

Evaluating Historic Seeding Treatments in Western Grasslands and Shrublands using the Land Treatment Digital Library

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Act 1. Brief Introduction to the LTDL
Act 2. Evaluating Historic Seeding Treatments
Act 3. A Brief Demonstration of Potential Applications Act 1. Brief Introduction to the LTDL Land Treatment Digital Library A centralized digital library for federal agencies to store and retrieve data on land treatments in the western U.S.



Land Treatment Digital Library

Where did it come from?

- USGS Great Basin Integrated Landscape Monitoring Project (2007)
- Joint Fire Science Program (2009-10)
- Bureau of Land Management (2010 2014)







Land Treatment Digital Library

What is it?

The Land Treatment Digital Library integrates planning and implementation information, seed information, monitoring data, and gis data with original documents and photos associated with a project or treatment



How does the LTDL gets its data?

STEP 1: Paper files are scanned and computer files are copied at field offices and stored as PDFs with project GIS data.



STEP 3: Data and maps are checked for accuracy with field office personnel.





STEP 2: Data are entered into the LTDL, treatment polygons are imported, and links are created to original documents.



STEP 4: Project and treatment data can be viewed, queried, or exported as tables or maps.



Land Treatment Digital Library
 The LTDL is designed around a single project record with one or more treatments











Project Status (Required)	Project Data (Required) Similar Project Check	Fire Information	Project Log
Project Documentation Project Completion Status Documentation available Project Complete Plans Project Status Unknown (Plans Only) Monitoring Data Project In Progress Photos Data Status Seed Treatment Data Status Seed List Exists Data Entry Complete Project Paper Map Data Entry In Progress Spatial documentation available Data Entry Incomplete (Placeholder) No Location Data Approximate Point Location Project Polygon Shapefile Project Polygon Shapefiles(s) Treatment Approximate Points Treatment Approximate Points	Project Identifier Type Identifier Value Wildfire Code CQ4W Del Wildfire Code CQ4W Del Project Title Adaven Fire (CQ3W) Del Major project agency State: Reason for Project Bureau of Land Manaç Nevada Fire Project start Project finish Office Calendar year calendar year Office 2006 2009 Complex Name Click to Select/Edit Ground Seeding, Livestock Closure, Monitoring Click to Select/Edit Perremial Establishment, Significantly (p=0.05) higher Click to Select/Edit Deremial Establishment, Significantly (p=0.05) higher Click to Select/Edit Deremial Establishment, Significantly (p=0.05) higher	Wildfire name Adaven Wildfire code Fire IDs CQ4W Wildfire Complex Name Wildfire cause Under Investigation Wildfire containment date Month Day Year 0 0	Enter only major updates made after the project was created Notes Delete Record User Entered

General Project Information

Project Descriptions	Project Concerns	Project Grazing Information	Links to other databases	Total cost
Soil description	Project concerns	Grazing restricted?	Alternative Database ID Field Name ID Value RIPS Del	\$126,951.25 Data interpretation alerts
	Click to Select Concerns native annuals. Novious Weeds	Years/seasons restricted?		
		Livestock present		
Pre-project veg/habitat description	Reasons for treating (description)	during restriction?	Land Type Acres	Data entry notes
The Adaven fire occurred in a mix of Pinuon-juniper woodlands and	1) Invasion of non-native annual grasses,	Criteria to resume grazing?	Allotment 557.6 Del	documents. See source data folder
sagebrush shrubland dominated communities.	2) Noxious weeds within one mile of burn; scotch thistle and whitetop potentially spread through OHV use in the area 3) Mule deer and same grouse habitat	The burned area will be closed to grazing until monitoring data indicates that vegetation recovery	Allotment 441.2 Name USFS	tor other documents not hyperlinked.

Update Treatment Grazing **Related/Overlapping Projects** Counts **Related Overlapping** Number of Projects Related and/or Overlapping Project Start Year Project Project Notes 4,407 • Update Related Go to Related Delete Project Notes Project Relationship Number of Treatments 16,108

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Land Treatment Digital Library Treatments can be queried and summarized

					Decade				
Treatment Name	1940s	1950s	1960s	1970s	1980s	1990s	2000s	2010s	Total
Aerial Seeding	0	20	77	56	123	482	910	0	1668
Drill Seeding	24	157	364	186	338	463	457	1	1990
Ground Seeding	10	71	48	56	87	168	237	2	679
Seeded	6	40	86	31	42	34	57	0	296
Seedling Planting	0	0	4	11	17	56	124	0	212
Prescribed Burn	1	30	15	16	152	330	421	13	978
Timber Harvest	0	10	50	14	48	63	49	0	234
Thinning/Cutting	4	14	22	44	44	82	438	4	652
Herbicide Application	4	43	182	33	35	162	211	0	670
Fence	11	91	131	66	229	594	845	5	1972
Livestock Closure	2	66	87	72	177	298	390	5	1097
Total	62	542	1066	585	1292	2732	4139	30	10448



Act 2. Evaluating Historic Seeding Treatments A cursory assessment...







4,800 Seeding Treatments



















4,800 Seeding Treatments



650 Seeding Treatments with ✓ Implement Record ✓ Confirm Seed List ✓ Success Reported





What is "Successful"?

"Monitoring indicated that there were 6 perennial plants per sq m as of June of 2007. Crested wheatgrass was the primary grass found in the monitoring plots, but bottlebrush squirreltail, prairie junegrass and Sandbergs bluegrass were also common in the plots. Bladderpod, astragalus and prairie lupine were the dominant forbs. Grass cover averaged 5% and perennial forb cover averaged 3%. Annual forb and cheatgrass cover was less than 1%, but this could be due to the dry winter and spring in 2007. Seedlings of grasses were common throughout the seeding. There were also a number of grass plants that survived the fire. New grass plants could easily be pulled from the soil surface. A second season of rest will help increase root biomass and resistance to being pulled out of the soil." From Craters C4XR Project



What is "Failure"?

"One monitoring plot was established in the drill seeding area." Qualitative observations showed poor to fair germination of the drill seeded species. Spring moisture was below normal levels. Extended drought conditions over the summer may have an effect on survival of germinated species. Overall, the density of seeded grass plants was still below established quantitative objectives. There were no seeded forbs documented in the plots. Annual exotic vegetation continues to dominate the area. A minimal amount of the seeded grass species (crested wheatgrass) were found in the plot. Based on the extreme cover of annual exotic vegetation on the plot and very low density of seeded species the seeding will be considered a failure."

Reunion_Burned_Area_Rehabilitation_C4MR_2006 Project



Success of Seeding Treatments





Species Seeded in 'Successful' Treatments

Rank	Species	Common	# times in Top Ten	Ave Rate Ibs/acre
1	Artemisia sp.	Sagebrush sp.	107	0.8
2	Agropyron desertorum	Crested Wheatgrass	84	3.7
3	Poa secunda	Sandbergs Bluegrass	83	0.8
4	Elymus wawawaiensis	Snake River Wheatgrass	54	2.6
5	Pseudoroegneria spicata	Bluebunch Wheatgrass	54	3
6	Achillea millefolium	Western Yarrow	50	3
7	Agropyron fragile	Siberian Wheatgrass	42	2
8	Medicago sativae	Alfalfa	42	0.7
9	Leymus cinereus	Great Basin Wildrye	39	2.7
10	Achnatherum hymenoides	Indian Ricegrass	34	1.8



Species Seeded in 'Failure' Treatments

Rank	Species	Common	# times in Top Ten	Ave Rate Ibs/acre
1	Artemisia Sp.	Sagebrush Sp.	52	0.9
2	Agropyron desertorum	Crested Wheatgrass	49	4.2
3	Agropyron fragile	Siberian Wheatgrass	29	2.4
4	Elymus lanceolatus	Thickspike Wheatgrass	23	1.4
5	Atriplex canescens	Fourwing Saltbush	21	1.1
6	Psathyrostachys junceus	Russian Wildrye	20	1.2
7	Achnatherum hymenoides	Indian Ricegrass	18	1.5
8	Linum perenne	Blue Flax	18	0.9
9	Medicago sativa	Alfalfa	18	0.8
10	Elymus wawawaiensis	Snake River Wheatgrasss	15	2.5



Differences in Seeding Rates Success vs Failure

		Success PLS	Failure PLS	
Species	Common	lbs/ac	lbs/ac	Diff
Artemisia sp.	Sagebrush sp	0.28	0.44	-0.16
Agropyron desertorum	Crested Wheatgrass	1.27	1.4	-0.13
Elymus wawawaiensis	Snake River Wheatgrass	2	2.1	-0.1
Agropyron fragile	Siberian Wheatgrass	1.6	1.4	0.2
Medicago sativae	Alfalfa	0.5	0.5	0
Achnatherum hymenoides	Indian Ricegrass	1.5	0.6	0.9



Factors Influencing Success Elevation





Factors Influencing Success Temperature





Factors Influencing Success Precipitation





Factors Influencing Success Soils





Act 3. A Brief Demonstration of Potential Applications

Assisting Managers and Researchers...

- Examples of LTDL Data Calls
 - All land treatments in sage-grouse habitats
 - Wildfire aerial seedings in Boise, Twin, and Elko BLM District Offices
 - Northern Great Basin crested wheatgrass seedings
 - Herbicide sprayings in southern Idaho



A Demonstration

Fire Rehabilitation Effectiveness:

A Chronosequence Approach for the Great Basin

David Pyke, David Pilliod, Jeanne Chambers, Matthew Brooks, & James Grace

major species groups.

Goal: Determine if ES&R projects:

- increase perennial plant cover
- improve community composition
- decrease invasive annual plants

result desirable fuel structure



Figure 2. Structural Equation Model showing effects of major factors presumed to be controlling

...relative to no treatment following fires.



Mining the LTDL for Land Treatments



Seeding Mixture & Monitoring Status



Limiting Scope, Maximizing Inference

- 1. Major Land Resource Areas (MLRAs)
- 2. Precipitation Zones

 <8 inch
 8-12 inch
 >12 inch

 3. Soils Silty Loam
 4. Seeding Type

 Aerial & Drill
 Time Since Seeding





For more information: http://greatbasin.wr.usgs.gov/ltdl/Default.aspx

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