



**GO NATIVE!**





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*We do not inherit the earth from our ancestors, we borrow it  
from our children ~ American Indian Proverb*

We get one chance to get it right.

When the dragline has walked away, when the bulldozers have re-shaped, when the soil is ready to receive its new companion growth...We have the chance to get it right. We have the chance ~ the obligation ~ to restore the land in a manner that will establish reclamation worthy of our children...and their children. This is the goal of the Sabine Mining Company.



**Northern Harrier Hawk hunting in reclamation**

The South Hallsville No. 1 Mine, operated by the Sabine Mining Company whose parent company is North American Coal, is located south of Hallsville, Texas, in the East Texas Pineywoods Region. The mining company employs approximately 284 persons full-time and over 40 contractors who assist with maintenance, reclamation and special projects. The mine has been in operation since 1984 and currently produces approximately 4 million tons of lignite per year from all operations. One 8200 Marion dragline is currently utilized in the South Hallsville mine for overburden removal. Additionally, as part of its soil handling plan, the mine utilizes a fleet of 150-ton end-dump trucks and an excavator to salvage oxidized soil material ahead of the dragline operations and relocate and distribute the material over regraded spoil. This operation creates the top four feet of reclamation soil/plant growth media.

Reclamation at the South Hallsville No. 1 Mine is comprised of various land uses as described in the approved permit, including forestry, pastureland, developed water resources, fish and wildlife habitat, and grazingland. These land uses are established in a manner that generally replicates the pre-mining environment, although pre-mining land uses included undeveloped lands and other uses that were not productively managed. Because the area within the mine is largely leased land, the selection of the post-mining land use is determined by preference of the land owners. Sabine Mining Company, in coordination with its lignite customer, work closely with land owners whose land has been leased for the purpose of lignite extraction to decide on the desired post-mining land use for each leased tract. Thousands of leases are held with private landowners whose land is within the South Hallsville No. 1 Mine. Ultimately, post-mining land uses include the predominate pre-mine land uses, yet with improved productivity and benefits that result from deliberate reclamation design.



**Typical Pre-Mine Undeveloped Land Use (mixed Pine and Hardwood)**

One land use that Sabine Mining Company (SMC) regularly employs is characterized similarly in both the pre-mining and post-mining state as “grazingland”; however, the manner in which that reclamation land use is designed and achieved by SMC produces benefits that far surpass the pre-mining condition. “Grazingland” can be defined as land that includes both grasslands and forestlands where the indigenous vegetation is actively managed for grazing, browsing, or occasional hay production. Land within the mine that was classified as grazingland pre-mining was described as having low to moderate management applied with sometimes poor results. Through its design and implementation of the “grazingland” post-mining land use, SMC has seized on its unique opportunity to create a lasting benefit to the environment.



**Newly planted reclamation**



The grazingland post-mining land use at the South Hallsville No. 1 Mine is distinctive in its exclusive use of native grasses that provide diversity of species, wildlife habitat enhancement as well as nutritional value for grazing livestock. SMC deliberately selects its seed mix based on these desired outcomes. Although the mix may vary depending on seed availability, the following describes a typical seed blend and benefits of each species.

Native Seed	Benefits
Big Bluestem ( <i>Andropogon gerardii</i> )	Dense, deep root system; wildlife cover; high quality forage, 16-18% protein content; drought tolerant; larval food for butterflies
Green Sprangletop ( <i>Leptochloa dubia</i> )	Nutritious forage grass
Switchgrass ( <i>Panicum virgatum</i> )	Wildlife cover; extensive root system; larval food source for butterflies
Sunflower ( <i>Helianthus annuus</i> )	Drought-resistant; nectar and seed food source; larval food source for butterflies
Maximilian Sunflower ( <i>Helianthus maximiliani</i> )	Seed and nectar food source
Cowpeas, “Iron & Clay”	Protein-rich forage legume; drought-tolerant; soil building; wildlife food source
Partridge Peas ( <i>Chamaechrista fasciculata</i> )	Wildlife food source; nitrogen-fixing roots; larval food for butterflies; flowering plants attract bees
Sideoats Grama ( <i>Boureloua curtipendula</i> )	Adaptable to varying soil conditions; high forage rate; wildlife cover and food source
Indiangrass ( <i>Sorghastrum nutans</i> )	Wildlife cover; drought resistant; larval food source for butterflies; nutritious forage grass
Illinois Bundleflower ( <i>Desmanthus illinoensis</i> )	Drought-tolerant; nutritious forage grass; soil building
Little Bluestem ( <i>Schizachyrium scoparium</i> )	Drought resistant; larval food source for butterflies; wildlife cover

While much of the East Texas agricultural use lands have turned to non-native species such as bermudagrass and improved bermudagrasses for forage, those non-native species represent a conundrum for agriculture in general as well as for options in reclamation. On the one hand, these grasses are used for the specific purpose of providing high yields, with heat and drought-resistant properties. Capable of withstanding the sometimes severe Texas climate, bermudagrasses are prized for their ability to stand up to intense grazing practices. However, the diversity that is offered by the use of native species supports and contributes to the overall health and balance of the ecosystem upon which life depends.

The native grasslands of Texas have been steadily disappearing since development in the State first began. With increasing populations and agricultural change, there came the conversion of land to row crops and pastures of non-native grasses. There are now more than 10 million acres of nonnative pastureland in Texas, with much of it planted to coastal bermudagrass for hay production and cattle grazing. However, bermudagrass and other non-native grasses are normally managed as monotypic (single species) stands of grass, so the plant diversity of the original ecosystem is lost.



**Indiangrass thriving in reclamation**

Through the use of native grass restoration, however, specific goals can be achieved including:

- 1) **IMPROVED WILDLIFE HABITAT** (e.g., bobwhite quail, grassland songbirds, butterflies);
- 2) **LIVESTOCK FORAGE** (native warm-season grasses provide high quality forage during summer and produce high-quality hay); and
- 3) **ECOSYSTEM RESTORATION.**

Additional benefits, although less apparent, are invaluable in reclamation soils:

- 1) **DEEP ROOT SYSTEM:** the deep root systems of native grasses hold soil in place, reducing erosion and decreasing runoff, which helps keep waterways healthy and recharges ground water;
- 2) **SOIL ENHANCEMENT:** when native grasses die, their roots decay and add significant amounts of organic matter throughout the soil, replenishing fertility. For reclamation soils that have a greater propensity for being sterile or void of nutrients, this quality is crucial.



As a forage resource, native warm-season grasses have several beneficial qualities. They require less supplemental water or fertilizer. Once established, they are drought tolerant and almost completely disease free because, like other native plants, they have co-evolved with the local climate, soils, and rainfall, and are well-suited to the growing conditions found locally. Average daily weight gains for cattle grazing native warm-

season grasses can be equal to or greater than gains reported for cattle grazing bermudagrass or bahiagrass. Their high productivity, combined with their high digestibility (70% or more) and high protein content (6 to 12%) make native grasses more compatible for operations striving to produce livestock forage AND good wildlife habitat simultaneously. This is important in East Texas where agriculture ~ and cattle ranching more specifically ~ are still vital to the regional economy.



Non-native grasses provide poor habitat for most wildlife and in fact, can be detrimental to most native wildlife species. Bermudagrass is a dense, matted grass that provides little cover or nesting habitat. Its growth structure eliminates bare ground, which birds such as quail and turkey need for feeding and moving easily through the landscape. Conversely, native grasses create a landscape of biodiversity that a monoculture of improved grasses does not. Today, significant losses have occurred in the acreage of tall grass and short grass prairie across North America. This loss has directly affected native wildlife so that many of those grass-dependent species are in decline. At Sabine Mine, reclamation represents and an opportunity to reverse some of the losses in native grasslands and thus in restoring wildlife habitat.



### Typical Native Grass Field

The use of native grasslands creates a vegetative stand that appeals to a variety of wildlife species, including grassland birds. Studies have indicated that the conversion of as little as 5 percent of hayfields to warm-season grasses can increase bird populations 10-fold. Native warm-season grasses provide more usable habitat for game birds, with its bunch grass open structure, providing bare ground between the plants and allowing chicks to move easily in search of food. They also offer excellent nesting areas while providing critical protective overhead cover. Areas established with grasses generally provide greater amounts of important food sources, such as seed, forbs, legumes and insects, attracting small mammals and larger game animals as well.





Bees have been the topic of great concern of late; detrimental impacts to the pollinators has readily discernable connections to mankind. Research shows a direct correlation between the decline of native grasslands habitats and the decline of many species of butterflies, bees and moths. Over 70 different butterflies and moths depend on native grasses as part of their life cycles. Grasses help balance the ecosystem by providing food, shelter, and nesting sites for many different pollinators along with birds and

mammals, as mentioned earlier. Pollinators need protection from severe weather and from predators, as well as sites for nesting and roosting. The diverse structure Sabine Mining creates using natives provides food and shelter for pollinator species. One example is the milkweed which thrives in areas established into native species; these plants are common at the mine and help sustain the life cycle of the declining monarch butterfly.

To be sure, it is not only the use of native grass species but the contiguous use of those species as well as its thoughtful deployment in concert with other land uses that is contributing to the SMC reclamation success story. Over 3400 contiguous acres of “grazingland” have been planted and are being managed at the South Hallsville No. 1 Mine. This is significant in that land fragmentation in conjunction with the loss of grassland habitat is often cited as the culprits in the decline of bird species. As an example, Bobwhite quail populations have been declining in the U.S. for several decades. Fewer acreage in grasses and increasing acreage in forestry and pastureland are believed to be the main cause. Bobwhite require bunches of vegetation that is less dense, and with bare ground for nesting and for chicks to access insects. They prefer to travel through their range on the ground and not through the air. And quail need at least 9 inches of protective cover, easily provided by the native grasses grazingland. It would be remiss not to quote a USDA article that notes that these populations are like the “canary in the coal mine,” serving as indicators of ecosystem health. “If bird populations are declining, it signals other environmental issues.”<sup>1</sup>



**Upland Sandpiper in native grass reclamation**

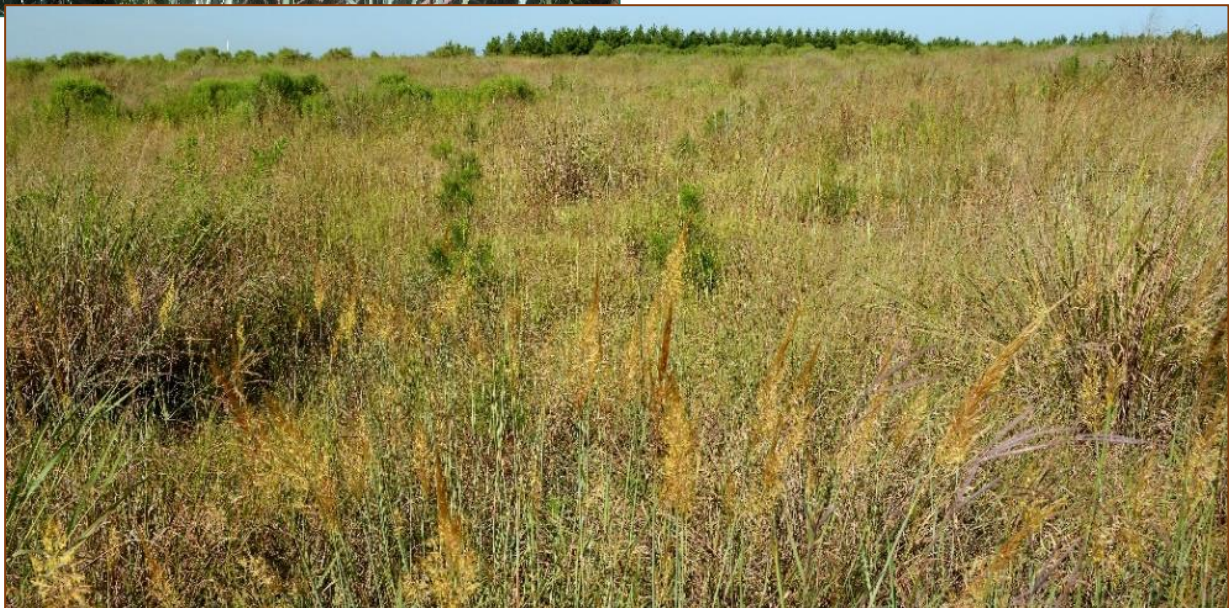
<sup>1</sup>Taylor, Ciji, “Native Plants Boost Conservation Benefits, Strengthen Wildlife Populations”, U.S. Department of Agriculture, Natural Resource Conservation Service.

However, the acres of contiguous “grazingland” land use far understates the total amount of native grass and contiguous habitat acreage being established in reclamation at the South Hallsville Mine. All of the post-mining “forestry” and “fish & wildlife” land use tracts are first planted with native grasses. Thus, in the first spring planting season after re-grading is complete, every disturbed tract



with the exception of improved “pastureland” and “industrial/commercial” land use tracts, is revegetated with native grass seed and forbs. Pine production is very common throughout East Texas, yet the establishment of a native grass understory is uncommon. This accomplishes the creation of wildlife habitat for the period prior to out-year tree growth and also in the understory once trees have matured. This builds an even more extensive connectivity of the habitat; it also produces a seed bank that can re-generate in future years, potentially after forestry harvest.

In combination with other features such as forestry, ponds and streams, SMC is utilizing the “grazingland” land use, and more specifically, native plant species, to supplement and enhance overall reclamation quality. Sabine Mine has worked with landowners and the general topographical landscape to create woody corridors to connect habitat areas when



feasible. This connectivity, sometimes along drainage-ways that may also provide access to water sources, provides passage for wildlife as well as protective cover. These and planted mottle features have been utilized with guidance from professional biologists and the Texas Parks and Wildlife, to provide even greater wildlife habitat enhancement. Other management tools employed include rotational mowing and light disking to encourage legumes and insects and deliberately expose portions of bare ground for bird use.



Reclamation has been ongoing at the South Hallsville No. 1 Mine since mining first began there in 1984. Mining regulations regarding reclamation outline clear success standards for growth and productivity that are used to “judge” the achievement of reclamation goals. However, going beyond basic requirements, the Sabine Mining Company believes that Reclamation can and should be synonymous with Restoration ~ Restoration of habitat, Restoration of ecosystems ~ and is doing just that by GOING NATIVE through the use of native grasses.

This land has been borrowed and this is the interest that is due: to reclaim the land as good as or *better* than it was before.

Photography provided by Jeremiah McKinney, Blackland and Associates

