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# **Resolving the manager's dilemma: utilizing an integrated approach to attain complementary objectives of conservation and cash flow**

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**Keywords:** management; integration; balance

## **Abstract**

Vermejo Park Ranch is the largest of several ranching properties owned by billionaire philanthropist R. E. "Ted" Turner. By his design, its mission is to balance ecological sensitivity and economic sustainability using native species. The property manager and employees at Vermejo Park have taken this challenge seriously and now utilize an integrated approach to attain the dual objectives of conservation and cash flow. The centerpiece of this effort is a management tool and process that addresses the underlying ecological condition and history as well as the site potential and looks to influence natural processes to promote better nutrient cycling, water infiltration and flow, and target species dynamics. This presentation provides an overview of the natural resource context and challenges and current management efforts underway as well as a brief introduction to the Land Enterprise Economic Health Analysis used to preserve both environmental values and operating profits.

## **Introduction**

Vermejo Park Ranch (VPR) is 592,823 acres (239,103 hectare) in size and is located in north central New Mexico, USA; and its elevation ranging from 6,400 to 12,900 feet (1,950 to 3,930 meters). The ranch has a wide variety and abundance of natural resources occurring in 6 ecological zones (Merriam's life zones), which are Semi-Arid Grasslands (Short Grass Prairie); Pinion Juniper Woodlands; Ponderosa Pine Forests; mixed conifer Forests; Sub-

Alpine Conifer (Spruce-Fir); and Alpine tundra. It is home to approximately 262 species of birds, 76 species of mammals, 30 species of fish, 20 species of reptiles, 8 species of amphibians, 32 species of mollusks and 275 species of insects.

Hunting, fishing, bison and timber production, nature and education tourism programs, and coal bed methane gas extraction are the primary sources economic returns are derived from. Because of its size and the diversity of the ecologic systems, the ranches management and operation is complex.

The over-arching mission of the landowner is: “To manage the property in an Ecologically Sensitive and Economically Sustainable manner while Conserving Native Species.” In trying to strike a balance between “Ecological Sensitivity and Economical Sustainability” many possible compromises emerge. The dilemma is, how does the manager know when the level of extraction or use of the natural resources for economic purposes crosses into that “Ecologically Sensitive” zone; and how far into this zone, and for how long of a period of time can activities for economic gain occur before sustainability is compromised?

## **The dilemma**

It is important to recognize that ultimately it is the health & functionality of the landscape through time that determines its capability for supporting plant and animal communities, and thus, products and conditions for economic sustainability. That is, vegetation mosaic, patch size, species composition, seral stages of vegetation, and condition of the forage component, that determines the character of the landscape, and thus its carrying capacity. The diversity and condition of plant and animal populations living in the ecosystem, their size and positive or negative synergies (balance) among them can affect their health, and sustainability as well as the health and viability of the landscape that sustain them. It is also important to recognize that once resource degradation has occurred because of ecological imbalance for years or decades, it will likely take years or decades before even the best management practices can restore conditions to a desired level.

To ease the dilemma, making it possible to effectively use an integrated approach to attain complementary objectives of conservation and cash flow, it is important and necessary to have a basic knowledge and understanding of key ecological processes and how they function to create and sustain a healthy ecosystem and landscape. It is also helpful to have some idea about the Historic Range of Variability (HRV) of the ecosystems; which defines the current state of the ecosystem in relationship to the past; the dynamic nature of ecosystems; the processes that sustain and change ecosystems; and the possible ranges of conditions that are feasible to create and maintain. This information allows us to obtain either a quantitative or qualitative measure of where the zone or threshold of sustainability is on the “Ecologically Sensitive” and “Economically Sustainability” spectrum.

## **The solution**

We (VPR) are taking a landscape-level approach to resource management. In the past, because of the lack of ecological knowledge and understanding, budgetary, personnel, and in some cases political and legal constraints, it has been customary to work on a project-by-project basis. This approach can lead to problems such as managing resources for a single use and inadvertently negatively affecting other resources, failing to monitor and learn from our mistakes, or working against natural processes. By working on a landscape or watershed scale, the focus of management is broadened from single-issue management to overall land health and ecosystem function. This large-scale, comprehensive approach allows us to assess resource conditions, quantify impacts, identify thresholds, and make informed decisions concerning overall landscape function and health. It give us a better understanding of the overall picture, and thus of where the “ecological” and “economic” thresholds are likely to be.

On VPR, it appears that past logging activities, historic livestock grazing, and fire suppression were the three factors that have caused the most significant vegetative changes on the ranch from Historic Times. These activities have changed the character and functionally of the ranch landscape, including the fire regime in most vegetation types.

### *Past logging*

Broad scale logging in the late 1800's and early 1900's removed a large portion of the mature Ponderosa pine and Doug fir trees from many parts of the ranch. This activity pushed vegetative conditions outside the HRV. Large portions of the ranch supporting these species were set back ecologically to an early seral stage. The amount of area affected in this short period of time was much larger, and more continuous than what would have normally been produced by the natural disturbance regime. Now there is little diversity in timber age, composition, and structure. Most all of these areas support pine trees from 85-120 years old. The normal amounts of expected seral stages are not present in the stands, and the mosaic is out of character for supporting some key wildlife species, especially mule deer. However, some species like elk, that do better in habitats that consist of later seral stages, and larger sized, denser patches of vegetation have benefited greatly

### *Past grazing management*

The rangelands, woodlands, and grazeable forestlands on the ranch have been exposed to livestock grazing for approximately 160 years due to the pattern of settlement and easy accessibility to grazing. Severe overgrazing on the ranch followed settlement, caused by a long history of unmanaged livestock grazing, especially in spring and summer. Changes in vegetation species composition especially cool season grasses and forbs and some shrubs are still apparent. Since TEI ownership no authorized livestock grazing has occurred on the ranch. Also, believed to be associated with poorly managed livestock grazing is the heavy encroachment of young ponderosa pine and pinyon & juniper trees into many areas.

### *Fire suppression*

Fire suppression since the early 1900's has altered the normal pattern of fire in the disturbance regime in most vegetation types. This has resulted in alteration stand structure and dynamics thus changing the way fire normally occurs. The resulting changes in the fire return intervals and burn intensity, has changed the vegetation species composition, structure and site dynamics.

As a result of the above activities having occurred, VPR resource managers believe the following are major changes from HRV on the ranch. These changes are based mostly on qualitative judgment, and are not yet fully scientifically established. As scientific information becomes available, or improves, adjustments will be made.

1. Vegetation across the landscape is aging, with a greater portion of the area in later seral stages, and a smaller area in early seral stages, and with less structure and age diversity, and the mosaic is shifting toward a larger patch sizes.
2. Elk numbers have increased dramatically from historic times. This change is due to the interaction of several factors; 1) transplants in the early 1900's, 2) establishment of game laws & regulations with subsequent law enforcement, and predator control by the NM Department of Game & Fish and landowners, 3) the improvement of habitat quality that resulted from the early logging and livestock grazing, 4) fire suppression since the early 1900's, and 5) the changed fire regime due to the effects of logging and grazing.
3. Large areas of the ponderosa pine are in even-aged, dense stand conditions, without much age class or structural diversity, and the mosaic is shifting toward a larger patch sizes. Historically ponderosa stands likely had a mosaic of much greater diversity in age and patch size, and with a more patchy distribution. Historic logging practices in particular, coupled with historic livestock grazing and fire suppression, have resulted in creating conditions that have increased the potential of large stand-replacing fires and/or heavy mortality from insects.
4. The quantity and quality of browse stands has steadily decline during the past 70-80 years, due to fire suppression, historic livestock grazing, historic high numbers of mule deer, and recent high numbers of elk. Thus, 1) fire has not occurred in its normal sequence to re-set plant succession to create new patches where new browse plants will grow, and 2) mule deer, elk, and livestock have continued to browse at heavy levels on a shrinking forage resource, 3) Ponderosa and pinyon pine trees are encroaching into, and gradually replacing many browse stands.

5. Aspen is declining in quantity and quality due to the lack of disturbance. A large percentage of aspen is old and even-aged, and was initiated by large stand replacing events in the late 1800's. Some of the largest fires in that time period occurred in 1879. Aspen stands are seral stands resulting from fire disturbance, and occur mostly within conifer stands.
  
6. Vegetation along many historic riparian areas has been severely damaged or destroyed due to previous livestock grazing, high elk numbers, diverting water, and the moving of stream channels to accommodate farming practices.

Trends and implications of these changes are:

1. Current vegetation patterns, both natural and human induced, have changed fire regimes for most vegetation types, heightening the risk of uncontrollable wildfire, and the spread of insects and tree disease,
2. Wildlife habitat values, and their arrangement on the landscape have and will continue to effect wildlife distribution and abundance, and
3. Abundance and distribution of forest products and their values have changed, creating a need to intensify forest management to improve conditions in order to create a sustainable timber harvest program and improved water infiltration system with a lower transpiration coefficient.
4. The quality and distribution of riparian and aspen areas for capturing rainfall and sequestering water on the property will continue to be limited without significant management changes.

## **Conclusion**

This presentation discusses the management approach now underway at VPR and introduces a specific management tool developed from an extrapolation of Stan Parson's enterprise management model to include both cash and non-cash transfer values and adaptable to non-financial currencies such as aesthetics, conservation values, and other critical decision-making components.

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