Pipeline Rights of Way Revegetation In The Eagle Ford Shale Oil and Gas Play

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A geologic Formation roughly 400 miles long by 50 miles wide that stretches from east Texas across south Texas and into Mexico.

From 2010-2013, more than 1,600 miles of new pipeline rights of way were added in the state of Texas.
Pipeline areas of concern

- Location
- Soil Mixing
- Revegetation
- Minimize unwanted plant species
Problems that come with Oil and Gas production
GOALS

- To objectively compare three seeding techniques for the reclamation of pipeline rights of ways (ROWs) using available ecotypic native seeds
- Compare the planting methods on three ecological sites
- Inform landowners and oil and gas operators of the results

TIMELINE

- Pipeline installation completed winter of 2011
- Sprayed with 2,4-D Amine and Glyphosate prior to planting
- Planted February 27th 2012
Broadcast Seeding

PROS

- One of the most common methods of seeding
- Cost $10-$30 per acre
- Fast
- Most contractors already have the equipment
- Can be done over rough terrain

CONS

- Difficult to calibrate seeding rate
- Must be followed by cultipacker to ensure good seed to soil contact
- Uneven distribution of seed due to size and weight differences
- Seed often distributed outside of planting area
Native Seed Drill

**PROS**
- Drill is equipped with multiple boxes to handle different sized seeds
- Easy to calibrate to desired planting rate
- Disk openers ensure seed is planted at correct dept and packing wheels ensure good seed to soil contact
- Cost $60-$135 per acre

**CONS**
- More expensive
- Some contractors don’t have the correct equipment
- Cannot be used on rough terrain
Hydro Seeder

**PROS**
- Can be used on steep slopes and areas conventional planter can not be used
- Utilizes a mulch layer which aids in moisture retention and limits erosion
- Can lead to faster and more consistent emergence

**CONS**
- Logistics of having water and mulch available in close proximity to planting site
- Difficulty of accurate calibration
- Cost $550+ per acre
Results

- Three months after seeding all planting methods resulted in over 60% basal coverage, and increased to over 70% within the first year.
- All methods achieved densities at least 2.5 times the NRCS Range planting standard minimum rating for a successful stand.
Results

- **Seeded Species**
- **Bare Ground**
- **Volunteer Species**
- **Non Natives Species**

Percent basal cover:
- **Drill**
- **Broadcast**
- **Hydroseed**
### GOALS
- Compare two native seed mixes on two ecological sites
- Compare two planting methods
- Inform landowners and oil and gas operators of the results

### TIMELINE
- Pipeline was completed in the winter of 2012
- Sprayed the pipeline with a mixture of 2, 4-D Amine and Glyphosate before planting
- Planted on March 6th
## Seed Mixes

<table>
<thead>
<tr>
<th>HIGH DIVERSITY MIX</th>
<th>GRASS ONLY MIX</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 native grass species comprising 50% of the seed mix</td>
<td>10 native grass species mix</td>
</tr>
<tr>
<td>14 Native forb species comprising 50% of the mix</td>
<td></td>
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</tbody>
</table>
Seeding methods

NATIVE SEED DRILL

NATIVE SEED TRILLION
Three months post seeding all methods and mixes achieved successful NRCS planting standards.

- We found no significant difference between planting method.
- We found no difference in density of seeded species between the two mixes.
- There was a significant difference in the number of seeded species that established between the mixes, the High diversity mix averaged 10 seeded species per plot and the grass only mix averaged only 6 seeded species per plot.
Results

![Bar chart showing seeded species per sq ft by sampling date and treatment (GOM and HDM). The bars for fall 14 show the highest seeded species count, with spring 13 and fall 13 having similar counts. The error bars indicate variability.]

- Spring 13: GOM and HDM have similar seeded species counts.
- Fall 13: GOM and HDM seeded species counts are similar, slightly higher than spring 13.
- Spring 14: HDM shows a significantly higher seeded species count compared to GOM.
- Fall 14: GOM and HDM seeded species counts are similar to fall 13.

The chart indicates that the seeded species count varies by sampling date and treatment type.