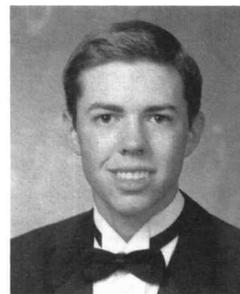


# Teamwork Solves: A Case Study in Stewardship and Management

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The most important legacy my generation can leave to its descendants is one of stewardship. We are placed on this earth only for a short time, and we must not leave it in worse shape than we received it. If any change in the land should come about during our stay, that change should be for the better. I know that this is an almost impossible standard to keep, because progress is inevitable, and some progress destroys the land. However, we should keep this degrading effect to a minimum, because what else but the earth, especially the soil, can give us food, shelter, and comfort?

Not only must we take care in not spoiling our living space, we must also reclaim that which was ruined in the past. I realize the fact that the reclamation of land rendered useless by our forefathers is a tremendous task. However, I also believe such an undertaking is possible, because I have witnessed such an example.

Approximately sixty years ago my great grandfather purchased a 365 acre farm in Jack County, Texas. In the 1940's a major oil company found oil on the land. Due to the length of time petroleum has been produced from our land, my family has seen many of the adverse effects of oil production.



During the 1960's and 1970's, when production suffered, the producers used a method called "waterflood" to increase output from the wells. Waterflood entails the pumping of saltwater down an injection well into an oil shale formation. Since most oil in Texas is found in salt formations deep underground, the excess water discharged from the well with the oil contained dissolved salt. Because this "saltwater" was poisonous to plant life, oil companies pumped it to a holding tank and from there back underground. Due to the corrosive properties of salt and the high pressure in the lines, leaks were common. The saltwater shooting from a hole in a pipe would spray twenty to thirty feet into the air. This is how the adverse effects of oil production became blatantly obvious on our farm.

When the saltwater hit the ground it covered the plants and soaked into the soil. Within days, all plants having soaked up even a small amount of salt from the soil were dead. Since the soil was also saturated with salt, no new plants could establish. What I have just described is a "salt kill." The salt kill on our farm covered less than one acre, but it affected a much larger area, because it created a

"critical area." A critical area is especially prone to erosion due to mismanagement at the hands of man and characteristically develops gullies. In our particular case, the steep slopes above the salt kill, combined with the loss of vegetation, created a perpetually worsening condition. Under normal conditions, water flowing from adjacent hills would travel through an area covered in grass. This would ensure that at least some of the water would be soaked into the soil, and that the rest would be slowed down and dispersed on the slight slope below. There were small gullies and rills formed from large rainstorms, but nothing more serious than that. May I share with you an amazing fact? Nature seldom creates a problem she cannot control! We should learn a lesson from her example.

The conditions created by the salt kill were anything but controlled. Water flowing off the slope gathered speed across the barren area, creating deeper and deeper channels and carrying with it deadly salt that had soaked into the soil. The gullies stretched several thousand feet across our land, sometimes reaching depths of five to eight feet.

This is the situation my dad was faced with when he took over the cattle operation from my Granddad in 1994. My dad's first reaction when he saw the erosion and realized the extent of the problem was dismay. His second reaction was to resolve the problem by seeking as much input and advice as possible. The first step to solving any erosion problem is recognizing that it will not solve itself. The second step involves securing knowledgeable help on how to solve it. To that end we called our district conservationist with the Natural Resources Conservation Service and asked him to help in devising a plan to correct the problem.

The conservationist proposed a plan with a projected cost well above my dad's expectations and resources. Fortunately, we were able to secure financial help from the oil company initially responsible for the damage. They sent an environmental engineer to personally take a look at the problem area and to assess the workability of the plan proposed by the conservationist. The engineer was pleased with the opportunity his company had to assist in solving the erosion problems created earlier and to help a landowner reclaim unusable land.

The third and most important step to solving an erosion crisis is to take action. The plan proposed and finally implemented was based on soil tests taken at selected sites in the general area. The soil tests determined the amount of salt dissolved in the soil at the tested sites. Drawing from

the information derived from the soil tests, we could see that there were several "hot spots," where there was no hope of establishing plants in the near future. On the other hand, the majority of the tested sites showed barely enough salinity to hinder plant growth. The plan called for the application of gypsum to the soil in these areas to increase the permeability of the soil through chemical means. Because of its solubility, low cost, and availability, gypsum is the most commonly used agent to reclaim salt affected soil. In essence, the gypsum reduced the amount of salt that could be absorbed by a plant by allowing the salt to be leached down through the soil profile.

This is a good method of reclaiming soils with relatively low salinity, but on the hot spots, it would take an impractical amount of time to leach out all of the salt. Accordingly, the plan called for the construction of three erosion control structures to catch the runoff water containing dissolved salt from those areas. Two erosion control dams were built at the upper end of the drainage area, immediately over two hot spots. Not only do these dams control salt distribution, they also reduce the amount of sediment and slow runoff to allow the vegetation to establish. With the third structure, called a basin diversion, even with the application of gypsum, salt content would be too high for successful vegetation efforts. Less runoff from the top of the watershed would also aid in revegetation efforts downstream.

Although we now had the upstream structures controlling excess runoff, we still had those deep gullies to contend with. If those areas were left uncorrected, the rate of erosion for the area would still be problematic. The gullies were reshaped in these critical areas by bulldozer to make the slopes more gentle, thereby slowing runoff and easing the stress on future vegetation.

The last step in reclamation of the critical area was to establish a stable stand of grasses. We sprigged bermudagrass and native grasses that were tolerant to salt and achieved about 70 percent coverage. There were still places where the water was causing erosion on the uncovered areas. To correct this problem, we placed hay bales and built small gravel levees at strategic locations to slow water flow and catch sediment. To protect the new stand of grass from our cattle, an electric fence was built around the newly planted area. This worked very well, enabling the grass to recover without the stress of grazing.

Early on I spoke of the legacy of the land and our responsibilities as caretakers. I used the word "we" in an effort to explain that we are all in this together. Whenever rangeland is ravaged by progress, we must band together to solve the problem. We must be prepared to lessen the environmental impacts of our actions.

In summary:

- (1) Stewardship of the land should be a priority.
- (2) We must all help to repair the damage done by our fellow man.
- (3) Progress will inevitably foul the environment, but we can minimize the effect.
- (4) These mandates are our duty, because future generations depend on us.

I believe the landowner, the oil company, and other concerned parties can and must work together in solving man-made problems affecting our natural resources.

**Editor's Note:** This paper was the 3rd place winner of the High School Youth Forum presentations at the SRM Annual Meeting in Wichita, Kansas.

