South Texas Natives

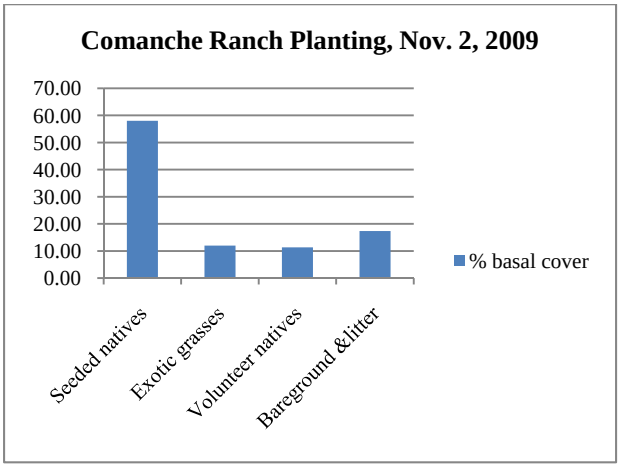
Rangeland Demonstration Planting Project
Progress Report
July-December 2009

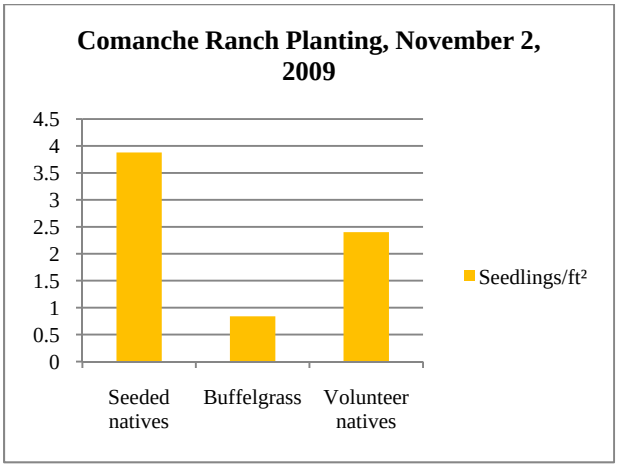
NEWS

→ In August, we planted the 8th project site at the **Comanche Ranch** in Maverick County on a silty clay loam soil. Rainfall at the site post-planting was excellent, and Figure 1 below shows the results just 65 days after seeding. Corresponding data for plant community composition on November 2 are given in Figure 2.

Figure 1. Comanche Ranch Demonstration Planting, August 27 (l) and November 2 (r), 2009.

Figure 2. Percent basal cover (l) and seedling density (r) at Comanche Ranch, Nov. 2, 2009.





The early results of this planting are very encouraging. We were surprised by the slow response of native vegetation from the seedbank at this site. This location is one that many people would recommend not seeding, expecting a response from the native seedbank. However, our data indicates not only a low response of native plants from the seedbank, but poor

composition in terms of potential competitiveness with the buffelgrass at this site. Of the 12 volunteer natives identified in our sampling, 8 were annuals, and will provide little long-term competition with buffelgrass. Our past research and many observations in south Texas tell us that buffelgrass will reinvade and dominate sites such as this without some other management intervention following disturbance. By seeding, native plant cover has been increased 5x and native plant density by >3.5 plants/ft². Of those 3.5 seedlings per square foot, 85% were perrenial native grasses. Compare this to the volunteer plant group, where only 10% of the seedlings that naturally reestablished on the site were perrenial native grasses, and of those, all were Halls panicum, a very weak perrenial at best.

Our ideas of areas that could benefit from reseeding are still being formed, but data such as these illustrates the value of this project and of future investigations of seedbank ecology in south Texas. A standardized technique to estimate seed bank existence and composition would greatly benefit restorationist. Researchers in Mexico are currently working on the development of one such technique, and we hope to test their methods at some point in the future. Until then, past land use history and observations may be the best guide to answering the question of "do I need to reseed"? A history of overgrazing, farming, soil profile mixing, or long-term dominance of the site by exotic grasses increases the likelihood of the answer being yes! Observing disturbed sites from several years prior on similar soils will also give you a good indication of what can be expected without seeding.

→ In November, we planted the 9th project location at **Rio Farms** in Wilacy County. This planting is located on land previously enrolled in the Conservation Reserve Program (CRP) on a fine sandy loam soil. As many of you know, CRP in south Texas had traditionally been planted with exotic grasses, resulting in poor quality wildlife habitat. Over the next 3 years, 1.3 million acres of CRP contracts will expire across Texas. Restoration of these lands to native habitat represents a unique opportunity to mitigate the loss of wildlife habitat occurring statewide because of urbanization. We hope this planting can help guide recommendations and serve as a demonstration of how to do just that. Rio Farms has been a tremendous supporter of STN, as their participation in yet another STN Project shows.

→ The planting at **Rancho Blanco** in winter 2008 and has shown fair establishment. Exotic grasses dominated this site by mid-summer 2009. Somewhat surprisingly though, by early November, exotic grass cover had declined slightly or stabilized, while cover of native species seeded the previous winter showed a sharp increase to 18%. A coinciding reduction in bare ground and volunteer natives was also documented. The existing seedbank at this site may be much like that at the Comanche Ranch site in that it is depleted of competitive plants that resist buffelgrass re-invasion. From a just-completed 3-yr project at Rancho Blanco we know that no single native grass species resists buffelgrass re-invasion for more than 2-3 years. We hope that the combination of several competitive plants used in the Demonstration Project seed mix will provide better results and help create wildlife-friendly habitat.

Figure 3. Demonstration planting at Rancho Blanco, Webb County, Texas, June (l) and November (r), 2009.

→ Annual rainfall and establishment of seeded native plants has been well below average at the **Womack Ranch** planting site. This planting is currently dominated by annual weeds. We've documented establishment of 5 seeded species so far. November sampling documented basal cover of 11% seeded plants at the site. Most notable were the tremendous numbers of deer pea vetch seedlings just emerging. This cool-season annual may contribute greatly to the winter and spring plant community here. Canopy cover at this sandy site is dominated by cowpen daisy, sand sunflower, and several perrenial native forbs. This location shows signs of having a tremendous existing seed bank. More than 20 native species were documented in the November sampling. Exotic grass abundance is low here also, with scattered Bermudagrass and Johnsongrass documented to date.

Figure 4. Womack Ranch Planting Site showing canopy of cowpen daisy and sand sunflower. Dense weed canopies may limit early emergence of native grasses, but have little effect on long-term plant composition on most restoration sites. In 2 past projects, sunflower cover has been observed to have benefitted native grass establishment. Many annual forbs serve as nurse plants for slow-to-establish perrenial grasses; they also provide or harbor food (bugs & seeds) for many wildlife species.

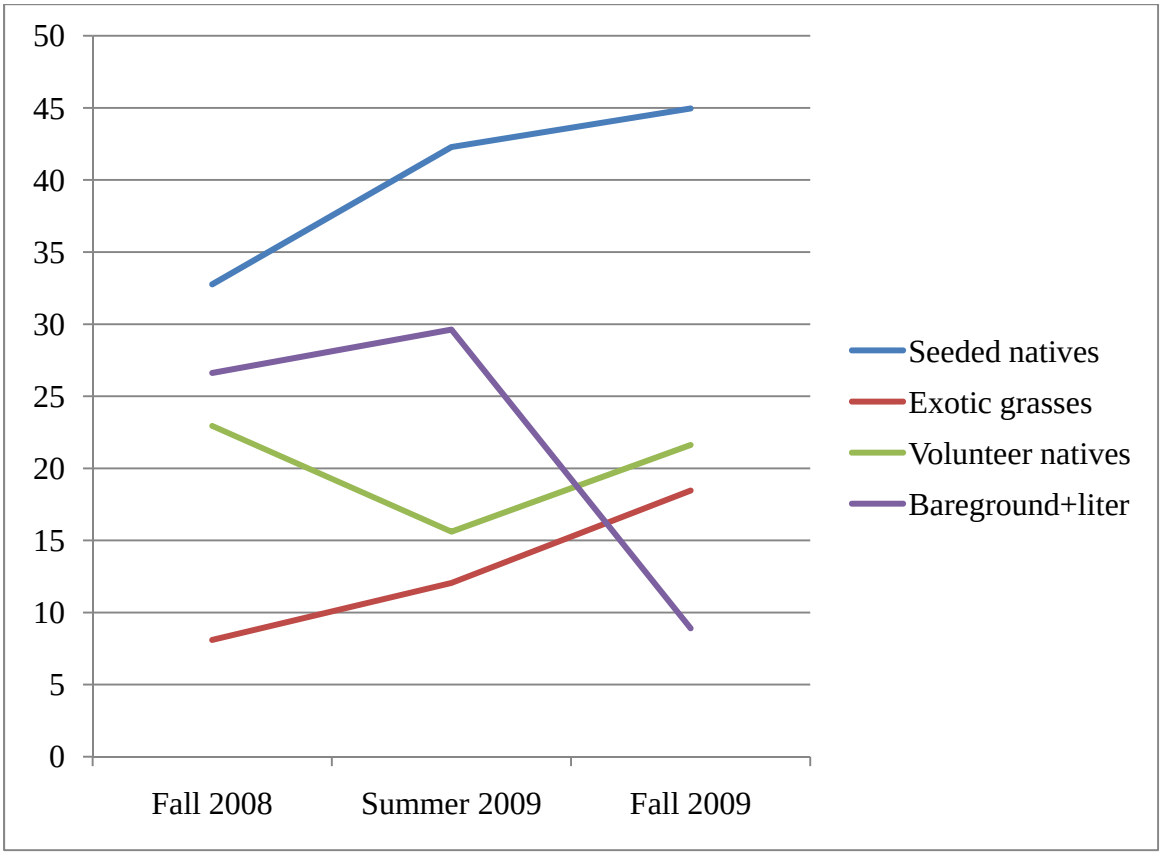
→ Late summer/Early Fall Plantings 2008

The 5 plantings established during August-September 2008 are extremely useful for identifying general trends occurring region-wide in restoration plantings. The similarity of planting dates and rainfall over the past year makes these plantings well-suited for comparisons. While soil types and exotic species are different at each site, the reality of south Texas is that habitat and soil diversity are common, and various soils and invasive grasses usually occur within the confines of a single ranch. By comparing a single seed mix and data collected from all 5 of these 2008 plantings, we can identify those seed releases that have broad adaptability, or those that may be limited in the scope of potential regional use. We can also begin to understand some of the interactions of native and exotic plants on south Texas restoration sites.

Overall trends 2008-2009

Averaged across 5 planting locations (**Temple, Cactus Jack, Las Cuatas, Tynan, Thompson**) seeded natives continued to increase since the summer 2009 sampling. Volunteer native plants also increased this sampling period, a function of the rains that fell this September. The majority of these plants were annual forbs, and their relative abundance is expected fluctuate based on rainfall. But, since most of the volunteer plants we've documented are annuals, as time since soil disturbance increases, we can expect a reduction in these plants.

Figure 5. Trends in basal cover of plant categories at 5 Demonstration Plantings initiated in late summer/fall 2008.



Although seeded native plants showed a continued increase, so did exotic grasses. Statistically, the difference in the degree of increase between seeded native plants and exotic grasses was not significantly different from summer-fall 2009. Rate of increase overall, and of native seeded and exotic cover from fall 2008 to fall 2009 is also statistically similar. There is a significant difference at all sampling dates in basal cover of both plant types, with mean native cover significantly higher than mean exotic cover across these 6 sites.

So what does all this mean? Seeding has provided a substantial amount of competitive plant cover on these sites. While we can generalize that basal cover of 45% has provided substantial resistance to immediate exotic grass encroachment, it is not great enough to completely suppress most exotic grasses from encroaching. If we look at the two most successful plantings to date, **Temple Ranch** and **Thompson Ranch**, native cover has stabilized at 65 and 75% respectively after one year; this is consistent with maximum basal ground cover on remnant native grasslands in south Texas. At these sites, the rate of increase of exotic grasses is substantially lower than elsewhere, even though one is surrounded by buffelgrass, and the other by old world bluestems and guinea grass.

Management Implications

Figure 6. Clipped plot to simulate grazing at Cactus Jack Ranch project site. Note the amount of basal native grass cover present beneath the buffelgrass canopy. Basal cover of native seeded plants at this sampling was 35%, however buffelgrass canopy cover was still >50%.

We think these results can be effectively used to devise management recommendations for restoration plantings in south Texas. Based on what we know, management efforts to

suppress exotic grasses may be very vital in plantings that do not obtain >65% native cover within the 6 month-1 year period after planting seed. One hypothesis going forward is that in plantings with native cover <65%, and exotic cover >10%, we will see an exponential increase in exotic grasses by this time next year. Native cover is still likely to increase, but plant composition will shift toward an exotic grass dominated community. When this happens, important wildlife habitat attributes such as bare ground and volunteer forbs will decline sharply.

To refine techniques to use when management is necessary, in 2010 we plan to implement several small plot studies within the Demonstration Plantings. These will consist of clipped plots to simulate cattle grazing (Figure 6), and herbicide trial plots. These pilot management treatments will be situated outside of transects used to collect other vegetation data, so that long-term results under a passive management style can still be collected.

→ Another important finding of this project is the importance of early successional plants to provide cover in the initial year of the planting. So far, across all plantings, despite comprising only 34% of the seed mix of warm season plants, early successional species comprise 87% of the warm-season seeded plant community! Mid-late successional plants comprised 47% of the mix and account for just 12% of the seeded vegetation on these plantings. Many of these plants, especially species with high seed dormancy such as bristlegrass, take 2-3 years on average to successfully establish. The time needed for establishment of late successional grasses in south Texas is another important reason early cover is needed. Our results clearly demonstrate that weedy, early successional natives meet this need well.

Figure 7. Ratio of seed mix composition: composition of seeded plant community of warm season plants based on Fall 2009 data collected at 8 Demonstration Planting sites.

Functional group	Species	% comp. of seed mix	% comp. of seeded community	Success ratio (values >1 indicate excellent performance)
Early-mid succesional	Dilley Germplasm slender grama	20.00	61.75	3.09
	Welder Germplasm shortspike windmillgrass	9.00	11.65	1.29
	Zapata Germplasm Rio Grande clammyweed	5.00	13.60	2.72
Mid-late successional	Catarina Blend Bristlegrass	13.00	4.40	0.34
	La Salle Germplasm Arizona cottontop	13.00	5.34	0.41
	Kinney Germplasm false rhodesgrass	10.00	0.01	0.00
	Goliad Germplasm Orange zexmenia	10.00	2.63	0.26
	Prairie acacia	1.00	0.01	0.01

Figure 8. Erosion control ability of slender grama (l) and shortspike windmillgrass (r) along a gully at the Temple Ranch. Rio Grande clammyweed is also pictured in the bottom right.

Figure 9. Fenceline photograph at Las Quatas Ranch on Dec. 8, 2009. Seeded plot (r), non- seeded disturbed area (c), and tanglehead/brush dominated community (l).

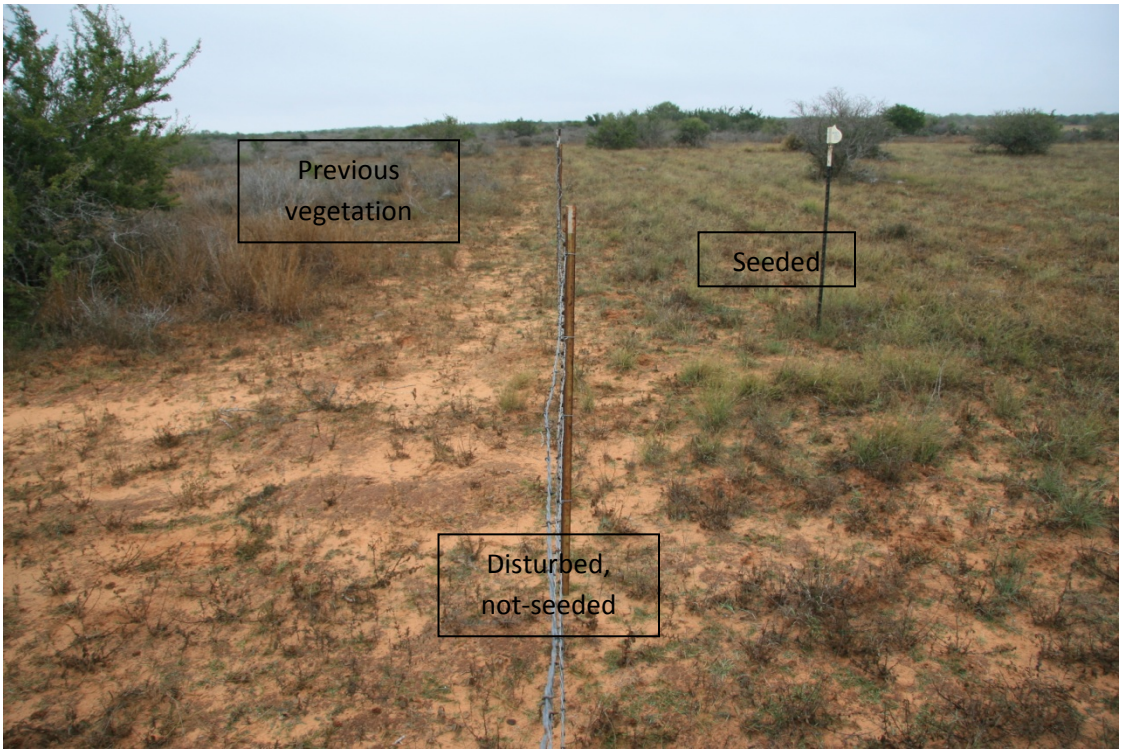


Figure 10. Thompson Ranch south of Kingsville. This photo shows 75% basal native plant cover and complete canopy closure <1 yr. after planting. Every species planted has successfully established at this site.

Figure 11. Tynan Ranch Planting, November 2009. Wild hogs and herbicide drift from neighboring crop fields have had a significant effect on the early establishment of this planting (the joys of restoration!!!). Despite this, native seeded cover of 10% was observed this sampling period.

→ One final observation from 2009 dealing with site preparation; the two most successful types pre-planting preparation:

I) Herbicide applications for 9-12 months prior to seeding to eliminate the exotic grass seedbank

II) Cropping of planting site prior to seeding for an extended amount of time

→ Thanks once again for your help with this important project! Look for the next project report in June/July 2010. As always, don't hesitate to call or write if we can help you in any way with your restoration efforts, or if you'd like more specific information about the planting at your ranch.

Wishing you a Merry Christmas and wonderful 2010,

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