



ELKHORN RANCH BRUSH CLEAR CASE STUDY April 19, 2018

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Story Map and Mesquite Density Analysis by Robert Davis, Quiet Creek Remote Sensing and Geospatial Analysis

Background

- Miller family purchased Elkhorn Ranch in 1945 to operate guest ranch and raise horses and cattle.
- Cattle removed from the operation in the early 1980s as grazing program not sustainable.
- Since then ranch has supported approximately 115-125 saddle horses and breeding stock on approximately 10,000 acres.
- Rangeland monitoring began in 1983 in coordination with US Natural Resource Conservation Service (NRCS).

How to increase rangeland productivity of ranch? Woody vegetation reduction!

- Dan Robinett and Charley Miller designed brush removal project on 10% of ranch.
- Mechanical brush work was done between 1984 and 1990 on about 1000 acres.
- Previous to treatment, mesquite density well over 50% with severe gully erosion and no understory vegetation.
- Cleared vegetation pushed into gullies to treat erosion.
- Belts of woody vegetation left along drainage corridors for wildlife habitat diversity.

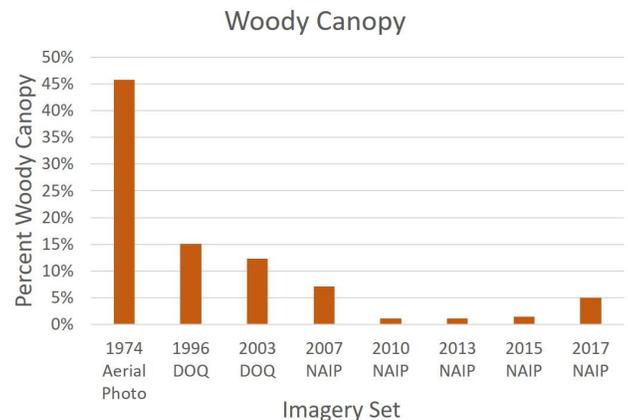
The Maintenance Challenge

- Original plan was to utilize prescribed fire to maintain cleared areas – proved impossible.
- Retreatment with backpack sprayer using Tordon began in 2002 and continues today.
- Follow up treatment with Remedy began in 2004 – two treatments necessary.
- These areas to the right have all had these treatments.

Comparing aerial imagery over time provides an objective view of change over time on the landscape

Randomly selected for imagery and GIS spatial analysis. Plot was buffered in a bit to reduce analysis problems associated with shadows, etc.

- 1974: 46% woody vegetation – before treatment (1974 USGS imagery (wet film at 15,000 feet with 150 mm lens)
- 1996: 15% woody vegetation – after mechanical treatment (1996 USGS imagery (DOQ 1-meter)
- 2003: 12% woody vegetation – after tordon treatment began in 2002 (2003 USGS image (DOQ, 1-meter)
- 2007: 7% woody vegetation – after remedy treatment began in 2004 (2007 USGS imagery (1-meter NAIP)
- 2010: 1.1% woody vegetation – after 2009 wildfire (2010 USGS image (NAIP 1-meter)
- 2017: 5% Woody Vegetation - This may be do to the almost 3X increase in pixel resolution (from 1-meter to 0.6 meters) (2017 USGS image (NAIP 0.6 meters)



Conclusion

- Treating 10% of the ranch for brush control has effectively improved rangeland condition on 100% of the ranch.
 - Higher productivity in treated areas.
 - Reversed gully erosion trends.
 - Increased range management & pasture rotation flexibility.
 - Recovery of native species in untreated areas.
- Together with AVCA partners, exploring use of other techniques such as Pig Mountain prescribed fire (planned for May 2018) and aerial application of Sendero (planned for 2019)
- Numerous important research topics.
 - Consideration of woody vegetation management goals and techniques related to soil type, canopy density and rainfall patterns.
 - Economic aspects of different treatments.
 - Integrated treatment of woody vegetation, erosion control and water retention.
 - Role of mesquite as nurse plants for native grasses in some areas.
 - Seeding strategies – if not Lehmanns love grass, then what?