Range Seeding Committee organized in 1946 to develop equipment and technologies to address land degradation issues in the Western US

Past to Present:
Range Seeding Committee evolved to “Vegetative Rehabilitation & Equipment Workshop” to RTEC today
Development of the Rangeland Drill

First rangeland drill constructed by the Forest Service in Oregon in 1951.

Range Seeding Committee designed and Laird Welding and Manufacturing sold the first the drill in 1955.
Rangeland Technology & Equipment Council

“Promote the wise use and improvement of rangelands through the supporting functions of equipment development and application of innovative technology” focusing on:

1. Site Preparation and Seeding
2. Plant Materials
3. Fire
4. Seedbed Ecology
5. Weed Management
6. Structures
7. Information and Publications

http://rtec.rangelands.org/index.htm
Recently Equipment Development

Rangeland Drill Improvements
Revegetation Equipment Catalog

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Produced in cooperation with:
Rangeland Technology & Equipment Council
USDA Forest Service
USDI Bureau of Land Management

On the web at “http://Reveg-catalog.tamu.edu”
“RTEC Business Meeting” Follows
Help Plan the 2013 Workshop
Aerial Seeding **Wyoming** Big Sagebrush in the Northern Great Basin

Mike Pellant, Great Basin Restoration Initiative Coordinator, BLM, Nevada State Office (Boise) & Don Major, Fire/Landscape Ecologist, BLM, Boise State Office

Input provided by Cindy Fritz, Boise District BLM and Tom Warren, Elko District BLM.
Focus Areas for Study

- Lower elevation, precip. & snow
- Higher elevation, precip. & snow
Study Approach

- Post fire rehab seeding (3 yr.) monitoring data - USGS Land Treatment Digital Library.

- Research/Studies

- Long-term landscape assessments—Low level, high resolution aerial photography
Site Level Monitoring--Issues

- Monitoring for 3 yrs. post seeding is inadequate for sagebrush.
- High level of landscape heterogeneity—problems with adequate sampling.
- Difficult to ramp-up project data for landscape interpretations.
Elko District Monitoring
2006-07 Projects

• 2006—8 fires aerially seeded with WY Artr with minimal (no) success.
  • Susie and Gopher Fires???

• 2007-15 fires aerially seeded with WY Artr; only three seedings had sagebrush (average 430 shrubs/ac).
2007 Gopher Fire

July 2011

2007 Susie Creek Fire

October 2011
Inconsistent documentation of seeding conditions, sagebrush PLS, and seed source
Sagebrush Subspecies

12 of 35 projects with sagebrush sampled

- Four projects had only Wyoming big sagebrush.
- Eight projects had Mountain and/or Basin big sagebrush plants mixed with Wyoming big sagebrush.

Idaho BLM
Technical Bulletin
2004-1
Research/Studies

• **Research**—Minimal on aerial seeding Wyoming big sagebrush. One exception: BSU MS thesis (Dalzell 2004).

• **Case studies (project specific)**—Difficult to extrapolate results---different weather conditions, soils, level of competition, etc.
Evaluation of 35 WY Big Sagebrush Aerial Seeding Projects in Snake River Plain

- **Control** - Average density of 38 shrubs/acre (27 projects—no sagebrush)

- **Seeded** - Average density of 215 shrubs/acre (23 projects—no Artr)

- Nearby unburned sagebrush stands had an average density of 5,074 shrubs/acre
Persistence of 35 WY Big Sagebrush Aerial Seeding Projects in Snake River Plain

- 15 projects (43%) burned since project seeded.
- Of these 15 projects, five reburned after first fire.
- Success is measured by sagebrush seeding establishment (short-term) and long-term persistence.
South-Central Idaho Wy Big Sagebrush Case Study

Summer 1994 wildfire, seeded in the fall of 1994

Spring 1995

Loamy 8-10" PZ (Wyo. Big sagebrush/Thurbers needlegrass) ecological site

Pre-fire Situation
## Seed Mixture

<table>
<thead>
<tr>
<th>Species</th>
<th>Application</th>
<th>Seeding Rate (#'s/ac bulk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crested Wheatgrass</td>
<td>Drill</td>
<td>4.5</td>
</tr>
<tr>
<td>Russian Wildrye</td>
<td>Drill</td>
<td>1.5</td>
</tr>
<tr>
<td>Fourwing Saltbush</td>
<td>Drill</td>
<td>1.0</td>
</tr>
<tr>
<td>WY Big Sagebrush</td>
<td>Aerial</td>
<td>2.0</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>Aerial</td>
<td>3.0</td>
</tr>
<tr>
<td>Yellow Sweetclover</td>
<td>Aerial</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>12.5</strong></td>
</tr>
</tbody>
</table>

83 seeds/ ft²
Seeded to Crested WG’s @6 lbs/ac.

Green STP2 Rehab - June 2000 (6 years post-fire)

Both areas were aerial seeded with sagebrush at two pound/acre (bulk)

Not seeded to Crested WG-native grass recovery
Long-term landscape assessments—Low level, high resolution aerial photography

1 m² Resolution Imagery

Google Earth

National Agriculture Imagery Program

Farm Service Agency

NAIP
Integrating Ground & Aerial Photography

1993 Greenstrip and seeding

1989 Greenstrip

Crater Rings

Crater II project

1987 Sagebrush Seeding
1987 Crater II Fire Rehabilitation Seeding

1991
1987 Crater II Fire
Rehabilitation Seeding

Strip 1

Strip 2

2011

1994

2011
1987 Crater II Fire Rehabilitation Seeding
Long Term Ground-Based Monitoring Issues

1987 Crater II Fire Rehabilitation Seeding
Long-Term Sagebrush Seeding Success

1987 Sagebrush Seeding

1989 Greenstrip

1993 Greenstrip and seeding

Crater Rings
Crater II project

1987 Sagebrush Seeding
1993 Fire Resistant Seeding

October 2008 - Fire Resistant Seeding

Forage kochia

October 2008 Adjacent Cheatgrass Area
Long-Term Sagebrush Seeding Success—Keep Fire Out!

Fire Regime prior to 1988, before treatments.

Fire regime post-1988, after treatments.
Pre-Initial Point

1992

1995 Fire
Minimal evidence of sagebrush expansion from existing stands
Prioritize Sagebrush Stands Where Recruiting is Occurring for Protection & Suppression
Object-Based Image Analysis

Jornada Experimental Range

Owyhee Mountains, Idaho
Findings

• Success of aerial seedings varies greatly.

• Aerial seeded WY big sagebrush appears to establish better in the higher elevation, more mesic landscapes in the Northern Great Basin.

• Long-term landscape monitoring is crucial to truly monitor sagebrush establishment & spread.

• Prioritize recruiting sagebrush stands for protection over non-recruiting stands.
Conclusions/Recommendations

- Improve/increase post-seeding (3-5-10 yr) monitoring using standardized USGS ES&R protocol with data input into the USGS Land Treatment Digital Library.

- Increase research/studies to determine causitative factors for sagebrush establishment, persistence, and spread.
Conclusions/Recommendations

- Initiate long-term, landscape-scale monitoring of aerially seeded sagebrush and its expansion or contraction.

- Use high resolution aerial photography or satellite imagery (for example SPOT, Quickbird, etc.

- Apply findings to future WY sagebrush seeding projects---share findings.
Almost the End...

Ground-based Wyoming sagebrush can provide more consistent results.....

Jarbidge Sagebrush Seeder
New Technology

Minimum till drill

Globe mallow

Native Shrub/Forb Rows

Native Grass Rows

Yarrow

Penstemon

Sagebrush