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## South Texas Natives eNews

News from the South Texas Natives Program at the Caesar Kleberg Wildlife Research Institute

### South Texas Natives Rangeland plantings: Observations from 5 years and counting

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In 2008 South Texas Natives (STN) began experimenting with the best methods to restore native plants on South Texas rangelands using locally adapted native seeds. In that initial year, we made 7 plantings on 7 soil types in 6 different counties across the region. Since these first plantings, STN has made an additional 40 plantings. Each of these plantings is different in some way- whether it be a new soil type, a new seedbed preparation treatment, or need for a different seed mix. What we have learned is that there are no two restoration sites exactly alike, ever! However, two commonalities in all plantings were that we used locally adapted native seeds, and that after planting all sites were left alone with no supplemental watering, and little purposeful management.

As is typical of South Texas, rainfall over the last 5 years has been anything but consistent, with a handful of wet years, and overall prolonged and extreme drought. On all our plantings, data has been collected bi-annually each June and September. During each data collection period, measurements were taken on the number of plants per square foot and step point transects were used to quantify percent ground cover. For the purpose of evaluating the plantings we were most interested in the number of seeded species that established per square foot, and in the relative amount of cover provided by seeded, volunteer, and non-native species.



Based on 5 years of data collected on nearly 50 different restoration plantings in South Texas, there are a few important findings we are able to report. The most important and many times forgotten factor in vegetation response is rainfall. Even though we are planting native species, they still need rain to establish and grow. Planting at the wrong time of the year, when we historically do not get rain, is a recipe for

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failure in the early stages. When looking at success rates relative to planting date, we are confident in recommending that plantings made from late August-early October have the best chance of quick success. So why is September the best month to plant? Ask any old timer how many times they can remember a dove season opener where it did not rain. This period is simply the most reliable period for rainfall, which translates to reseeding success.

Second, we have learned that successful restoration is a process. We have documented few examples of native restoration plantings being successful when seed is casually planted after minimal seedbed preparation such as a single application of discing just before planting. Our most successful rangeland seedings resulted when land preparation started well in advance of planting. This is due to two major factors. The first is that discing alone typically results in poor seedbeds, leaving large amounts of residual plant material standing, or seedbeds that are too fluffy. Loose seedbeds hold moisture poorly and are not conducive to creating good seed to soil contact that is required for seed germination.

#### **Examples of poor seedbeds prepared by discing only.**

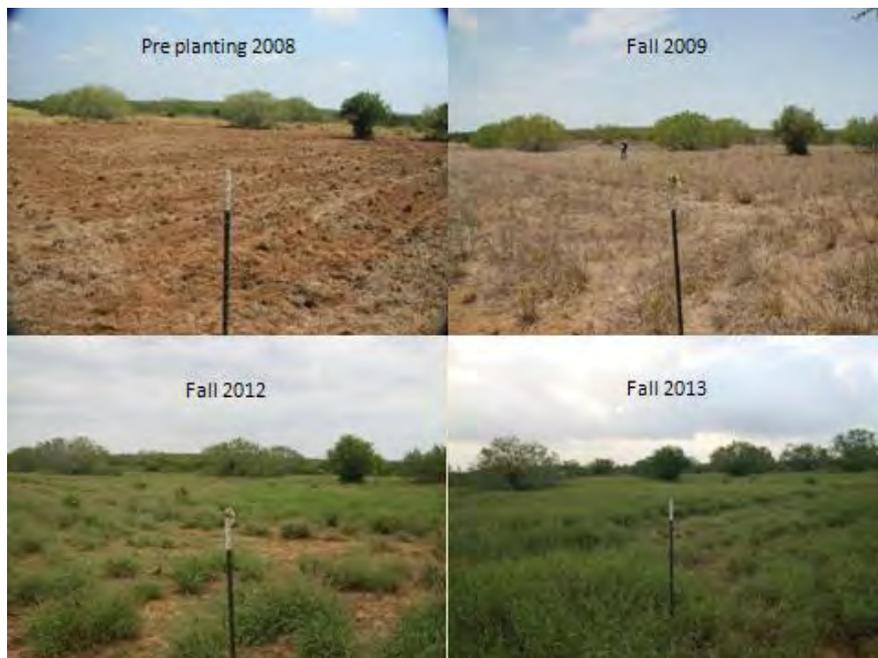


#### **Examples of good seedbeds prepared by repeated seedbed preparation treatments over several months.**



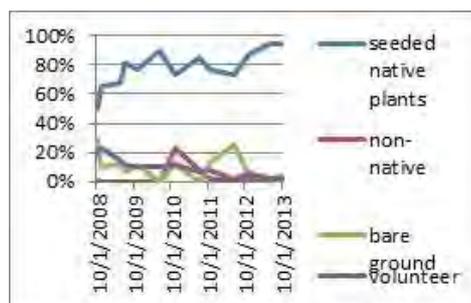
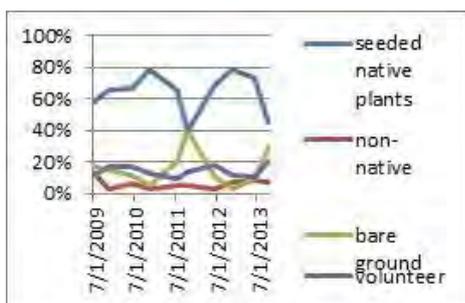
The next major factor that needs to be taken into consideration when planning a native rangeland seedings is the presence of non-native grasses. Our most successful seedings in areas previously dominated by non-native species have followed multiple cycles of discing or herbicide applications. Repeated site preparation treatments reduce the seedbank of non-native grasses, thereby reducing the amount of competition following seeding. This is a process that can take a year or two to adequately do.

#### **Example of poor seedbed preparation (one pass discing) leading to early and continued dominance by the non-native grass buffelgrass.**

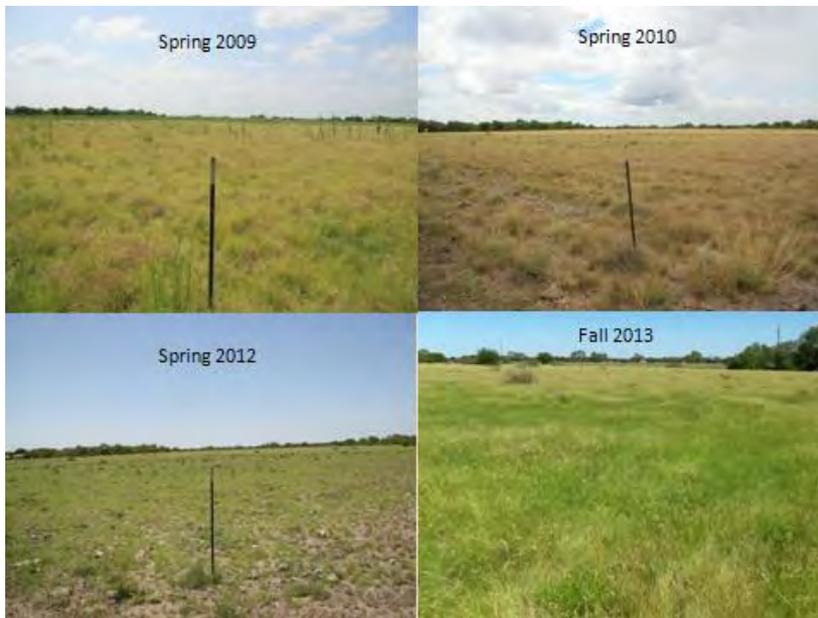


We have also learned that you have to plant the right native species for each specific planting site and soils. Not all natives are native everywhere and not all native plants are well adapted for quick establishment or persistence necessary to make a seeding successful. It does not matter if you get rain and you do all the land preparation correct if you do not plant native species adapted to your particular planting site. Another important factor we have learned when it comes to species selection, is fast establishment of early successional native plants is critical to later success. In nearly all of our seedings, the relationship between the density of seeded species and the other plants (weeds or exotic grasses) has remained relatively constant from the first sampling date (a few weeks or a month after emergence) through at least 5 years after planting. Different native species may be present over time, but the relative amounts of seeded natives, non-natives, and volunteer plants often changed little. The surprising take-home message is if you have good seeded species cover within 30 days after favorable germination conditions, our results suggests you will probably maintain good seeded species cover for the foreseeable future. So what does that mean for species selection? Make sure that a large percentage of your native seed mixes are early successional species. These species are adapted to the quick establishment that is generally required for a planting to be successful both short-term and long-term.

**Percent basal cover of 2 rangeland plantings dominated by seeded native species in early sampling periods and remaining stable over 4-5 years. Temporary effects of severe drought can be clearly seen in the left figure.**



**Excellent early and continued cover by seeded species despite wet and drought cycles**



Finally, we have learned not to expect the same results in any two plantings. Even after conducting almost 50 plantings no two plantings have ever turned out the same from a vegetation standpoint. That's not saying that if you have success one year and you do everything right the second you are not going to be successful again, but more than likely you will have different native plant species expressing themselves in each planting. Minor differences in the timing or amounts of rainfall before and after planting make huge differences in the resulting vegetation. Also, minor soil differences that are common across South Texas can create dramatic differences in results. This inherent variability in conditions is best overcome by planting diverse native seed mixes. While we cannot predict which exact native species will do best in given conditions, we can reasonably predict 8-10 native species that will do well on most sites over the broad range of conditions we have in the region.

After 5 years of monitoring trial plantings in South Texas we are still figuring out the details of native rangeland restoration. Up to now we have learned a number of important commonalities of success: 1) Plan to plant from late August - early October, 2) Prepare a good seedbed well in advance of planting, 3) If exotic grasses are present, be prepared to conduct repeated control applications in the year preceding planting, and 4) Select and plant seed mixes of adapted native plants for your specific planting sites, including a large percentage of early successional native species.



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