- Maple Grove Blue Flax
- Globmallow's
- Penstemon's
- Western Yarrow

## Non-Native Forbs

- Alfalfa
- Sanfoin
- Yellow Sweetclover
- Small Burnet
- Lewis or Apar Blue Flax

## Native Shrubs

- Bitterbrush
- Cliffrose
- Fourwing Saltbush
- Big Sagebrush (Wyoming & Mountain)

## Non-Native Shrubs

- Forage Kochia

# The Challenges

1. Planning/Securing Funding
2. Contracting
3. Archaeological Clearance (nearly 140K ac.)
4. Logistics of such a Large Undertaking (Gathering Equipment, Supplies, Materials and Implementing within Tight Timeframes)
5. Stabilization of a Dust Hazard on a Harsh Ecological Site (Clear Spot Blowout Area)
6. Reversing the Root Problem (Highly Flammable Invasive Annuals = The Fire/Cheatgrass Positive Feedback Cycle = Fire/Cheatgrass Dis-Climax)

# 1. Planning/Securing Funding

- Initial Plan within 7 days of Fire Containment
- Full Stabilization Plan within 21 days of Fire Containment
- Completion of the Field Assessments in time to Incorporate into Final Plan within 21 days
- Stabilization and Rehabilitation Plans for Each Field Office (County Area) (2X2=4 Plans)
- An Implementation Plan, Team and Timeline were developed
- Employed the Existing Utah Partners for Conservation and Development (Utah PCD) Structure
- The State Agencies and Private Land Owners had to Secure Funding/Labor & Equipment

# The Planning Remedy

- The Governor Stressed the need for Everyone to work together to Stabilize the area
- Locals used for Field Assessments & brought in Outside Help for Plan Writing
- Developed an Implementation Plan/Timeline and formed a Team with Division of Functions: Oversight, Planning, Logistics, Operations, Finance & Public Affairs
- Involved the local County Commissioners and Public; Set Implementation Priorities
- Utilized the Existing and Efficient Utah PCD system consisting of 14 State and Federal Agencies
- **Without this division of labor and the vast diversity of personnel and knowledge, this massive effort would not have been possible**

# Project Priorities for Implementation

- ✘ Risks to People and Property
  - ★ Dust (Clear Spot)
  - ★ Floods
  - ★ Public Health
- ✘ Ecological/Environmental Risks
  - ★ Erosion
  - ★ Threatened & Endangered plants and animals and species of special value
  - ★ Cheatgrass expansion
  - ★ Invasive species (weeds)
- ✘ Cost/Benefit
  - ★ Treatment success
  - ★ Landowner cost share
- ✘ Beyond Stabilization (Long Term)
  - ★ Long Term fire impacts
  - ★ Ecological integrity
  - ★ Diversity of wildlife populations
  - ★ Water quality and quantity
  - ★ Stability of local ranches and farms

**Rehabilitation/Restoration  
Team Leader (IC)**

*Verlin Smith*

- Coordinates with Offices
- Coordinates with all Agencies

**Liaison**

Brian Cottom – Gov Office  
Bill Hopkin – UDAF  
Rory Reynolds – UDNR  
Kim Christy – SITLA  
Ron Davidson - NRCS

**Goals and Objectives**

- Stabilize Watersheds
- Eliminate Cheatgrass
- Seamless Rehab
- Restore Watersheds & Habitats

**Planning**

Lead: *Jack Brown (BLM)*  
Asst Lead: *Paul Briggs (BLM)*

*Rory Reynolds (UDNR)*  
*Jason Vernon (UDWR)*  
*Ron Torgerson (SITLA)*  
*Brock Bensen (NRCS)*  
*Paul Schlafly (BIA)*

- BLM ESR PLANS
- Utah PCD Plans
- NRCS Plans
- FSA Plans
- County Plans
- BIA Plans
- Other Plans

·Consolidated  
Implementation  
Plan

**Operations**

Lead: *Harvey Gates (BLM)*  
*Ron Torgerson (SITLA)*  
*Brent Spackman (BLM)*  
*Tyler Thompson (UDWR)*  
*Nile Sorenson (State Parks)*  
*Paul Schlafly (BIA)*

- Project Inspection
- Project Implementation
- Fence Construction
- Chaining
- Seeding
- Contract Supervision
- Monitoring

**Logistics**

Lead: *Curtis Warrick (BLM)*  
*Rory Reynolds (UDNR)*  
*Jason Vernon (UDWR)*  
*Joelle McCarthy (BLM)*  
*Craig Harmon (BLM)*  
*Lori Hunsaker (Gov)*  
*Ron Torgerson (SITLA)*  
*Bill Shaver (SITLA)*  
*Paul Schlafly (BIA)*  
*Ross Workman (BLM)*  
*Ron Baugh (BLM)*

- Seed Delivery & Testing
- Seed Mixing
- Seed Storage
- Seed delivery to sites
- Fencing Materials
- Cultural Clearances
- Tribal Consultation
- Equipment
- NEPA
- Property Survey

**Finance**

Lead: *Marilyn Chapman (BLM)*  
*Cassie Sandberg (BLM)*

- Track costs
- Identify funding sources
- Allocates project funds
- Procurement
- Contracting

**Communications**

Lead: *Lola Bird (BLM)*  
*Larry Lewis (UDAF)*  
*Tammy Kikuchi (UDNR)*  
*Lisa Reid (BLM)*

- Reports on Project
- Informs the public on benefits and progress
- Public Meetings
- News Releases
- Site Visits
- Web Site

**Draft Milford Flat Fire Costs - FY 2007 & FY 2008**

	Hours	Dollars
BLM Labor for 2007 & 2008 thru PP200728 (average 31.20 per hr.)	42682	
BLM 2822 Ops/Labor as of 01/25/2008		
Contracts/Services		\$ 6,501,235.00
Labor		\$ 1,331,783.00
Other (411C)		\$ 6,029,455.00
Rent		\$ 31,816.00
Supplies/Materials		\$ 7,646,329.00
Telephones		\$ 13,389.00
Travel		\$ 71,625.00
Vehicles		\$ 173,379.00
Sub-total:	42682	\$ 21,799,011.00
SITLA Contributions (Kim Christy) 01/16/2008		
Non-personnel costs, i.e. travel		\$ 9,182.00
Salary		\$ 77,076.00
Seed Purchase w/DWR		\$ 175,000.00
Cultural TL & Record Search Beaver Cty		\$ 55,005.00
Interagency Coord. Hours(CORs&PIs)	634	\$ 15,394.27
Sub-total:		\$ 331,657.27
Utah DWR (Tyler Thompson) 01/04/2008		
Personnel Services a/o 12/14/2007	2979	\$ 60,228.72
Private Land Seed/Rehab		\$ 2,093,981.00
Public Land Seed/Rehab SITLA		\$ 567,263.00
Other Costs		\$ 1,601,587.94
GBRC Seed Handling, Mixing, Storage - 19% of BLM Seed Costs		\$ 501,587.94
Waived 18% overhead for \$6 million contract oversight		\$ 1,080,000.00
Estimated Rental Value of UDWR owned equipment - 3 Ely Chains, 3 Drill Seeders		\$ 20,000.00
Sub-total:		\$ 5,924,648.60
Quality Growth Commission Legislature and Governor (Bill Hopkin 01/04/2008)	110	\$ 4,400.00
		Included in Tyler's Report
Dave Cook UDF Grazing Improvement 01/23/2008	110	\$ 4,400.00
GIP Personnel		
USDA (Bill H. Randy M. Tom T.)	471	\$ 16,409.00
NRCS (Lynn Kitchen)	50	\$ 800.00
UACD (Derrick W. Tyce P.)	30	\$ 1,290.00
Sub-total:	661	\$ 22,899.00
County Comm Contributions		
Don Willdon - mileage		\$ 112.00
<b>2822 Grand Total to Date:</b>		<b>\$ 28,082,727.87</b>

## 2. Contracting

- BLM Contracting is Cumbersome and Extended (Large Contracts handled through the National Business Center in Denver and on a Priority Basis, and can take Months to Prepare and Execute)

# The Contracting Remedy

- An Assistance Agreement was set up with the Utah PCD allowing the State DNR to do most of the Contracting (Streamlined Contracting compared to the Federal Government, More Timely and Efficient)
- An Existing in-State IDIQ Archaeological Contract was used which shortened the process

# 3. Archaeological Clearances

- No Ground Disturbance Actions Allowed without an Archaeological Clearance
- Clearance Delays shortened the Implementation Timeframe
- Approx. 35 acres/day/Person
- Cost is Approx. \$35./acre
- Shortage of Qualified Archaeologists

# The Archaeological Clearance Remedy

- An Existing in-State IDIQ Archaeological Contract was used which shortened the process
- Several Teams of Archaeologists set up with Different Areas to Clear
- Utilized several State Agency Archaeologists Outside of Contracted Personnel
- Prioritized Clearance Areas (Higher Elevation Areas Cleared first and Working Downhill with the Season)

# 4. Logistics

- Some 50 different Seed Drills
- 13 Anchor Chains
- 10-24 Heavy Tractors (Rubber Tire and Crawler Types)
- 1.5 M lbs. Seed to Store, Mix and Deliver to contractors
- Some 13-18 Different Contracts occurring Simultaneously each Requiring Equipment, Supplies, Materials, Contracting Officers (CO's) and Project Inspectors (PI's)
- All Equipment Required Ordering, Delivery, Mobilization, Servicing, Tracking, Returning, and Bills Paid

# Logistic Remedies

- Dedicated Full Time Logistics Coordinator
- Dedicated Full Time Field Operations Coordinator
- Equipment provided by All Parties (BLM, UDWR, BIA, UDOT and Local Landowners)
- UDOT Transported Seed and Equipment
- SITLA handled CO Responsibilities
- UDWR and BLM Provided Seed, Seed Mixing and Seed Storage
- Separation of Duties based upon each Agencies Strengths and Resources

# 5. Clear Spot Dust Hazard

- Salt Desert Shrub Ecological Site
- Deep Saline Silt Clay Loam Soils (Old Lake Bonneville Sediment)
- 5.5"-7.3" ppt. / year with most as Winter Snow
- Down Wind of a Long Narrow Wind Corridor between mountain ranges in line with Prevailing Winds
- Down Wind of old "Lake Shore" Sand dunes that provide Saulter's which Start the Silty Soil Movement
- Devoid of Perennial Vegetation due to Repeated Burning
- A Very Harsh Environment for Seedling Establishment
- Has Caused Past and Recent Deaths along I-15
- Causes Several I-15 Shutdowns or Detours per year
- Causes the Wasatch Front to Fail Air Quality Standards on Windy Days

# Clear Spot Blowout Remedies

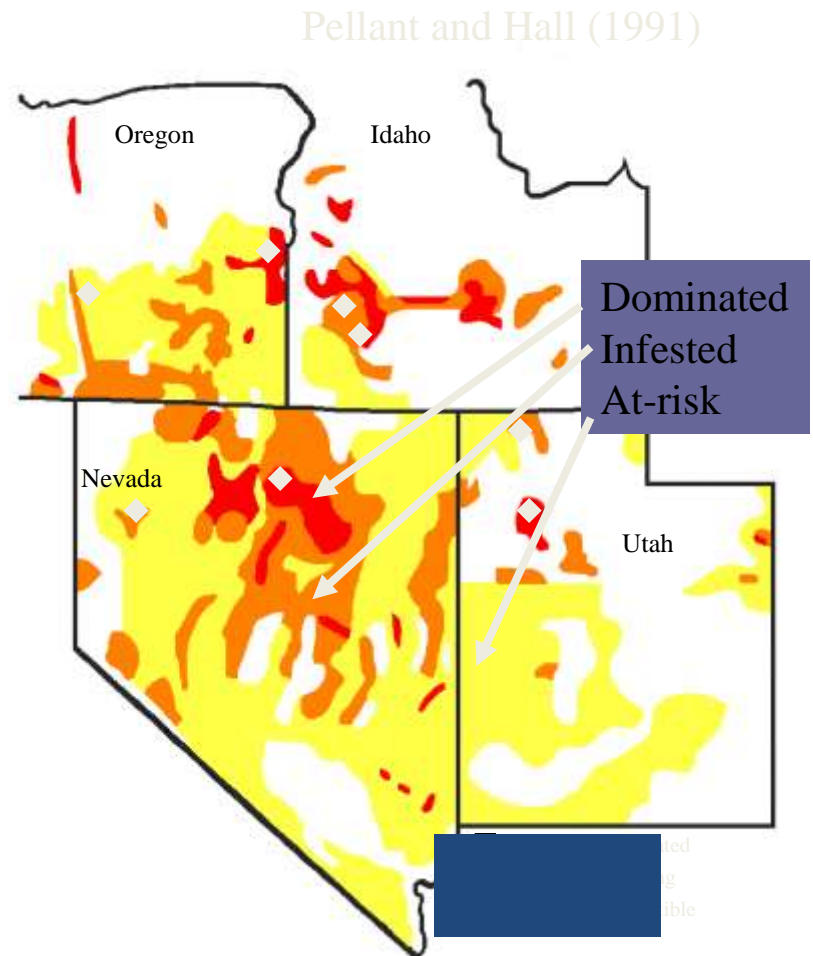
- Perennial Vegetation Establishment has met with Limited Success since the Milford Flat Fire
- 1988 Seeding Trials Established Fire Resistant Introduced Species (Prostrate Kochia, Ephraim Crested Wheatgrass)
- Seeding, Chiseling and Silt Fences Parallel to Prevailing Winds Provides some Stability
- Indian Ricegrass, Winterfat, Poa's, Bottlebrush Squirreltail, Kochia & Crested Wheatgrass will Establish with Protection
- The Area of "Blowout" gets smaller each year with Stabilization/Rehabilitation Efforts

# 6. The Fire-Brte Cycle

- Up to 13,000 plants/m sq. & 17,000 seeds/m sq.
- Seeds are Highly Germinable & Remain Viable up to 5 yrs
- Is an Efficient User of Nutrients, especially Nitrogen
- Creates a Dense Contiguous Stand of Flashy Fine Fuel
- Plants are Flammable 4-6 weeks Earlier and 1-2 months Later than Natives
- Brte Seed in the Duff is Not Destroyed by the Fast, Relatively Cool, Fires
- Burning Releases Nitrogen which Favors Brte more than it does Native Plants
- Brte is a Cool Season Annual which Takes Advantage of winter/spring Moisture. When the Natives Break Dormancy or Sprout, the Available Moisture may Already be Used Up
- Brte is Adapting and Moving Up in Elevation

# Cheatgrass Occurrence

- Mack (1981) stated that cheatgrass had reached its range by 1930
- Pellant and Hall (1991) surveyed BLM-administered lands in the Great Basin:
  - 3.3 million acres dominated
  - 76.1 million acres either infested or susceptible to cheatgrass invasion with disturbance
- Found in 49 states



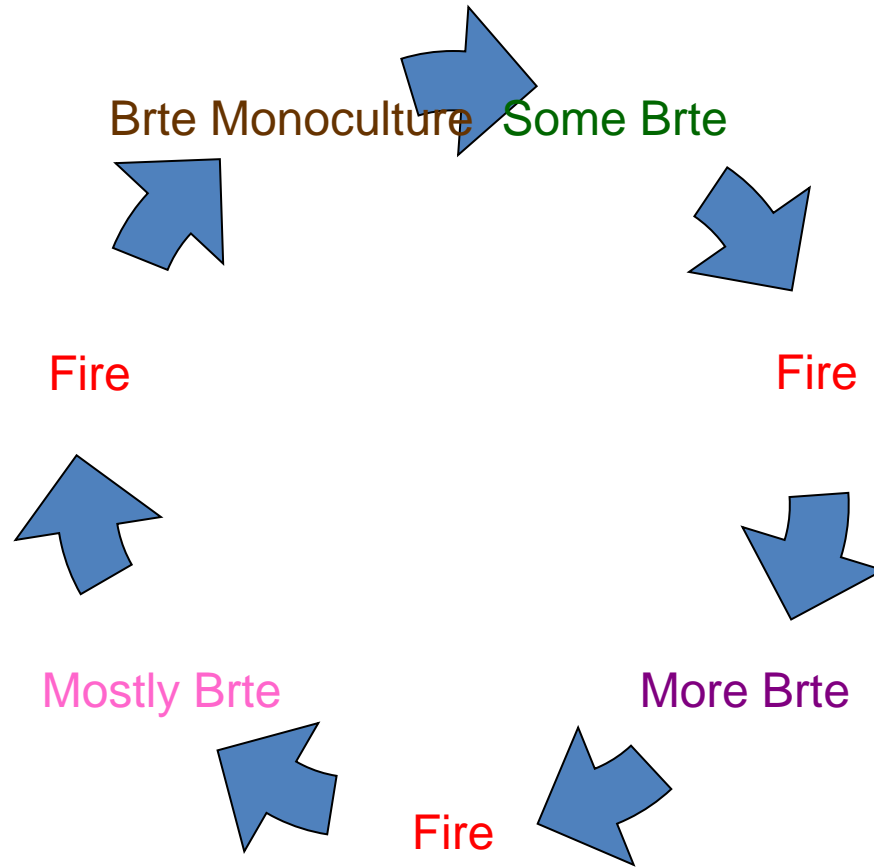
# Is Conversion to Cheatgrass Desertification?

1. Invasion by undesirable exotics
2. Alteration in biological diversity
3. Reduced productivity of desirable plants
4. Accelerated soil erosion
5. Increased hazards for human occupancy

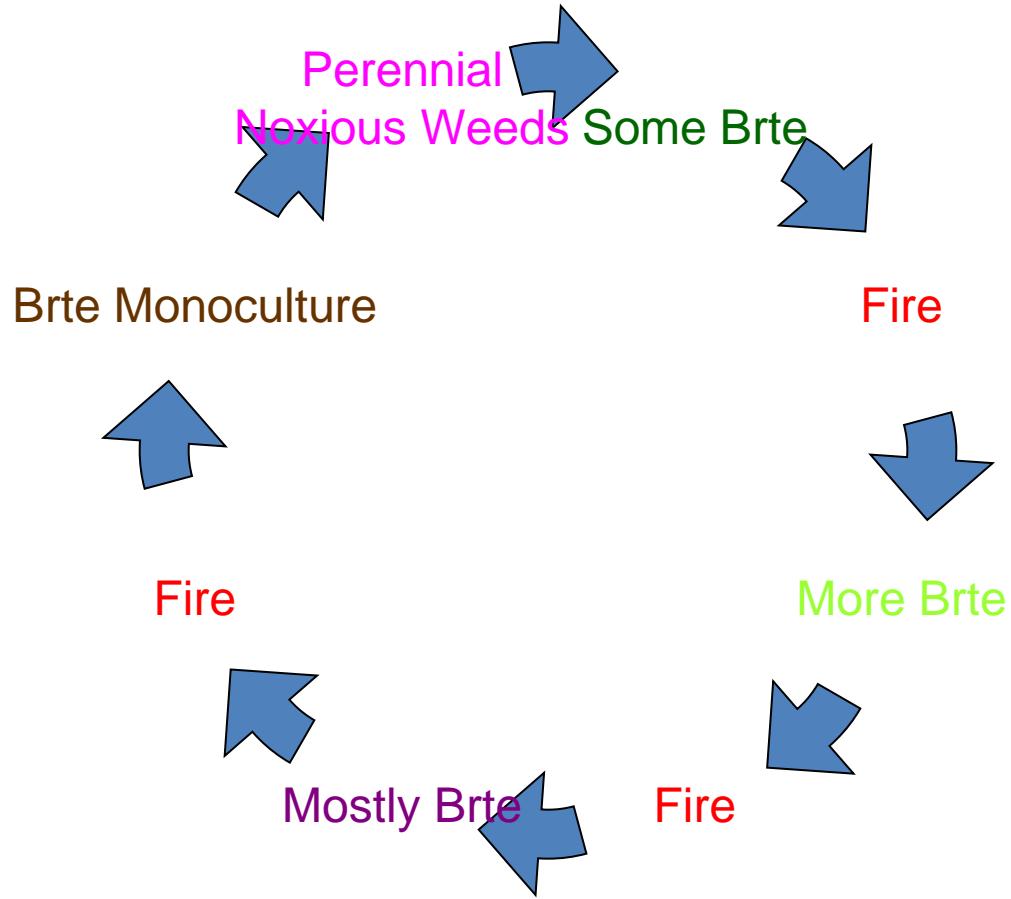
**H. E. Dregne. 1977. Desertification of Arid Lands. Economic Geography 3:329.**

# Fire / Cheatgrass Cycle

(Operates as a Positive Feedback Loop)



# Beyond Cheatgrass



# Breaking the Positive Feedback Loop



# Strategy to Convert Cheatgrass Rangelands to a Desired, Diverse Plant Community

## Assisted Succession Model



Conceptual Five Step Process



**Step 1: Control the Cheatgrass – Biological, Mechanical, Fire, Herbicide, or Combination of the Above**



# Step 2: Establish Competitive Species (Deplete the Cheatgrass Seed Bank)



# Step 3: Re-Initiate Proper Livestock Grazing/Vegetation Management



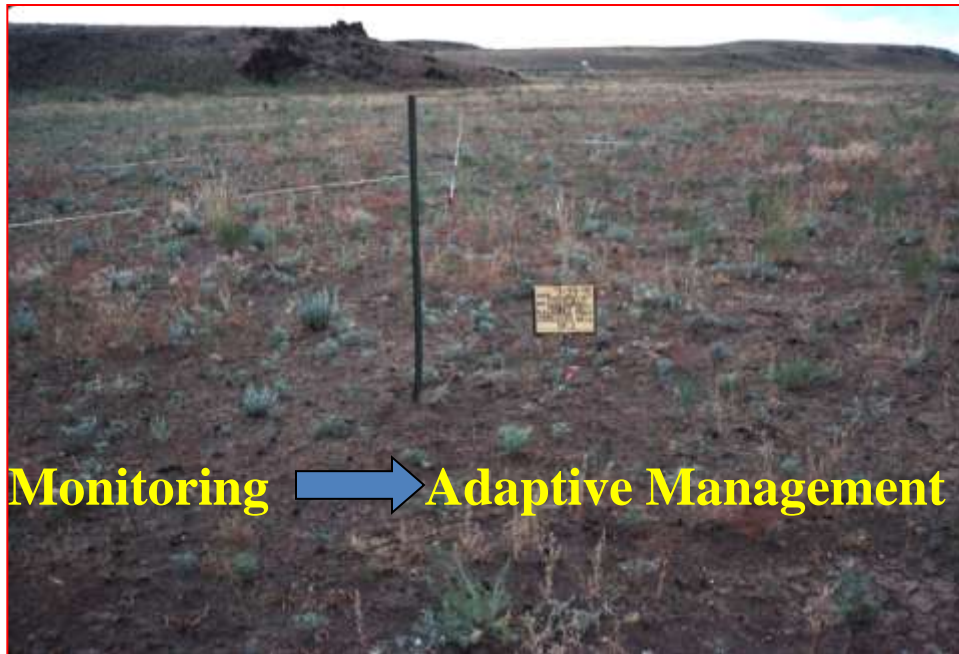
Enhances flexibility  
to restore other  
areas



# Step 4: Restore Diverse Community



# Step 5: Monitor and Continue Proper Management & Protection



Vegetative Fuel Break

# Tools in the Tool Box

- Biological Control
  1. Pathogens
  2. Livestock
  3. Seeding (Vegetational Competition)
- Mechanical
- Prescribed Fire
- Herbicides
- A Combination of the Above

# More Tools

- Training (example = 1730-60 BLM Course)
- Emphasize the Problem (Managers, Public, Academia, Anyone that will Listen)
- Leverage Funding through Cooperation
- Develop and Strengthen Regional Work Groups (GB, Colo. Plateau, Mohave)
- Recruit a New Generation of Dedicated Workers/Researchers/Supporters

# More Tools

- Think Long Term (maybe up to Several Decades down the road)
- Think about Steps to Solving the Problem (each Step Building on the Previous)
- Think Prioritization of Your Resources
  1. Protecting Existing Good Condition Habitats as the First Priority (Green Strips, Starts Suppression, etc.)
  2. Rehabilitation of Degraded Habitats with High Potential as the Next Priority
  3. And Writing Off Marginal Areas where Safety is not a Concern (> 6" ppt, Salty Soils, etc.) at the present time due to Limited Resources.