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Mitigating Oilfield Impacts: the Eagle Ford Shale
Part I: Surface Locations

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We have all heard the old adage, "death from a thousand cuts." Although one would not typically associate this adage with ecology, in the case of the Eagle Ford Shale and its impacts on south Texas, the association is rather clear. No one could foresee the sweeping invasiveness of Eagle Ford Shale development on south Texas. The Eagle Ford Shale has, and will continue to, impact thousands of acres across south Texas and it is our job as land stewards to reclaim and protect the native habitat. As a mentor of mine once said, "the land, habitat, and landowners will be here long after the oil boom!"

Eagle Ford Shale

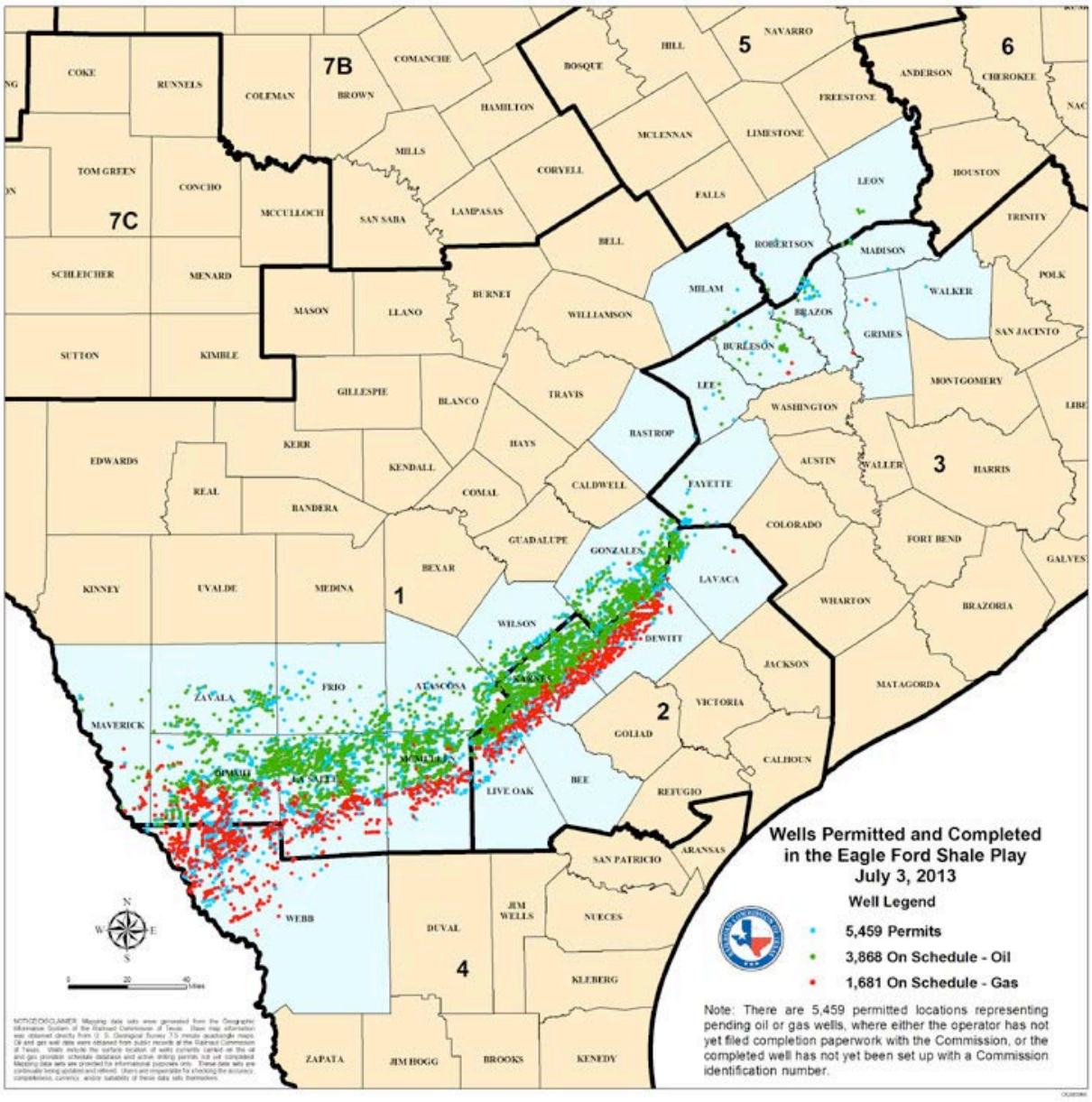
If you live in Texas, you are familiar with the recent oil and gas play, known as the Eagle Ford Shale. It has had a significant impact on the local and national economies, making it a worthwhile venture for years to come. The Eagle Ford Shale stretches southwest from Leon County to Maverick and Webb Counties along the Rio Grande River cutting straight through the heart of south Texas. There were 11,008 permitted oil and gas wells in the Eagle Ford Shale as of July 3, 2013 (Figure 1), with the majority of the wells located in south Texas. Think about how many acres have already been disturbed! Direct impacts on south Texas associated with the Eagle Ford Shale include loss of habitat and fragmentation due to the construction of roads, drilling sites, pipelines, and frac pits. Indirect impacts include soil erosion, the spread of exotic plant species, and increased rainfall run-off.

Deer are a product of their habitat, and because oil field activities impact habitat, it is important for deer managers to reduce the negative impacts as much as possible. As oilfield activity continues to increase in the Eagle Ford Shale, thousands of acres of habitat will be impacted in south Texas. Part I, of a two part series, will take you through some possible steps of Eagle Ford Shale mitigation and reclamation in south Texas associated with new drilling locations and other surface structures such as compressor stations and tank batteries. Part II, which will go out next month, will focus on the steps of Eagle Ford Shale mitigation and reclamation in south Texas associated with flowlines and pipelines.

Each Situation is Unique

The mitigation and reclamation techniques available to each individual, whether a landowner or not, will vary depending on the situation. Factors such as size of the property, available resources, and ownership of mineral rights will determine the degree to which mitigation and reclamation techniques can be applied. Those with mineral rights will likely have more leverage and in turn, more negotiating power in their surface use agreement than those without mineral rights. However, this does mean that those without mineral rights do not have the ability to negotiate a surface use agreement or to reclaim disturbed sites. Whether a landowner has mineral rights or not, it is important to seek legal advice when negotiating a surface use agreement with an oil and gas company.

Figure 1. Permitted oil and gas wells in the Eagle Ford Shale (light blue counties). Courtesy of the Railroad Commission of Texas http://www.rrc.state.tx.us/eagleford/images/EagleFordShalePlay070313-large.jpg.



Mitigation Process

For those impacted by the Eagle Ford Shale, it is important to have a good, detailed Surface Use Agreement. The surface use agreement serves as a "rule book" with which the oil and gas companies must comply when working on your property. Secondly, pre-plan for oil and gas activities by developing a baseline, or checklist, for new surface sites (wells, tank batteries, and compressor stations). When developing a baseline for a new surface site, you should consider the following: sensitive areas of habitat (i.e. no disturbance zones), soil erosion potential, road access, wildlife and grazing impacts, and the reclamation potential of the new site. For landowners, it is important to know what areas of your ranch are designated as sensitive areas where disturbance is prohibited. Riparian habitats, highly diverse, native plant communities, and areas near water sources would all be examples of no disturbance zones. Developing a map of no disturbance zones on your ranch will make it much easier to determine whether or not a new surface site lies within these zones. Moreover, the mitigation process can be made easier by providing a "no disturbance zone" map to the oil company beforehand.

Each new surface site brings the potential for soil erosion and soil is in most cases, irreplaceable. Try to position new surface sites in flat areas and not in areas with a slope. Furthermore, try not to position new surface sites in a water shed, or an area where water flow is high. If a new surface site is positioned in an area where slope is a concern, use soil erosion blankets to mitigate erosion. Sloped areas can be seeded and then covered with soil erosion blankets to help establish vegetation.

Remember, each new drilling site will have to be accessible to the oil company, and in turn, require a road. Use existing ranch roads as much as possible, and if a new road is required, make sure the oil and gas company takes the necessary steps to install the road properly. When building a new road, keep in mind factors such as erosion, topography (steep versus shallow slopes), water runoff, and sensitive habitat types. Additionally, think about using techniques that will decrease the flow of water on the road and shed water off the road; thereby capturing the water in the pasture where it will be useful.

The reclamation potential of a new surface site is dependent on the existing soils and plant community. Some locations will reclaim much faster than others; however, try to steer clear of highly productive plant communities. Remember, the fastest way to reclaim an area is to not disturb it in the first place. In some cases, a new surface site can be used to your advantage when it comes to reclamation. In other words, you can position a surface site on a degraded range site, or in an exotic grass monoculture, in hopes of adding diversity and stabilizing the plant community when reclaiming the location.

One last mitigation step to consider is the development of an "oil field corridor." An oil field corridor is an area on your property of concentrated oil and gas activity which localizes disturbance and reduces habitat fragmentation. For example, a strip along a property boundary would be a good oil field corridor because it would concentrate all activity along your property boundary, leaving the interior of your property undisturbed.

Reclamation Techniques

The mitigation process and reclamation techniques go hand in hand. Along with choosing a suitable site, certain techniques can be used to enhance the site's reclamation potential. If

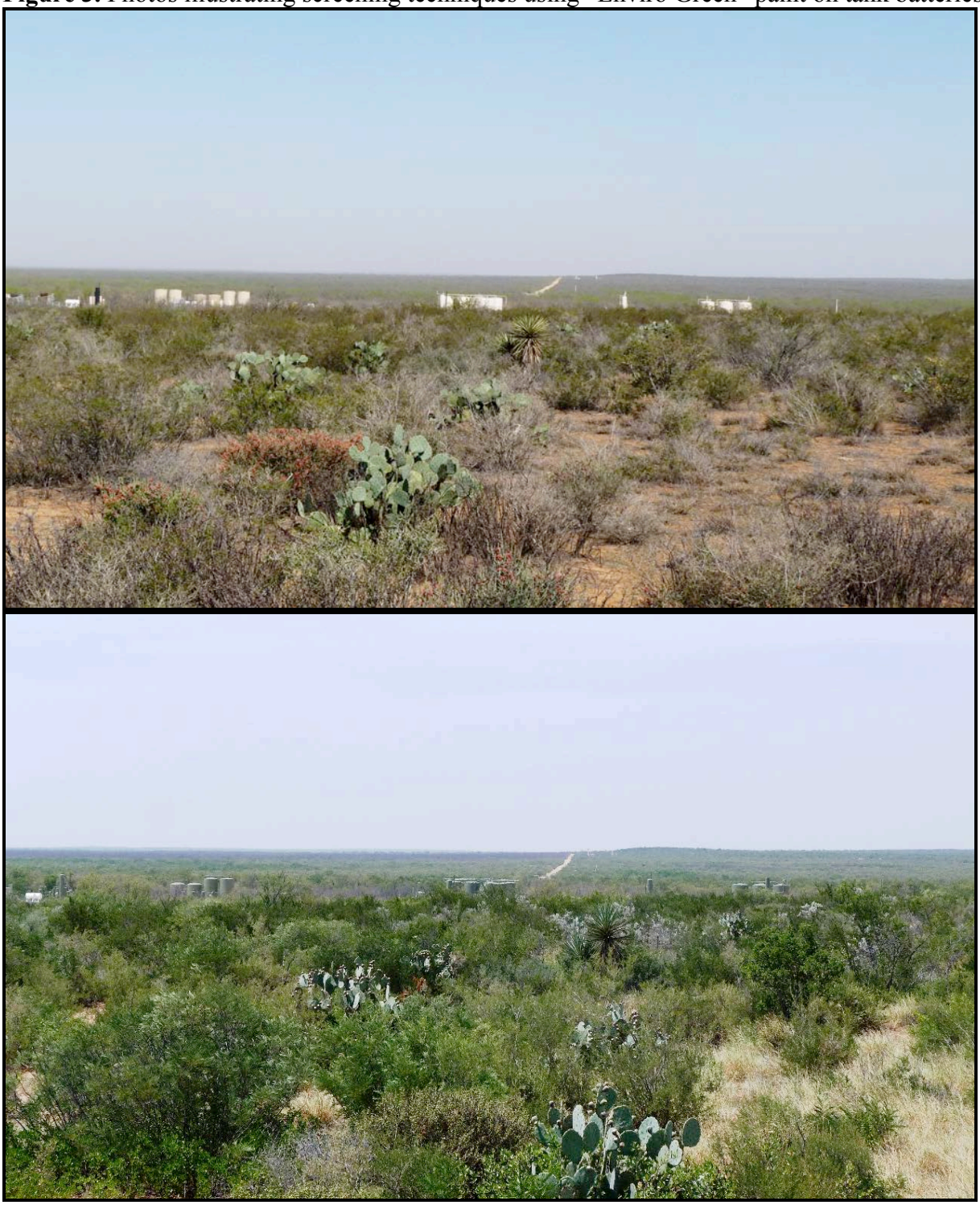
environmental friendly base, such as wooden drilling mats (Figure 2). Before a surface site is constructed, whether the base will be caliche, gravel, or wooden mats, remove and stockpile as much topsoil as possible. This will keep the topsoil from mixing with the caliche or gravel, or in the case of wooden mats, keep the topsoil from compacting or becoming contaminated if a spill occurs. Make sure all equipment used to construct the site has been steamed cleaned to eliminate the spread of invasive plant species.

Figure 2. Reclaimed well location where wooden drilling mats were used for a base, rather than caliche or gravel.

Once the surface site has been completed and is no longer in use, remove the base and re-distribute the topsoil back over the site. Once the topsoil has been spread out evenly and the site leveled, you can then re-seed the site with a native seed mix. It is important to design a native seed mix with the plant species that are compatible with the soil type of the area being re-seeded. Additionally, you should use an ecotype for the region in which your ranch is located. South Texas Natives and Douglas King Seed Company and Pogue carry a variety of native plant species that are compatible with south Texas. Also, don't be afraid to experiment with numerous native plant species in your seed mix; it may take several locations before you develop a seed mix best suited for your situation.

Lastly, have the oil company paint the well head, the fence around the well head, tank battery, and other surface structures a color that blends with the landscape. By doing this, the reclaimed drilling location or tank battery takes on a more natural appearance and in turn, is less noticeable (Figure 3).

Figure 3. Photos illustrating screening techniques using “Enviro Green” paint on tank batteries.



Monitoring

Before construction of a new surface site, take an inventory of the plant species currently existing on the location and several photos of the site. Both will prove valuable in the long term, allowing you to compare the plant community before and after construction. Furthermore, you can determine if the construction process aided in the establishment of exotic plant species. If exotic plant species were not present prior to construction of the new surface site but appeared

important to monitor your reclamation success over time. This allows you to assess the success of your reclamation and to make future adjustments. The easiest way to monitor your reclamation is through photo points. Before construction, establish a photo point that will capture the pre-construction, pre-reclamation, and post reclamation phases of the new drilling site (Figures 4 and 5).

Figure 4. Photo point illustrating the pre-construction and construction phase of a new drilling location in the Eagle Ford Shale. Note the bulldozer in the background of the second photo is stockpiling topsoil before the base material is laid.

Figure 5. Photo point illustrating drilling site recovery over time. Note the well head in the second photo has been painted “Enviro Green” to help blend in with the landscape.

Deer Management and the EFS

So, how do the aforementioned impacts of oil and gas activity in South Texas affect deer? Well, as with any other species, deer need habitat for survival and production. Furthermore, as previously mentioned in other Deer eNews articles, native habitat is preferred by deer. Remember, not all deer have access to supplemental feed as a result of social interactions and other factors, and such deer depend on the native plant community to provide them with adequate nutrition.

Deer are adaptable; however, preserving as much native habitat as possible and eliminating the spread of exotic plant species will benefit your deer herd in the long run. We are all aware of the threat that exotic plant species pose to the native habitat in South Texas; however, I think it is safe to say that activity associated with the Eagle Ford Shale poses a much more significant threat. The Eagle Ford Shale is here to stay and its impacts will be felt long after the last oil well is drilled. By planning before the first equipment moves onto your property, being creative and steadfast in minimizing impacts, and reclaiming disturbed sites, the Eagle Ford Shale's negative impacts on wildlife and habitat will be manageable.