

Minimizing the Impacts of Oil and Gas Development

Forrest Smith

Dan L Duncan Endowed Director

South Texas Natives & Texas Native Seeds Projects

Caesar Kleberg Wildlife Research Institute

Texas A&M University-Kingsville



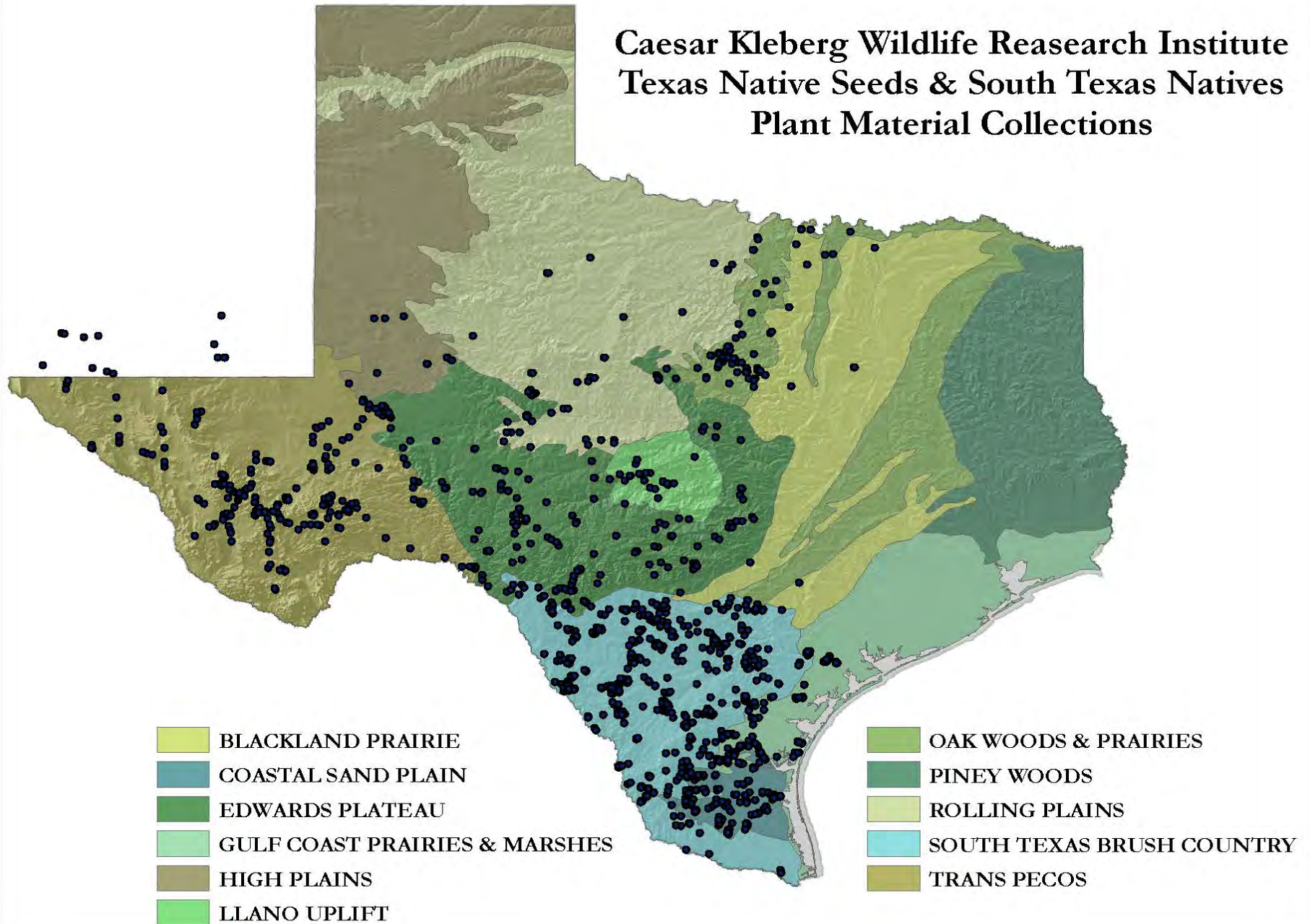


South Texas Natives & Texas Native Seeds Projects

- Mission: *Develop native seed sources for Texas*
 - 30 Commercial native seed sources developed in last 14 yrs
 - Seed for >50,000 acres of plantings available annually
 - Working to develop additional seed sources for Central and West Texas
- What we do:
 - Collect seeds of native plants from wild stands
 - Test, select, and increase suitable populations
 - Provide seed stock to commercial growers for large-scale production
 - Figure out the best methods to use to successfully restore native plants



**Caesar Kleberg Wildlife Research Institute
Texas Native Seeds & South Texas Natives
Plant Material Collections**



Atascosa

Germplasm Texas Grama
Bouteloua rigidifolia Steud.



Balli

Germplasm
Prostrate Bundleflower
Desmanthus virgatus (L.) Wild.
var. *depressus* (Walt.) B.L. Turner



USDA NRCS

Catarina Blend
Bristlegrass
Setaria leucopoda
(Berlin & Morr.) K. Schum.
and
Setaria viridis
(Lam.) Roemer & J.A. Schultes



E. "Kika" de la Garza
Plant Materials Center
Kingsville, Texas



Chaparral

Germplasm Hairy Grama
Bouteloua hirsuta Lag. var. *hirsuta*



Dilley

Germplasm Slender Grama
Bouteloua repens (Kunth) Scribn. & Merr.



Divot

Tallow Weed Blend
Plantago hookeriana Fisch & Mey
Plantago rhodasperma Dcne.



USDA NRCS

Falfurrias
Germplasm

Big Sacaton
Sporobolus wrightii
Munro ex Scribn.



E. "Kika" de la Garza
Plant Materials Center
Kingsville, Texas

USDA NRCS

Goliad Germplasm
Orange Zexmenia



Wedelia texana (A. Gray)
B.L. Turner



USDA NRCS

Hidalgo Germplasm
Multi-flower False
Rhodes Grass



Trichostema pluriflorum Fourn.



Hoverson

Germplasm
Deer pea vetch

Vicia ludoviciana (Nutt.)



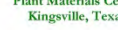
USDA NRCS

Kinney Germplasm
False Rhodes Grass

Trichloris crinita (Lag.) Parodi



E. "Kika" de la Garza
Plant Materials Center
Kingsville, Texas



La Salle

Germplasm Arizona Cottontop
Digitaria californica (Benth.) Henr.



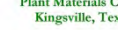
USDA NRCS

Lavaca Germplasm
Canada Wildrye

Elymus canadensis L.



E. "Kika" de la Garza
Plant Materials Center
Kingsville, Texas



USDA NRCS

Mariah Germplasm
Hooded Windmillgrass

Chloris cucullata Bosc.



E. "Kika" de la Garza
Plant Materials Center
Kingsville, Texas



Maverick

Germplasm Pink
Pappusgrass
Pappophorum bicolor
E. Fourn.



USDA NRCS

Oso Germplasm
Hall's Panicum

Panicum halli Vasey
var. *filipes* (Scribn.) Walter



USDA NRCS

Rio Grande
Germplasm
Prairie Acacia

Acacia angustissima (Mill.) Kuntze
var. *nirra* (Nutt.) B.L. Rob.



South Texas

Germplasm
Sideoats Grama
Bouteloua curtipendula (Michx.)
Torr. var. *caespitosa* Gould &
Kopidis



Venado

Germplasm
Awlless Bushsunflower
Simula calca
(Engelm. & A. Gray) A. Gray



Webb

Germplasm Whiplash
Pappusgrass
Pappophorum vaginatum
Buckley



USDA NRCS

Welder Germplasm
Shortspike Windmillgrass

Chloris » subulicostachya Muell.
(pro sp.) [cucullata » verticillata]



Zapata

Germplasm Rio Grande
Clammyweed
Polanisia dodecandra (L.) DC.
ssp. *rigidandensis*







Long and Important Partnership with Texas AgriLife Center in Uvalde



Challenges for oil field restoration:

- Realistic expectations & informed recommendations
 - Lack of objective research
 - Little regulation
- Is the corporate mindset of doing good reaching the ground?
 - Contractors
- What do we think is needed?
 - Better information about restoration
 - Informed private landowners
 - Keep it simple

VOLUNTARY CONSERVATION PRACTICES

Balancing Wildlife Conservation
and Oil and Gas Development
in the Eagle Ford Shale Region
of South Texas



Operations

- Locate fracking ponds in a way that takes advantage of natural features, minimizes soil erosion, and provides lasting benefits to wildlife while also protecting sensitive habitats such as high quality riparian areas.
- Protect sensitive areas such as streams and unique plant communities by avoiding disturbance within or near these features, and when possible during pipeline construction or maintenance, bore under the feature.
- Control soil erosion at all stages of construction and development. Consider natural contours during construction and require procedures to maintain natural contours and drainages. Monitor these processes.
- Construct and operate with short-term, long-term and final reclamation goals in mind.
- Consider aesthetics during construction whenever possible (meandering roads, paint infrastructure with natural colors, noise abatement strategies).
- Take critical steps to control the introduction of exotic/invasive plant species. Use the fundamentals of early detection and rapid control response if exotic/invasive plants are introduced.
- Minimize disturbances to your agricultural operations. Limit during times of the year when these activities would negatively affect traditional uses of the property, such as hunting, farming and livestock production.
- Request the operator to provide a gate guard to control access, minimize traffic, and provide security during high traffic operations.
- Use single-lane roads with turnouts/bypasses to minimize the footprint of roads. Use "invisible" roads where applicable.
- Employ dust control techniques to minimize impacts to air quality.

Reclamation

- Remove development infrastructure from the surface.
- Request re-contour of the site to pre-construction specifications to facilitate the return of the natural landscape.
- Specify reclamation techniques desired.
- Control erosion, including removing, storing and labeling topsoil for future reclamation and vegetation re-establishment.
- Test the soil before attempting reclamation to ensure successful plant establishment is possible.
- Request interim reclamation of areas in and around roads, pads, pipelines and other infrastructure throughout development and production phases.
- Reseed with mixes of locally adapted native species. Order native plant seed mixes one year in advance to ensure availability.
- Control exotic and invasive plant species and monitor for desired results.
- Prepare a firm seed bed and use planting equipment appropriate for the type of seed being planted.
- Use annual cover crops for temporary erosion control.
- Measure reclamation success by plant establishment and survival, erosion control, and water quality.
- Defer livestock grazing to permit adequate plant establishment.
- Ensure abandoned wells are properly plugged and pads reclaimed as required by law.



Seed native grasses using adapted native seed.

Monitoring

- Conduct baseline and follow-up surveys to assess impacts.
- Identify monitoring procedures for adherence to the SUA, construction activities, reclamation results, and potential problems with invasive plants or hazards to wildlife.
- Ensure that monitoring procedures and resulting data are used within an adaptive management context to allow landowners and operators to refine plans to adapt to changing conditions.
- Use remote monitoring where applicable to gauge production and reduce traffic.
- Create a simple, consistent, and predictable monitoring plan with clear guidelines on "what, who, when and how" for use by both the landowner and the operator. Stay engaged and keep communicating.
- Establish a simple reporting system for compliance with the SUA and reclamation plan. Request quarterly or yearly reports.



Monitor restoration results.



©2013 Texas Parks and Wildlife Department PWD BR W7000-2706 (3/13)

In accordance with Texas State Depository Law, this publication is available at the Texas State Publications Clearinghouse and/or Texas Depository Libraries. TFWO receives federal assistance from the U.S. Fish and Wildlife Service and other federal agencies. TFWO is the whole subject to Title 16 of the Code of Federal Regulations, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, in addition to state and discrimination laws. TFWO will comply with state and federal laws prohibiting discrimination based on race, color, national origin, age, sex, or disability. If you believe that you have been discriminated against in any TFWO program, activity or event, you may contact the U.S. Fish and Wildlife Service, Division of Federal Assistance, 4401 N. Fairfax Drive, Mail Stop M652-4003, Arlington, VA 22203, Attention Civil Rights Coordinator for Public Access.



Is this wildlife habitat?



Maybe it could be someday?
8 months ago this was a drilling pad.



Oil pad for 40 years



24 months later







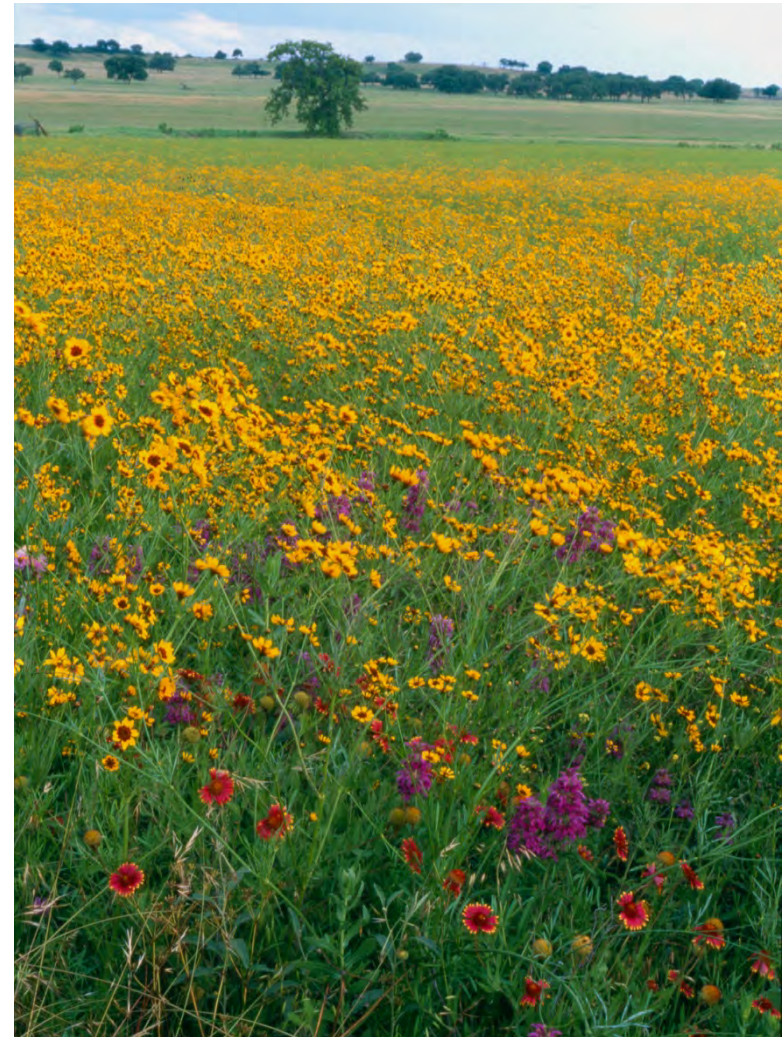


Negotiate the strongest Surface Use Agreement (SUA) Possible

- Be detailed
 - Example: “restore to previous condition” vs. “restore exactly this way using this technique, this seed, this contractor, etc.”
 - Negotiate to be in control of your own restoration (get paid to improve your own land)
- Be specific
 - When, where, how, what, who
- Be diligent in seeing that it is followed
 - Do not assume the plan will be
 - Do not assume anybody but you is concerned with your interests

What are the impacts of oil and gas development?

- Habitat loss:
 - *8-10 acres denuded/well*
- Habitat degradation:
 - *7-20% of surface area direct impact*
- Habitat fragmentation
 - *4,500 ft of road added per well*
 - *8% loss of core areas*
- Soil degradation
 - *Erosion-estimated at 74 tons per acre*
- Invasive species
 - *OWB- occurs in 82% of near-road locations vs. 22% random locations*



Location is everything

- If you can:
 - Avoid high quality habitats
 - Avoid difficult to restore areas
 - Consider aesthetics
 - Prevent fragmentation
 - Consider crossing old pastures/cropland
 - Cheaper
 - Be willing to negotiate

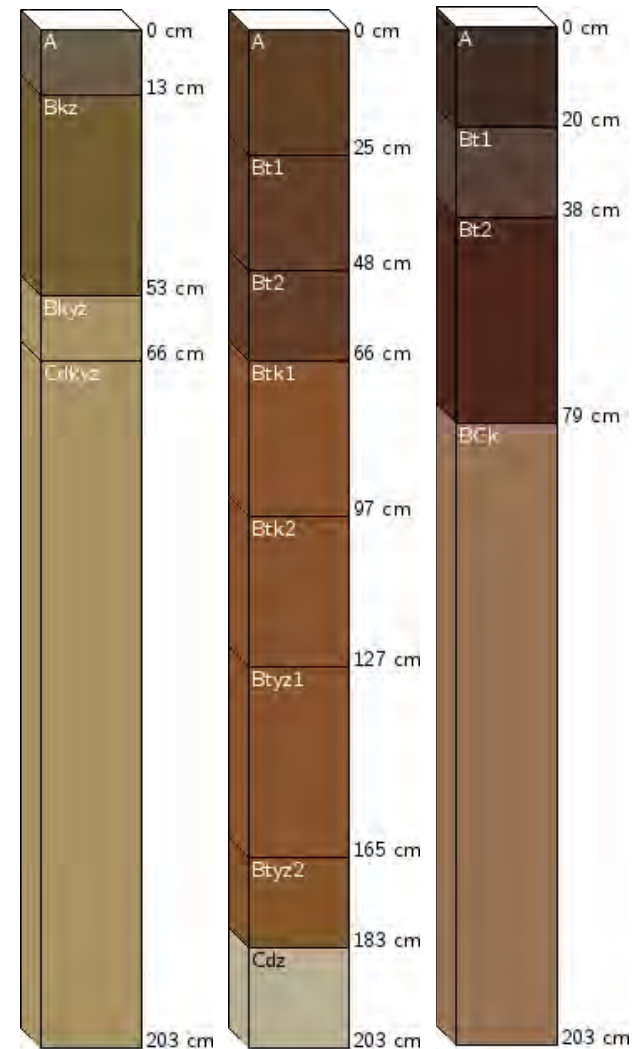






Soils management

- How to clear?
 - Plow/grub
 - Hydro-ax
 - Chemical
- Trenching
 - Blade top 1-6" to the side and windrow (natural seedbank)
 - Double trench/ditch
 - Premise to keep topsoil and subsoil layers separate
 - Soil tests and knowledge of soil profiles is important







1. PROTECT THE TOPSOIL & TEST THE SOIL BEFORE ANY WORK IS DONE



2. PREVENT EXOTIC SPECIES INTRODUCTION



3. Reseeding matters-negotiate for it

Live Oak Co., Texas-Eagle Ford Shale Pipeline
Planted February 2012, photo June 2012

South Texas Natives released seeds

Non-ecotypic native seed mix

Two years later...

Adapted native seed mix planted


“Standard” native seed mix planted



Where native seed used in restoration originated from is very important

L-2123
December 1984

Haskell Sideoats Grama

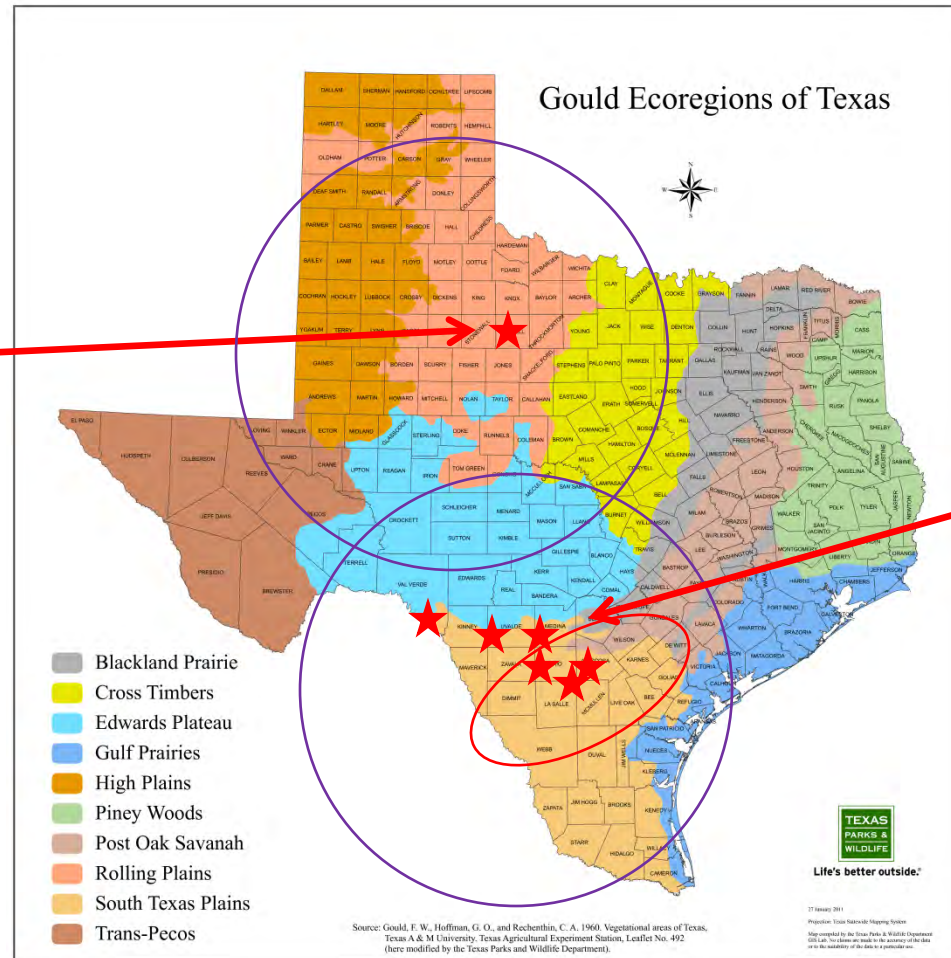


A long-season native, rhizomatous sideoats selection

- High-quality grass for range or pasture uses
- Adapted to Central and South Texas
- Helps control erosion on surface-mined areas

The Texas Agricultural Experiment Station
Neville P. Clarke, Director
The Texas A&M University System
College Station, Texas

In cooperation with the U.S. Department of Agriculture-Soil Conservation Service and USDA-Agricultural Research Service



South Texas Germplasm Sideoats Grama

Bouteloua curtipendula (Michx.)
Torr. var. *caespitosa* Gould &
Kapadia

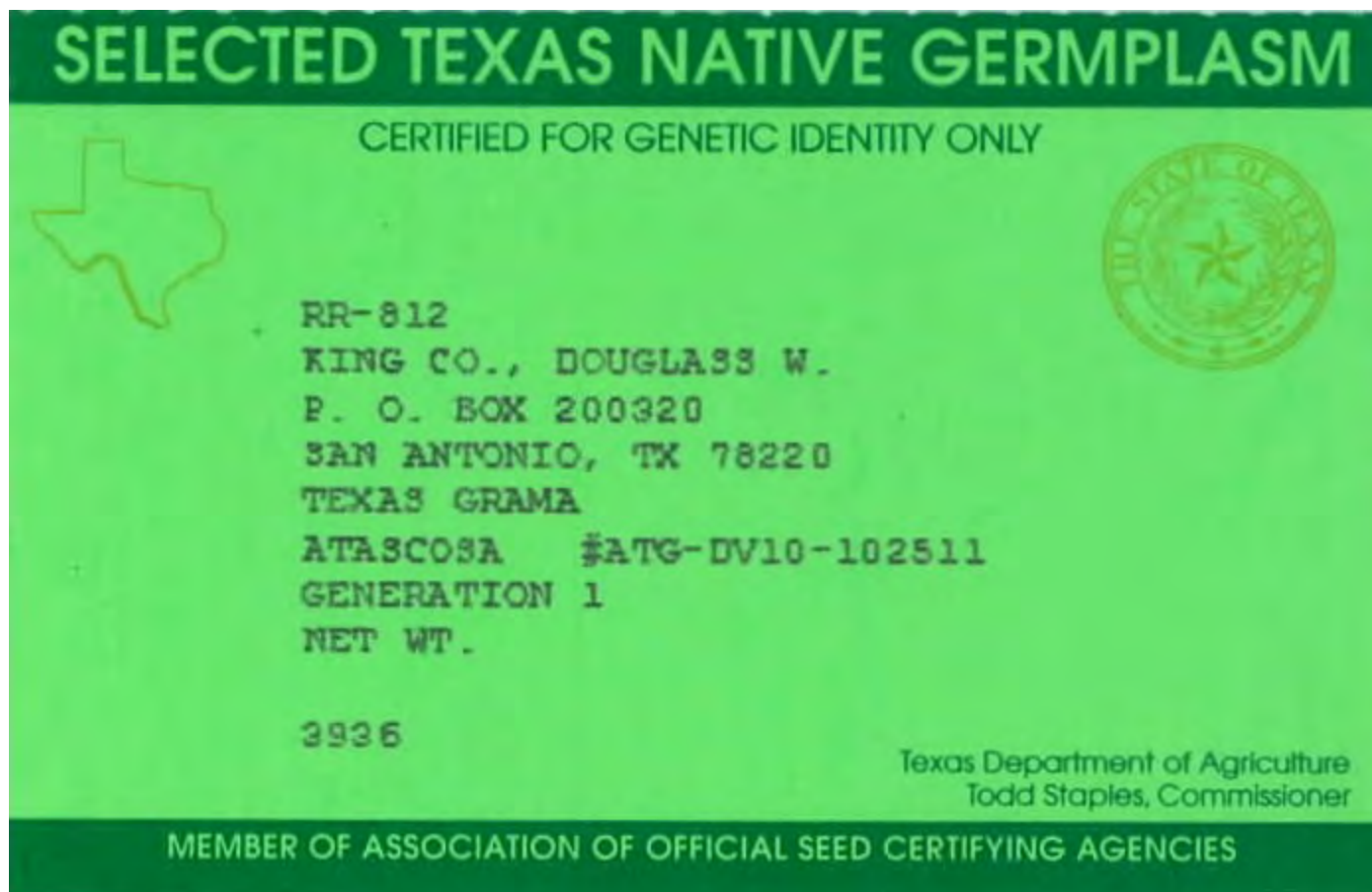


Seed Origin is very important

- Local adaptation is a must for “now” performance
 - *It will “adapt” is a poor strategy!*
- “Native” is a relative term
 - Little bluestem is native from Canada to Mexico
- Location of the seed company *has nothing to do with where seed originated from*
- Ask seed companies for seed origin
 - Seed Certification proves origin
 - Named varieties give assurances
 - If dealer does not know origin and quality of their seed, don’t buy it



Seed quality is also very important



Things to know for today:

- Native Seed supply for South Texas is excellent
 - 2015 was an outstanding production year
 - Douglass King Seed Company is primary vendor
 - 22 different STN releases available
- Seed cost average \$85 per acre, ranging to \$140
- Planting window for 2015 is closed-wait to plant in spring 2016
 - Strong El Nino conditions make spring plantings an excellent option
 - Cooler winter may necessitate later planting dates
 - Prepare seedbeds now, be diligent to control weeds early and often
 - Consider cool season cover crops (small grains)

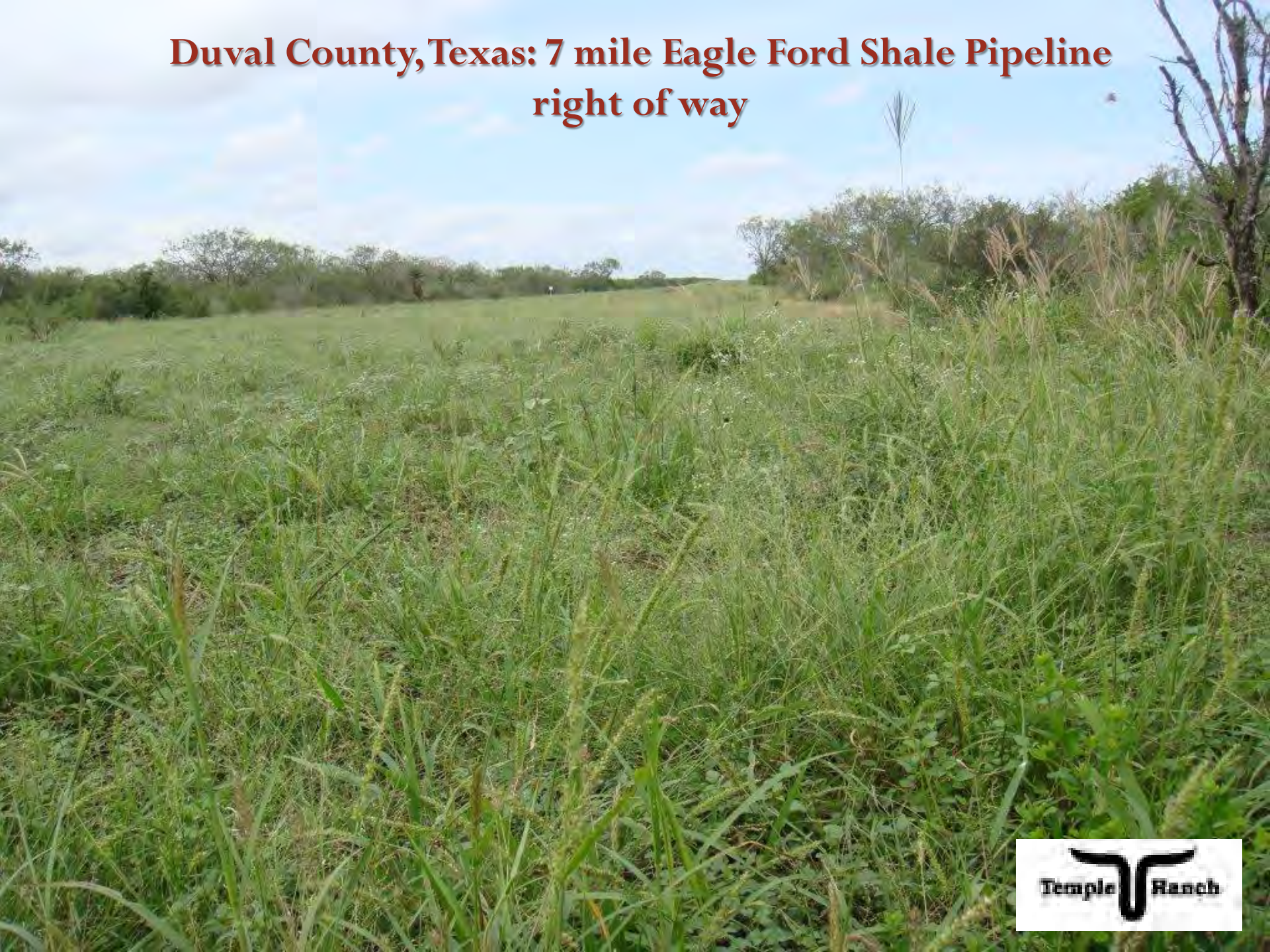
La Salle County, Texas-10 mile Eagle Ford Shale pipeline right of way planted with native grasses



NATIVE
HABITAT
RESTORATION
NHRTEXAS.com



Duval County, Texas: 7 mile Eagle Ford Shale Pipeline right of way



Maverick County, Texas, Drilling Pad Site Restoration



**Kleberg County, TX-Historic Oil Pad/Drilling Site
Restoration, pad from 1960s**



Kleberg County, TX-New pipeline right of way, planted
October 2014



Review

- Negotiate the best possible surface use agreement
- Protect the topsoil
 - Test soil properties before and after
- Reseed using locally adapted, high quality native seeds
 - Use seeds that are ecotypic in origin to your soils and region
 - Buy seed on a Pure Live Seed (PLS) basis
 - Beware of seed without proof cleanliness (use certified seed only)
- Restoration , even improvement ,of lands impacted by oil and gas exploration can be extremely successful

**Uvalde County, Texas-conversion of irrigated cropland
to native grassland for cattle forage and quail habitat**



**Atascosa County, Texas-conversion of marginal
cropland to native grassland for cattle forage and quail
habitat**



For more information or for recommendations:

- <http://ckwri.tamuk.edu/research-programs/south-texas-natives/>
- Email: forrest.smith@tamuk.edu
- For seed mixture recommendations, send GPS coordinate of planting site(s) and planting date

