

The Promise of Water: Restoration of Duff Springs

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article & photos by Bonnie J. Warnock

When I first saw Duff Springs in central Brewster County, the Trans-Pecos was at the end of one of the worst droughts on record. Ten years of low rainfall and the long transition from grassland to shrubland had combined to decrease spring flow dramatically.

Historically, the spring flowed over two miles and literally was an oasis. But by spring 2002, all that remained of Duff Springs was a series of small pools spread out across a half-mile of stream channel.

The upland habitat consisted primarily of bare ground and mesquite, the stream banks were mostly bare soil with a few willows, and the sole cottonwood had one living branch. In cooperation with the O2 Ranch and the F. E. Lykes Foundation, we developed and initiated a restoration plan for Duff Springs in 2003.

The restoration work was performed on approximately 1,500 acres surrounding Duff Springs where four major vegetation types and seven soil series occur. The riparian channel and surrounding desert grassland were selected for restoration because of their deep, loamy soils. Reclaiming the brush-encroached grassland also had the potential to increase water flow in Duff Springs and directly impact the shallow, 30- to 45-foot deep water table.

Prior to restoration, vegetation transects were randomly located through the grassland to determine the amount of bare ground, grass, and shrubs on the site. These areas would serve as benchmarks and track changes in the plant community. Groundwater levels and rainfall and weather conditions were also monitored.

In June 2004, a combination of Reclaim® and Remedy® herbicides were aerially applied to 300 acres of Torrey mes-



Following habitat restoration, running water has returned to Duff Springs. Live water is found throughout the year for over two miles from the spring.

quite located in the uplands habitats from the stream channel. Application rates followed those of the Texas Agricultural Extension Service and were applied before 1 p.m., with humidity greater than 20 percent, air temperatures less than 95 degrees F., and wind speeds less than seven mph.

Following herbicide applications, in July 2004, native seeds of four-wing saltbush and alkali sacaton were scattered in natural depressions across the sprayed area. Willow cuttings and cottonwood seedlings were also planted along the riparian channel in 2006 to increase bank stabilization and provide habitat for wintering and migratory birds.

In less than two years, restoration of Duff Springs was well on its way. Grass cover in the upland sites had increased from seven to 60 percent, while bare ground had decreased from 63 to 31 percent. Shrub coverage also changed from 46 to 31 percent. Mesquite dominated the

shrub community prior to herbicide treatment at 56 percent, but two years after treatment, four-wing saltbush was the dominant shrub at 37 percent. Following herbicide treatment, apparent mesquite mortality was 88 percent, but by 2006, the mortality rate had decreased to 51 percent.

The drastic change in vegetation (coupled with a break in the drought) had a direct impact on the flow of Duff Springs. By the end of 2004, flow had increased from still pools to a stream of water flowing over two miles. The spring has maintained this flow to the present.

The increase in water, grass, and vertical structure provided by the riparian habitat has also changed the wildlife community in and around Duff Springs. We have documented nesting by yellow-billed cuckoos, painted buntings, and many other migratory birds. Pronghorn and mule deer habitat has also been increased dramatically due to the decrease in shrubs and the increase in water. ♪

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