

# **SURFACE MINE RECLAMATION, NORTHERN NEW MEXICO: FIRST YEAR RESPONSE OF FALL AND SPRING SEEDING.<sup>1</sup>**

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**Extended Abstract.** In Northern New Mexico, surface mine reclamation programs are normally scheduled for either a spring (April – May) or fall (September – October) seeding. In fall 2004, approximately 300 acres were scheduled to be seeded with a mixture of grasses, forbs and shrubs. A total of 130 acres were seeded in October and November 2004. The delays were largely due to weather and with similar problems; only 12 acres were seeded in April 2005. The remaining acres were fall seeded in 2005. The purpose of this paper is to document and compare the establishment of seedlings fall 2004, and spring 2005. The amount of data collected for this evaluation is limiting. Therefore, the conclusions are based, in part, on these observations and observations made over the past 10 years at the mine. In general, a fall seeding, when associated with near normal climatic conditions, is the best time for the establishment of grasses, forbs and shrubs.

The mine area is 18 miles north of Farmington, New Mexico at an elevation of 6200 feet in a 12-inch precipitation zone. The precipitation patterns are extremely variable from season to season and from year to year. These patterns make it difficult for consistent successful reclamation and as a result “failure” is well known to the reclamation programs. The mine spoils are generally not limiting and typically a 12-inch layer of suitable cover soil is applied. Therefore, the most limiting factor to reclamation is associated with the pre- and post-seeding weather conditions.

The 2004 fall seeding was conducted during the months of October and November and terminated when soil freezing prohibited further seeding. The spring seeding was conducted during April 2005 and was terminated because of excessively wet soil conditions largely due to spring snowstorms. The evaluation of the two seeding programs was completed over a few days in September 2005. Total vegetation cover and shrub density was measured along ten randomly located transects in each of the fall seeded and spring seeded areas. Cover, by life

**Additional Key Words:** Seeding establishment, plant cover, shrub density

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form, was measured using the point intercept method along a 30 m transect (a total of 60 points/transect), shrub density was measured using a 2 by 30 m belt transect and reported, by species as shrubs, per hectare.

Perennial cover (grasses and forbs) was nearly 20 times greater in the fall seeded area (30%) than the spring seeded area (1.7%), Table 1. With similar magnitude, four-wing saltbush density was higher (9467 shrubs per ha) in fall-seeded area than the spring-seeded area (650 shrubs per ha), Table 2.

The results of this study and results of other similar projects at this mine support the recommendation to schedule fall seeding when possible. In fact, seeding through November or until prohibited by frozen soil is also recommended.

The success of the fall seeding, in contrast to spring seeding, is most likely associated with the early spring germination of seedlings in the months of February and March. These early-germinated seedlings can become established nearly two months before the April seeded counterparts. These fall-seeded seedlings are able to establish deeper root systems that better sustain them during the summer months than the spring-seeded seedlings. Regardless of the reason, fall seeding has consistently been more successful than spring seeding at the mines.

Table 1. Perennial Plant Cover, Fall and Spring Seeded Area, New Mexico.

Seeded	Perennial Plant Cover, %		
	$\bar{x}$	SD	N
Fall	30.0	7.3	10
Spring	1.7	1.4	10

Table 2. Shrub Density, Fall and Spring Seeded Area, New Mexico.

Seeded	Shrub Density, #/Hectare				
	Four wing	Winter fat	Big sage	Fringe sage	Total
Fall	9467	683	850	1817	12,817
Spring	650	0.0	0.0	0.0	650